Multistorey Car Park Design and Construction Standards (G214)

Government of South Australia
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1 INTRODUCTION

The Department of Infrastructure and Transport (DIT) manages the design and construction of multistorey car parking for various SA Government Client Agencies.

Public Transport South Australia (PTSA) also manages the construction, operation, and maintenance of bus Park & Ride interchanges and multistorey car parking in the Adelaide Metropolitan Public Transport Network.

For Public Transport South Australia (PTSA) projects refer to AM5-DOC-003705 Addendum to DIT Multistorey Carparking Design and Construction Standards for Public Transport.

1.1 Purpose

The purpose of this standard is to specify the scope, character, performance, and quality requirements for the design and construction and delivery of multistorey car parking facilities for the Department of Infrastructure and Transport (DIT) Building Projects.

It serves to provide quantitative and qualitative information of the key project requirements and will be referenced during the design through to final handover. For PTSA projects the DIT Master Specification DIT Master Specification - Department for Infrastructure and Transport - South Australia.

This standard must be read in conjunction with the DIT Preliminaries, General Requirements, Demolition specifications and all other Contract documents.

Multistorey car parks are also required to be designed and constructed in accordance with all relevant approvals, codes, standards, and practices. The carpark must be designed to ensure it can be built, operated, and maintained in a safe manner. This includes public, staff, and service providers.

Written approval is required from DIT for all departures to the requirements of this guidenote.

1.2 Scope

This guide note applies to all new and upgraded multistorey car parking designed and construction for DIT Building Projects and includes references to multistorey car parking for public transport infrastructure buildings managed by PTSA.

1.3 Objectives

The car park design objectives are as follows:

- to meet the need to enhance and expand parking facilities by improving accessibility for all car carpark users.
- providing safe and secure undercover on-site public and staff parking facilities
- maintain a safe and secure environment both within, and adjacent the Site.
- to deliver a high quality, robust built form that responds to the site and local context.

1.4 General Requirements

The Designer/Contractor shall comply with all relevant DIT publications, policies, and guide notes. They can be found on the DIT website at Information and Documents for Contractors - Department for Infrastructure and Transport - South Australia (dit.sa.gov.au)

In some cases, the Engineering Standards states requirements in excess of statutory and / or Australian Standards requirements; in these cases, the greater requirement shall apply.

2 REFERENCE REQUIREMENTS

2.1 Design and Construction Standards

In addition to all statutory and authority requirements, the carpark must comply with the following Codes and Standards as a minimum:

Australian Standards

- AS 1428 (all relevant parts) - Design for access and mobility
- AS/NZS 1680 (all relevant parts) - Interior lighting AS 1735 (all relevant parts) - Lifts, escalators and moving walks.
- AS 2312.1 (2014) - Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings – Paint coatings.
- AS 2890.1 (2023) - Parking Facilities – Off-street car parking.
- AS 2890.2 (2018) - Parking facilities - Off-street commercial vehicle facilities
- AS 2890.3 (2015) – Parking Facilities – Bicycle Parking
- AS 2890.6 (2022) - Parking Facilities – Off-street car parking for people with disabilities
- AS/NZS 3000 (2018) - Electrical installations
- AS 3610 (1995) - Formwork for concrete
- AS 3610.1 (2018) – Formwork of concrete – Specifications
- AS 3798 (2007) - Guidelines on earthworks for commercial and residential developments
- AS 3661.2 (1994) –Slip resistance of pedestrian surfaces - Guide to the reduction of slip hazards
- AS 4586 (2013) - Slip resistance classification of new pedestrian surface materials
- AS 4663 (2013) - Slip resistance measurement of existing pedestrian surfaces.
- AS 4678 (2002) - Earth-retaining structures

Stormwater

- Australian Rainfall and Runoff – Volume 1, Engineers Australia, National Committee, 2019.
- Australian Rainfall and Runoff – Volume 2 – A guide to Flood Estimation, Engineers Australia, National Committee, 2019.
- Storm drainage design in small urban catchments – ARRB Special Report No. 34, Argue, 1986.
- Bureau of Meteorology data. Available URL: http://www.bom.gov.au
- Australian Runoff Quality, A guide to Water Sensitive Urban Design, Engineers Australia, 2006
- Urban Stormwater – Best Practice Environmental Management Guidelines, CSIRO, 2006
- Guidelines for Urban Stormwater Management, Government of South Australia, 2002
- Stormwater Pollution Prevention Code of Practice for the Building Industry, Environmental Protection Agency, website www.environment.sa.gov.au.

- Environmental Protection (Water Quality) Policy 2015, SA Government

For Public Transport South Australia (PTSA) projects refer to AM5-DOC-003705 Addendum to DIT Multistorey Carparking Design and Construction Standards for Public Transport for a list of design and construction Standards applicable for public transport projects.

2.2 DIT Requirements

- For Building Projects, provide a project specific specification based on the appropriate NATSPEC worksections and DIT amended NATSPEC worksections. The DIT Amended NATSPEC worksections are available for download from bpims.sa.gov.au.

  The car park shall comply with all relevant DIT publications, policies, and guide notes. They can be found on the DIT website at Information and Documents for Contractors - Department for Infrastructure and Transport - South Australia (dit.sa.gov.au)

Guidenotes include the following:

- Construction Contract Tender Documents Format (G4)
- Recycled Pavement Materials (G36)
- Site Contamination (G37)
- Ecologically Sustainable Development - Planning, Design, Delivery & Sustainment (G44)
- As Built Documentation, Operations Manuals and Maintenance Manual (G54)
- Electronic Document Requirements (G65)
- Solar Panels for Government Funded Building Projects (G140)
- Critical Work Plans (G169)
- Seismic Restraint of Engineering Services (G172)
- DIT Road design standards - Roads - Department for Infrastructure and Transport - South Australia (dit.sa.gov.au)
- DIT Building Access for Maintainable Plant and Roof Safety Systems (G190).
- DIT Design Review (G29)

2.3 Additional Client Agency Requirements

SA Health

For SA Health projects the following additional requirements are required:

- SA Health In-house Green Rating Assessment Tool - 5 Star IGRAT – Design Rating required to be achieved
- SA Health - Project Completion Requirements
- SA Health - Installation of a Structured Cabling System Specification Version 6
- SA Health - Security Specifications
- SA Health – Signage Standards

3 ARCHITECTURAL REQUIREMENTS

3.1 Design Data

The design needs to ensure integrity and functionality for a minimum period of 50 Years. Encompass whole life costs, including costs of energy consumption, maintenance costs inclusive of sustainability to include costs in use and through to final decommissioning.)

Hours of operation to be 24hours, 7 days a week including public holidays, with peak demand weekdays from 8am to 6pm.

3.2 General Requirements of the Development

The building must specifically consider the following criteria in planning, design, construction, commissioning, and operation the following criteria and develop balanced responses:

- Proven reliability and performance
- Ease of maintenance and replacement
- Energy efficiency as defined
- Environmental responsibility
- Cost effectiveness
- Current technology and standards
- Optimising whole life cycle cost

3.3 Building Context

Provide a development that responds appropriately to the surrounding context, providing:

- a primary and identifiable address
- an appropriate response to the Development Plan
- an appropriate relationship to the site and local context through built form and materiality
- and promoting public access, passive security, clear identity, and visibility

3.4 Design Philosophy

It is the Department intention to realise a building with a distinctive aesthetic appearance commensurate with the precinct demographic and existing landmarks.

The visible location requires the building to respond to the existing context. The design shall be responsive to the context with respect to scale, materiality and massing and improve amenity through the careful selection of materials, landscaping, and lighting.

The preferred architectural strategy addresses the façade design and circulation to mitigate the visual impact of a potentially overbearing structure.

The design should respond to the Office of Design and Architecture SA (ODASA) six Principles of Good Design as follows: Refer to Design Review - The Office for Design and Architecture SA (odasa.sa.gov.au)

Context

(Good design is contextual because it responds to the surrounding built and natural environment and contributes to the quality and character of a place)

Inclusivity

(Good design is inclusive because it creates places for everyone to use and enjoy, by optimising social opportunity and equitable access)

Durability

(Good design is durable because it creates buildings and places that are fit for purpose, adaptable and long-lasting)

Value

(Good design adds value by creating desirable places that promote community and local investment, as well as enhancing social and cultural value)

Performance

(Good design performs well because it realises the project potential for the benefit of all users and the broader community)

Sustainability

(Good design is sustainable because it is environmentally responsible and supports long-term economic productivity, health, and wellbeing)

3.5 Safety in Design

The Contractor is required to ensure, as far as is reasonably practicable, that a structure is designed to be without risks to the health and safety of persons who:

- at a workplace, use the structure for a purpose for which it was designed.
- construct the structure at a workplace.
- carry out any reasonably foreseeable activity at a workplace in relation to the manufacture, assembly, use, maintenance, proper demolition, or disposal of the structure.
- are at or in the vicinity of a workplace and are exposed to the structure or whose health and safety may be affected by an activity related to the structure.

The Contractor, in consultation with the Project Team as required, shall undertake all duties required to fulfil the obligations with regards to Safety in Design as required by the Work Health and Safety Act 2012.

Ensure both road and pedestrian safety requirements are considered.

Safety shall also be considered through the principles of Crime Prevention through Environmental Design (CPTED), incorporating strategies such as natural surveillance, legibility, territoriality, and vulnerability.

Recesses to entrance, stair wells, and dark corners to be minimised and designed to avoid persons loitering/rough sleeping.

A Safety in Design Risk Assessment report in accordance with DIT “Principles of Safe Design” Guidenote (G125) shall be provided at the end of concept phase and on the final design.

3.6 Maintenance

A building maintenance and access strategy that addresses all aspects of regular safe access and maintenance of all areas is to be provided by the Contractor. The strategy shall explore cost effective solutions that minimise the need for external ladder access, confined space access, harness/rope access, scissor lift or platform access.

The Contractor shall provide roof and façade, access, and safety systems to enable the cleaning and maintenance of the building, including the façades, windows, gutters, solar array, etc. Lockable stair access shall be provided.

Roof entry point(s) to be via internal ladder system, from upper floor to (each) roof level ideally. One of the stair wells should come up to the general roof level to permit safe roof access.

Roof access walkways, to be provided to access all maintainable plant (including solar systems).

Roof walkways for solar panel access/cleaning, to facilitate safe access to 2 panels (above/below/side to side) from the walkway.

Roof access walkways to be 3000mm minimum away from a live edge.

Roof perimeter handrail and access systems shall be considered/designed in accordance with DIT Building Access for Maintainable Plant and Roof Safety Systems (G190).

3.7 Materials and Finishes – General

A complete finishes schedule shall be submitted by the Contractor for review. A preliminary schedule is to be provided at 60% Design Development Stage design review and final schedule to be provided at 90% Documentation Stage design review prior to construction.

All materials and finishes shall be of a high commercial quality, durability and be resistant to damage and vandalism, with consideration given to whole-of-life costs.

The preferred architectural strategy shall include materials with applied finishes rather than integral. Any paints and undercoats for the Project shall be selected to suit their interior or exterior location and maximum durability and from a proprietary brand such as Dulux Australia or Wattyl.

All exposed structural steel shall have protective coatings and paint finish to minimise life cycle costs and maintenance requirements.

As a minimum all painted surfaces shall be provided with a sealer coat and two topcoats.

Walls and surfaces shall generally be painted a light colour to assist in reflecting artificial and natural light whilst avoiding glare. Painted finishes shall be durable and be easily reapplied.

Door hardware to be of a selected commercial quality proprietary range with a keying system to match in with the existing sitewide system.

All paints to be low VOC, <0.5% VOC level.

All external pathways and circulation routes shall be edged, and broom finished in situ concrete and have sufficient falls to prevent ponding.

Concrete surfaces are required not to hold surface water, with no greater than 3mm maximum ponding depth anywhere 10 minutes after a rain event.

Sealing of concrete floors is required to minimise dust build-up and reduce cleaning requirements.

Ledges and other opportunities where bird nesting and roosting can take place shall be eliminated.

3.8 Roof drainage

Roof drainage shall generally be concealed behind roof parapet walls and easily accessible for maintenance.

Box gutters shall be sized to allow cleaning by broom.

Outlets shall be protected to prevent blockage and an adequate overflow system provided that will alert the end users to blockages.

Overflow locations shall not impinge on safe vehicle and pedestrian movement.

Any internal downpipes shall be protected from vehicle and pedestrian impact, and vandalism.

Downpipes shall be impact resistant, steel pipes and painted finish to match columns.

3.9 Traffic and Car Park Layout

The Contractor is to consider the impact of the design on all roads within and adjacent to the site and undertake a detailed traffic impact assessment of their design. Items to consider (but not limited to) includes –Existing and proposed traffic volumes.

- Queue lengths
- Peak and off-peak traffic volumes on all roads impacted by the proposed carpark
- Safe turning movements into, out of and within the proposed carpark
- Changes in traffic volumes over the life of the new carpark
- Impact on surrounding roads
- Pedestrian safety and connectivity

The contractor is required to provide a detailed traffic design basis report for the proposed design that includes all design assumptions, design calculations and layout plans of the proposed solution.

The contractor must engage a suitably qualified traffic engineer to design and document the car parking layout and configuration, traffic movements, turning circle analysis, adequate circulation space, road safety, and ensure the design is fully compliant with all relevant Australian Standards.

The layout of the car park should meet the requirements of AS 2890.1:2004, the Australian Standard for Parking Facilities, Part 1: Off-street Car Parking.

Where positive speed control is necessary within the carpark speed humps shall conform to AS 2890.1 section 4.9. Humps type 1 or 2.

Queue lengths at peak times to be modelled by the traffic engineer.

A design basis report is to be prepared by the traffic engineer documenting the proposed design including all assumptions, risks and must provide input into the safety in design risk assessment for the project.

Vehicular parking for people with disabilities must be provided in accordance with Australian Standard AS/NZS 2890.6:2009 Parking Facilities – Part 6: Off-street parking for people with disabilities. Parking spaces for people with disabilities need to be much wider and longer than other parking spaces in car parks. The extra space is needed because of advances in technology for vehicle mounted equipment for loading and unloading wheelchairs. Vehicles equipped with ramps or platform hoists either at the side or rear of the vehicle allow for wheelchair-bound passengers or drivers to enter or leave the vehicle in the wheelchair.

3.10 Signage

Architecturally designed identification and statutory signage for services, amenity and escape areas is to be provided throughout in compliance with the NCC, Australian Standards and SA Health Signage Standards for SA Health projects, PTSA Wayfinding Rulebook for public transport projects and Lead Agency corporate requirements.

All operations in the car park shall be directed by suitable directional. informative, regulatory, or warning signs in accordance with AS 2890.1.

A Wayfinding and Signage Strategy is to be developed outlining the planning, locations, functional categories vehicle, pedestrian, and identification signage for multistorey carparks.

3.11 Acoustics

The design and construction shall be in accordance with authority requirements and consider the acoustic environment to avoid excessive noise permeating throughout the environment during normal use. Consideration of the adjoining space usages shall be taken into account to ensure that noise breakout from the Project does not override or interfere.

3.12 Access Report

A qualified disability access consultant with Access Consultants Association (ACA) accreditation shall be engaged by the Contractor to ensure access compliance and high level of accessibility is achieved. A report shall be provided at the end of concept phase and on the final design.

3.13 Staging

The work may be undertaken in stages with ‘enabling works’ to be undertaken as the first stage. All staging of works shall be agreed with all the relevant stakeholders prior to construction.

4 FACILITIES REQUIREMENTS

4.1 Summary of facilities

All parks are required to be undercover and as such a roof to the top level is required.

All pedestrian areas and parking floors are to be non-slip, AS1428 and AS2890 compliant.

The multi-level carpark shall include the following:

- entry / pay station / lift foyers
- entry canopy
- parking control system including indicators and electronic signage
- accessible toilet
- end of trip facilities if used for government staff carparking including bike parks, showers, and lockers
- plantroom
- cleaners store
- lifts and stairs
- pedestrian walkway zones
- car park and vehicle ramps
- vehicle barriers to car park spaces
- disabled car parks and pram parks located near lifts and on flat concrete slab zones
- CCTV, public address, and fire systems where required

External works shall include the following:

- landscaping and irrigation
- reconfiguration of existing access driveways and road modifications required for integration with the local road network
- boundary fencing
- road reserve alterations

4.2 Facilities

4.2.1 Entry / pay station / lift foyers.

An automatic sliding door shall be provided at the ground floor foyer.

Recessed entry mats shall be provided to this entry.

Non- primary entry point doors are to have proximity readers and intercom for after hour's access. Door to be opened by push button for accessibility.

Finishes shall generally be of a high commercial quality and include the following:

- Floors - vitrified unpolished non-slip ceramic floor tiles, laid in a square grid format
- Skirting - matching ceramic skirting tile, laid in a square grid format
- Doors - 2100 mm high hinged solid core doors fitted with door closers and fire rated where required by code. Paint finish to frames and doors. Commercial grade door hardware
- Ceiling - impact resistant plasterboard with recessed lighting

Foyers shall be protected from the weather by a solid façade material.

4.2.2 Entry canopy

A steel framed canopy shall be provided at the entry to the car park foyer and entry to the bicycle parking facilities to provide undercover entry.

Vandal resistant recessed lighting shall be provided.

The canopy shall be of adequate size to protect persons entering from inclement weather conditions.

Consideration shall be given to the integration of the canopies into the architectural expression of the building.

4.2.3 Parking control system

A system of carpark access control, payment and management is to be provided for the Project. The system will need to include smart, efficient technology.

The Contractor shall design, select, and install a system in consultation with the existing site infrastructure / client agency and traffic engineers to ensure adequate capacity, ease of use, maintenance, and operation.

Provide all system hardware, cabling, conduits, software, equipment, and interfaces as required for a complete and operational system.

4.2.4 Accessible toilet

An AS1428 compliant accessible toilet shall be provided adjacent to the entry foyer and additional accessible toilets in accordance with NCC requirements.

Materials and finishes shall be of a high commercial quality, AS1428 compliant and include the following:

- Floors - vitrified unpolished non-slip ceramic tiles, laid in a square grid format
- Skirting / splashback - ceramic tile, laid in a square grid format
- Walls - impact and moisture resistant plasterboard, paint finish
- Ceilings - impact and moisture resistant plasterboard ceiling with access panels as required for services management, paint finish. Ceiling height typically 2400mm
- Doors – Solid core doors, paint finish. Door hardware in accordance with AS1428

Fixtures and fittings shall be of a high commercial quality, AS1428 compliant and include the following:

- Grab Rails – Stainless steel grab rails shall be provided
- Vanity basins - The basin shall be a wall mounted vitreous china hand basins. A mirror and shelf shall also be provided
- Toilet pans - Toilet pans are to be wall-flush floor-mounted vitreous china complete with integrated toilet seats with concealed dual flush cisterns, or approved alternative
- Taps / mixers - A high quality mixer / aerator will be provided. The mixer will be polished chrome with pressure compensating aerators in spray pattern. Tapware shall be WELS 5 star rated
- Towel dispensers and driers - Paper towel dispensers and an electric hand drier shall be provided
- Soap dispensers - Surface mounted stainless steel commercial quality soap dispensers shall be provided
- Sanitary napkin disposal - Space for chemical sanitary napkin disposal units shall be provided. Units will be provided by the building operator/manager

4.2.5 End of trip facilities

End of trip facilities for government staff shall be provided and include showers, toilets, lockers, benches, and bicycle parks, with secure access from the entry canopy.

Bicycle parks shall be provided. A mix of wall and floor mounted fixtures is acceptable, with each enabling the wheel or frame to be locked securely. The arrangement of the room should dissuade ad-hoc stacking of bikes.

Separate male and female amenities shall be provided, each shall have lockers, benches, shower cubicles, hand basins with mirrors above and an ambulant toilet cubicle.

A proximity card access security system shall be provided as an extension of the existing sitewide system.

Materials and finishes shall be of a high commercial quality and include the following:

- Floors - vitrified unpolished non-slip ceramic tiles, laid in a square grid format.
- Skirting / splashback / showers - ceramic tile, laid in a square grid format. Full height tiling to shower areas.
- Walls - impact and moisture resistant plasterboard, paint finish.
- Ceilings - impact and moisture resistant plasterboard ceiling with access panels as required for services management, paint finish. Ceiling height typically 2400mm.
- Doors – Solid core doors, paint finish. Toilet doors have a set of stainless-steel push plates/pull handles accompanied by appropriate symbolised signage indicating male / female / disabled.

Fixtures and fittings shall be of a high commercial quality and include the following:

- Shower / Toilet Partitions - Partitions shall be a 32mm thick proprietary partition system nominally 1800mm high with a 650mm wide door panel and hung from the ceiling and secured at the floor. All exposed surfaces are to be finished in selected plastic laminate on high-grade water-resistant board. Cubicle doors to have a locking indicator bolt, closed hinges, door bumper, strike and combined coat hook door stop. The ambulatory cubicle doors have a locking indicator bolt and self-closing hinges.
- Lockers – provide half height ventilated lockers with digital time locked keypads.
- Benches – provide fixed benches adjacent to the lockers.

- Vanity basins - a vanity shelf approximately 350mm wide will be provided above the basins. The basins shall be wall mounted vitreous china.
- Hand basins - A full-length mirror shall be provided above the shelf together with one double GPO outlet to each bank of basins.
- Toilet pans - Toilet pans are to be wall-flush floor-mounted vitreous china complete with integrated toilet seats with concealed dual flush cisterns, or approved alternative.
- Taps / mixers - A high quality mixer / aerator will be provided to each hand basin. The mixer will be polished chrome with pressure compensating aerators in spray pattern. Tapware shall be WELS 5 star rated.
- Cleaners tap – a cleaner's tap shall be provided to each toilet area.
- Towel dispensers and driers - each toilet area shall have one stainless steel built-in paper towel dispensers with electric hand driers and combined wastepaper basket. The depth of the wastepaper basket will be sized to avoid paper clogging.
- Soap dispensers - Surface mounted stainless steel commercial quality soap dispensers shall be provided above each basin.
- Sanitary Napkin Disposal - Space for chemical sanitary napkin disposal units shall be provided in all female and unisex accessible toilets. Units will be provided by the building operator/manager.

4.2.6 Plantroom

Plant room/s shall be provided to house switchboards and other services equipment. For PTSA projects refer to PTSA requirements for equipment rooms CCTV comms, electrical and other equipment1.

Plant room/s shall be integrated into the architectural expression of the main building. The visual impact of plant room/s shall also be minimised from long and short view perspectives.

A proximity card access security system shall be provided as an extension of the existing sitewide system.

An anti-stain and corrosion resistant floor sealer, such as Rokite or similar, shall be applied over the finished concrete slab. Sufficient floor drainage shall be available to prevent water pooling or becoming slippery and dangerous.

4.2.7 Cleaners store

A cleaner's store of approximately 4m2 shall be provided in close proximity to the end of trip facilities.

A floor mounted stainless steel cleaners sink shall be provided.

A proximity card access security system shall be provided as an extension of the existing sitewide system.

4.2.8 Lifts and stairs

A minimum of two lifts shall be provided to serve each floor of the car park. For PTSA projects this may be reduced to one lift depending on carpark capacity.

Lifts shall be of a high commercial quality and durability, suitable for a 24/7 operating car park.

Stair finishes shall include the following:

- Floors - steel trowelled non-slip concrete over ‘Stairmaster’ or similar steel stair system. Provide undercut to risers and slip resistant bars to treads and landings. Structural steel of stair to comply to BCA requirements.
- Walls and ceiling - textured paint finish is to be provided to walls.
- Soffits - paint finish is to be provided to stair soffits and stringers.
- Doors - fire rated, steel frame, paint finish.
- Balustrades - galvanised steel pipe with vertical railings at maximum 125mm centres to ensure code compliance. The balustrades shall be painted throughout.
- Consideration shall be given to the provision of natural light and outlook from stairwells, as well as passive surveillance to achieve CPTED principles.

4.2.9 Pedestrian walkway zones

Pedestrian walkway zones shall be provided on each floor to separate pedestrian and vehicular movement with no overlap of zones.

The walkways shall be fully compliant with AS1428 and AS 2890.6:2022.

Pedestrian and accessible walkways must be clearly identified and separate to the required parking aisle and driveway ramp widths.

There should be no trip hazards at change of levels, and around stairs and lift lobbies.

Physical barriers, such as rails or bollards painted ‘Safety Yellow,’ shall be provided to prevent vehicles from accessing the walkway.

Railings or bollards shall be 1600mm high minimum and painted ‘Safety Yellow’, to assist drivers of cars backing into spaces to see the barrier above the rear of the car.

Non-slip pigmented flexible polyurethane deck coating system, such as Deckshield ID or similar, in a contrasting colour unique to each floor level is to be applied to the pedestrian walkways. Sufficient floor drainage shall be available to prevent water pooling or becoming slippery and dangerous.

Slip Resistance of all finished surfaces is key for the Public and Government Staffing perspective, for both a pedestrian and vehicle perspective.

Pedestrian walkway surfaces are required not to hold surface water, with no greater than 3mm maximum ponding depth anywhere 10 minutes after a rain event.

Trip hazards must be avoided in all pedestrian areas with particular attention required at change of levels, and around stairs and loft lobbies.

Construction of stairs, pedestrian zones and handrails must be in compliance with all the relevant Australian Standards.

4.2.10 Car park and vehicle ramps

Parking areas and vehicle ramps shall be concrete.

General parking bay sizes shall be 2.6m wide by 5.4m deep (minimum). It is acknowledged that IGRAT or Green Star points are available for the provision of small parking spaces, however it is highly desirable to minimise the inclusion of small parking spaces and achieve the required IGRAT or Green Star rating through other means.

Accessible parking bays shall be in accordance with AS2890.6

Aisle widths shall be 6.2m (minimum)

All pedestrian areas and parking floors are to be non-slip, AS1428 and AS2890 compliant.

Vehicle access ramps including any required transition ramps at the bottom and top of ramps shall be in accordance with AS2890.

The car parking entry driveway design shall consider the recommendations from the traffic assessment report provided and the Contractors own traffic impact assessment.

All floors minimum clearance shall be 2500mm and verified this has been achieved at practical completion.

In addition, to the above minimum clearance heights should also be discussed and confirmed with the Client Agency at the design stage for any additional requirements and verified at Practical Completion.

Early warning (vehicle max height) Signage and Entry Bars (externally) at all building entries to be provided.

Illuminated entry / exit signage shall be provided above both entry points.

Painted free hanging height bars shall be provided to all vehicle entry points of the car park and at the entry point for ramp to upper floors.

Physical barriers, such as rails or bollards painted ‘Safety Yellow,’ shall be provided to prevent vehicles from accessing the foyer and pedestrian walkway zone.

Wheel stops should be avoided in areas if they present a trip hazard and also prevent use of mechanised floor cleaning machinery.

The contractor shall ensure that the final finish of the concrete floor of the car park should be serviceable and resistant to wear from wheeled traffic.

Edges of slabs should address the shedding of water.

An anti-stain & corrosion resistant floor sealer, such as Rokite or similar, will be applied over the finished concrete slab to avoid the infiltration of oil, grease, and the like. Sufficient floor drainage shall be available to prevent water pooling or becoming slippery and dangerous. Finish shall not cause cars tyres to squeal.

Finishes shall be:

- Broom finish to concrete floors and vehicular ramps with non-squeal oil and slip resistant additive.
- Grooved finish to concrete vehicular ramps.

Galvanised steel column/wall guards shall be provided where vehicle impact is possible.

Galvanised steel bollards shall be provided as required.

Car park lines, lane separation lines, directional arrows, and kerb line are to be clearly defined using durable, non-slip, line marking finish. Directional arrows are to be oversized for greater visibility. The contractor shall ensure that sufficient contrast between floor finish and line marking is achieved so that parking bays are easily identifiable.

Car park shall be painted between the carpark soffit down to approx. 1600mm above FFL in two-tone acrylic paint finish. Colour scheme shall include the columns, circulation lobbies and stair risers. Each floor shall have a unique colour scheme.

Note: section 3.7 requirement that all exposed structural steel shall have protective coatings and paint finish to minimise minimising life cycle costs and maintenance requirements.

4.2.11 Crash Barriers

Car park safety barriers, kerbs, wheel stops and other protective devises to comply with AS/NZS 2890.1:2004 section 2.4.5.

Barriers to be and designed to resist the vehicle impact live loads stipulated in section 5.3.2 must be placed in-board from the external walls, retaining wall or façades so that the following can be achieved:

- Barriers can be inspected from all sides to assess their condition.
- Barriers can deflect and be replaced after impact without significant damage to the adjacent wall, façade, columns, or carpark structure.
- Barriers positions can be measured relative to the wall or façade to detect evidence of previous impacts during the service life of the structure and thereby inform the timing of barrier condition assessments.

4.2.12 Minimum Slip Resistance Values (SRV) requirements

The summary below is issued as a DIT minimum requirement and where it states a higher expectation than the information contained within Australian Standards and HB197-1999, it is deemed to take precedence.

DIT's minimum requirement at Practical Completion is to achieve a Slip Resistance Value (SRV) of >54 Mean BPN (Slider#96) per individual test location, equivalent of a Coefficient of Friction (CoF) of > 0.59, equating to a minimum P5 rating for all new floor surfaces including, but not limited to carpark walkways, ramps, driveways and parking bays, tested in accordance with AS4586-2013 (Slip resistance classification of new pedestrian surface materials) measured by the Wet Pendulum Slip Resistance Test.

One of the conditions precedent to achieve Practical Completion is the following:

- A minimum of 20 random locations per level are to be tested by a NATA accredited testing provider, engaged by the Contractor, in accordance with AS4586-2013.
- The tests are to be conducted within a period of not greater than 30 days prior to the issue of Completion.
- The test results per location tested are to achieve an SRV of >54 Mean BPN (Slider#96).

It is noted the Contractor is to provide details of how the areas are to be maintained as part of the Operations and Maintenance Manuals issued prior to Practical Completion throughout the Defect Liability Period and beyond to ensure the required SRV is achieved at Final Completion.

The DIT minimum requirement at Final Completion is to achieve a Slip Resistance Value (SRV) of >45 Mean BPN (Slider#96) per individual test location, equivalent of a Coefficient of Friction (CoF) of > 0.47, equating to a minimum P4 rating for all new floor surfaces including, but not limited carpark walkways, ramps, driveways and parking bays tested in accordance with AS4663-2013 (Slip resistance measurement of existing pedestrian surfaces) measured by the Wet Pendulum Slip Resistance Test.

One of the conditions precedent to achieve Final Completion is the following:

- A minimum of 20 random locations per level are to be tested by a NATA accredited testing provider, engaged by the Contractor, in accordance with AS4663-2013.
- The tests are to be conducted within a period of not greater than 30 days prior to the issue of Final Completion.

The test results per location tested are to achieve an SRV of >45 Mean BPN (Slider#96).

To minimise recurrent costs to the Principal, DIT expect the above requirements will be achieved without the use of an applied coating system. It is expected the minimum requirement will be achieved through the process of finishing the concrete to achieve a physical textured finish as opposed to a honed finish. The expectation is the final finish to the concrete will be via a wood float and or broom finish or similar.

It is expected the slab will be cured and treated with a sealer / hardener, with a minimum 5-year warranty, to provide the longevity / durability of the slab in accordance with the Principal Project Requirements. It is noted the application of this sealer / hardener needs to be carefully considered to ensure the minimum requirements of the SRVs are achieved.

It is noted where the design standards require the differentiation and marking of walkways, accessible bays etc, a coating system, with a minimum 5-year warranty, will be deemed acceptable in these locations whilst the minimum SRV requirements stipulated are still required to be achieved at both Practical Completion and Final Completion.

1. 1no. 3.0 x 3.0 concrete test panel, minimum 150mm thick, utilising the proposed mix design and process of finish treatment to achieve a physical textured finish with the application of a sealer and hardener with line markings.
2. 1no. 3.0 x 3.0 concrete test panel, minimum 150mm thick, utilising the proposed mix design and process of finish treatment to achieve a physical textured finish with the application of a coating system proposed for walkways etc where applicable for the differentiation of spaces.

Both concrete test panels are to be tested as follows:

- A minimum of 5 locations per test panel are to be tested by an independent authorised testing agency, engaged by the Contractor, in accordance with AS4586-2013.
- The tests are to be conducted after a minimum period of 30 days following the pouring of the test panels and application and curing of coatings / line markings where applicable.
- The test results per each location tested are to achieve an SRV of >54 Mean BPN (Slider#96) before approval will be given to the sample and commencement of the carpark pavement slabs.

In addition to the minimum slip resistance values stipulated, DIT highlight the requirement of dealing with water that may enter the building through the open to ensure it does not lead to the build-up and ponding of the water on the pavement areas. Areas open and prone for water entry are to be designed to ensure the water exits through either capture and or redirection through falls and or outlets within the pavement areas.

The above minimum expectations and conditions are required to be met whilst noting the design and construct responsibility in achieving these expectations remains with the Contractor.

4.3 Architectural expression

The architectural expression of the facade shall respond specifically to the site context, which includes adjacent buildings and residential properties. Each elevation shall respond appropriately to the adjoining interface and be designed to mitigate the visual impacts.

Materiality will be highly durable, of a high quality and comprise integral rather than applied finishes. Precast concrete finishes shall be minimum Class 2 with integral rather than applied colour. The visual qualities of precast concrete finishes shall be demonstrated by samples.

Particular consideration shall be given to the articulation of significant expanses of solid walls to mitigate their visual impact. The preferred architectural strategy will consider three-dimensional articulation to manage bulk and mass and explore opportunities for natural light and ventilation access, cognisant of acoustic requirements.

The preferred architectural strategy will implement a holistic approach to the design that considers the site context, public realm, pedestrian amenity, access strategies, durability, and landscape elements.

Opportunities for potential future development of the site shall be considered in the location of the carpark and provisions to be included to ensure expansion can be achieved.

4.4 Façade systems

4.4.1 General

The facade shall be subject to design development in conjunction with the Contractors design team to optimise:

- Facades and all perimeter external fabric to deflect rain form entering into the building
- Daylight penetration
- Ease of cleaning, maintenance, and operating costs
- Consider and reduce the risk of any privacy issues that may arise from the orientation of the building
- Meet design intent and architectural integrity
- Minimise capital investment and whole of life costs
- NCC Section J compliance
- Consider heritage of surrounding buildings
- Provide necessary ventilation for all floors as per NCC Part 3.12.4 Air Movement
- The facade detailing to mitigate risks associated with of overlooking, headlights, light spill, and acoustics

A holistic approach is to be taken with the design of the envelope of the building with all of the above being taken into consideration.

The facade system shall:

- be confirmed within the design development stage of the Works with the stakeholder team
- discourage unauthorized persons loitering and climbing onto the building
- discourage graffiti
- be constructed from factory assembly prefabricated panels and steel frame system
- Prevent vehicle headlight glare to adjacent properties or buildings
- Any gaps between façade and floor structure to be sealed to prevent items being dropped through the gaps and or persons being trapped / tripped etc

4.4.2 Car park screens

The car park screen system shall be durable and screens prefinished with a powdercoated ‘push pull’ aluminium perforated panels in a painted structural steel frame. The perforated push pull opening of the panels must shed rainwater away from the façade and not allow ingress of rainwater onto the internal concrete slab. The car park screen system is to be highly corrosion resistant, and powdercoated mild steel panels shall not be used as these have been proved to be susceptible to corrosion.

The car park screen system shall:

- comply with structural requirements, including impacts of vehicles as per AS 2890.1 and AS/NZS 1170.1
- provide sufficient free air ventilation for the carpark to be classified as ‘open deck’ such that mechanical ventilation is not required
- provide adequate wind and rain screen protection for users
- have no openings that allow passage of a 120mm diameter sphere to prevent the throwing of projectiles
- be resistant to attack / breaching with domestic hand tools such as pliers, screwdrivers etc
- include isolation / separation of incompatible metals to avoid galvanic / dissimilar metal corrosion
- have mechanical fixings with matching finish and be easily accessible
- provide safe access to replace damaged facade panels
- be non-scalable with no sharp edges
- Mitigate the risks associated with of overlooking, headlights, light spill, and acoustics to adjoining premises
- light coloured screens to minimise heat absorption
- Include a variety in screen colour (for example: white, green, and grey) and interspersed panels with a folded profile, to assist with breaking down the monumentality of the facade

A large-scale prototype sample panel including frame and fixing of the proposed car park screens, panel finish, hole aperture and detailed design /shop drawings is to be submitted for DIT approval to confirm the visual impact of cars and service infrastructure, including crash barriers and balustrades are effectively minimised and the sculptural form is maintained.

4.5 External works

4.5.1 Landscaping

Landscaping and irrigation shall be provided to the areas surrounding the multi-level car park. Refer to amended DIT NATSPEC specification landscaping and irrigation worksections and for PTSA projects the DIT Master Specification and standards.

4.5.2 Access Driveway

A two-way public access driveway shall be provided to the new building.

The traffic designer shall consider the volume of traffic during peak times and design to the recommendations from the traffic assessment report provided and own traffic impact assessment.

Where required pedestrian crossings shall be provided with painted white parallel stripes across the road and pedestrian crossing signs.

4.5.3 Road reserve

Modifications required to the road reserve shall be carried out in accordance with authority requirements. Works may include alterations to and / or provision of new paved footpaths, kerb ramps, crossovers, street trees, street lighting, road signage, services infrastructure, etc to DIT Road and Paving standards.

4.5.4 Road modifications

Modifications required to external roads shall be carried out in accordance with authority requirements. The contractor must engage with all local authorities as required to design and document a fully compliant solution to Austroads requirements including obtaining all necessary approvals.

5 STRUCTURAL REQUIREMENTS

5.1 Generally

The structural design shall take into consideration the possible changing building uses and the local environmental conditions during the design life. Material selections and specifications and detailing of the structural elements shall be such as to provide optimum structure durability.

Provision shall be made in the structural design for penetrations of the slab in designated areas. Penetrations to include but not limited to exhaust, trade waste, soil, water riser space.

The Preliminary Design generally anticipates a concrete framed structure however alternatives that meet the requirements of this guidenote and authority requirements (including DIT, Planning, and local council development Plans) may be considered.

The structural design shall consider and ensure the following key issues are addressed:

- ensuring the Project program is achieved
- restricted site area available for the Contractors site compound
- intended design life of 50 years
- minimising life cycle costs and maintenance requirements
- ensuring lighting levels and security requirements are achieved

5.2 Foundations

Design parameters shall be determined and evaluated by a Registered Professional Geotechnical Engineer by sufficient insitu testing. All geotechnical site investigations, testing procedures and design details shall confirm to AS1726 – Site Investigations Code.

Foundation designs prepared by the structural engineer shall incorporate all geotechnical design values as recommended by the Geotechnical Engineer.

Due consideration shall be given to:

- Allowable bearing pressures
- Soil and rock stiffness values
- Reactive soils and their effect on ground floor slabs, particularly the vulnerability of flat slabs to the effects of “edge heave.”
- Earth pressures on temporary and permanent retaining systems
- Ground water
- Rock relief pressures and movements

- Effects on adjacent and surrounding building sites and environs due to change within the ground conditions resulting from the proposed development
- Effects on existing in-ground services adjacent to the site
- Transmission of seismic forces to building
- Constructability, in particular the impact of noise and vibration to any adjacent facility operations

5.3 Structural Design Parameters

5.3.1 Building Loads

All building gravity loads, superimposed dead loads and live loads shall be carried by the structure with adequate factors of safety in accordance with AS1170 Part 1: Dead and live loads and load combinations.

The following superimposed loads need to be included:

- Partitions
- Floor finishes and toppings
- Services
- Ceiling
- Plant and Equipment

Note that the main influences on the structural design of the typical floors will be spans, floor to floor height, space, floor area and the configuration of services.

5.3.2 Live Loads

The following minimum loads shall be adopted without reduction:

- Car parking 2.5k Pa
- Car parking concentrated load 13kN
- Vehicle barrier loading typically 30kN
- Vehicle barrier loading bottom ramps 240kN
- Partitions 1.0kPa
- Services and ceilings 0.3kPa

Design load shall be designated on all structural floor plans.

5.3.3 Wind Loads

Design wind loads shall be based on AS1170 Part 2.

The design wind velocity shall be based on a 100-year return period. Results of suitable wind tunnel testing may be incorporated where opportunities existing in providing efficiencies of structural form.

The design of facade elements and their connections to the structure shall make provision for all local peak wind pressures effect.

Wind vibrations need to be designed such that the harmonic wind movements of the building are not resonant with its own natural frequency.

The building frame must be designed to resist wind pressure with sufficient stiffness to keep the vibration caused by the wind within design limits.

Projecting canopies and awnings, particularly at street level shall be designed to resist the wind forces caused by deflected pressure flows from the surrounding tall buildings.

5.3.4 Seismic Loads

Seismic design requirements shall be in accordance with AS1170 Part 4.

The earthquake loads on the structure shall be determined by applying the requirements of this Standard or by using reliable data and references in a manner compatible with the requirements of this standard together with information on local conditions.

A menu of return period is to be presented based on varying importance levels. Generally, for carparks an importance level of 2 is appropriate however if the building is to be rated as being essential for post-earthquake recovery, then an importance level 4 and a special study is required.

5.3.5 Lateral Loads

Interior walls and permanent partitions and their fixings and support shall be designed to resist all loads to which they are subjected, but not less than a lateral force of 0.25 kPa applied perpendicular to the walls.

5.4 Vibration Effects

Vibration due to construction activities and plant should not be structurally critical or unacceptable to occupants. The lead agency shall be consulted and agree on vibration and noise limits associated with adjoining facility operations during construction and for the final design solution.

Floors shall be designed to ensure that there are only slight perceptible vibrations under footfall effects, or from other internal or external sources.

5.5 Deflections

The structural components shall be designed and constructed to contain any deflections under service loads within acceptable limits for:

- Structural integrity
- Visual appearance
- Avoidance of excessive floors slopes
- Prevention of cracking in floors, walls, and ceilings
- Proper installation and operation of machinery
- Traffic
- Building occupants
- Avoidance of ponding

5.6 Deflection Limits and Serviceability

The following deflection limits shall apply unless more stringent deflection limits are required for special loading conditions:

- Beams and Slabs – irrespective of the materials or type of construction used, deflections shall not exceed the limits set down in Section 2.4.3.24 of AS3600.

In addition to the deflection requirements set out in the latest or equivalent version of AS 3600 for concrete structures and AS 4100 for steel structures, all concrete and steel components are to be designed such that:

- Their incremental deflection does not exceed the lesser of span on 250 or 20mm; and
- Their total deflection does not exceed the lesser of span on 250 or 25mm.

5.7 Lateral Drift

Serviceability levels shall be designed and constructed to the limit inter-storey lateral drift of the storey height such that the integrity of all connected building elements is maintained.

In particular the effect of lateral drift needs to be included in the performance of the façade system.

5.8 Temporary and Construction Loads

The building structures shall be designed to resist all loads imposed during construction. In all instances, the building components in their temporary constructed state must remain structurally stable.

5.9 Handrails

All handrails and balustrades shall be designed in accordance with AS1170 Part 1. Where applicable, the design shall include for the effects of impact.

Under maximum load conditions these elements shall deform by following a plastic deformation mechanism.

The heights of handrails on the perimeter of elevated floors are required to be set to prevent deliberate falls from height, with due consideration for scalability.

5.10 Penetrations

The design of the concrete structure shall, as far as practicable, avoid the need for post construction penetrations. All penetration that may be subsequently required shall be to the approval of the Structural Engineer.

5.11 Construction Tolerances

Construction tolerances for structural components are to be as nominated in relevant design codes and as required for the finishes applied over those structural components.

Surface levels to the typical floor finished concrete slabs will be required to not vary by more than +/-6mm over the length of a 3 m straight edge in accordance with the Guide to Concrete Construction as issued by Standards Australia.

Concrete surfaces (floor slabs and stairs) should not hold surface water and no ponding greater than 2-3mm max depth.

5.12 Specialist Facade Design Parameters

Factors to be considered in the design of specialist facade systems shall be:

- Façade and structure interaction
- Wind effects and pressures
- Impact caused by wind borne debris
- Earthquake effects
- Thermal effects
- Human impact
- Falling and propelled objects
- Hail impact
- Fire

The structural engineer must also consider the effects of extreme events on structure performance following a possible cladding failure.

5.13 Structure Fire Rating

Structural components shall have a fire resistance level in accordance with NCC and other current Statutory Authority Regulations.

5.14 Construction Materials

Materials shall be non-combustible or exacerbate the spread of fire in accordance with the NCC requirements.

5.15 Column Core – Differential Displacement

Differential displacement between the core and the columns shall be evaluated and limited to tolerances set by AS3600.

Calculations shall allow for combinations for the following:

- Axial shortening
- Concrete creep
- Concrete shrinkage
- Loading Differentials
- Thermal differentials and temperature gradients

5.16 Structural Certification

A Registered Professional Engineer shall provide structural engineering certification in accordance with relevant Authority requirements with NPER-3 registration.

In addition, an Independent Design Certifier is required in accordance with the DIT NATSPEC and Master Specification.

5.17 Specialist Consultants

Where necessary, the structural engineer shall include the effects or advice provided by specialist consultants particularly relating to the following items:

- Geotechnical advice.
- Wind modelling
- Dynamic performance
- Seismic activity
- Acoustic isolation
- Facade performance
- Insitu and precast concrete technology

6 CIVIL REQUIREMENTS

6.1 Generally

External works are required for the full extents of the site to the boundary line of the site as follows –

- Provide well-lit accessible external areas with vandal resistant lighting and non-slip paving to comply with the relevant codes and standards
- Ensure the entire site is drained adequately for all design rain events
- Stormwater is managed to ensure there is no runoff impacting neighbouring properties
- There is no ponding or erosion
- Avoid drainage grates, or other pedestrian hazards. in the middle of the paths
- Any public area provisions within the site and or adjacent areas are to be documented and provided to DIT for review prior to construction

6.2 Civil Works

The civil works for multistorey carparks should generally comprise the following elements:

- Environmental controls during construction – erosion, sedimentation & contamination controls for site & surrounding areas
- Demolition
- Site clearing and bulk earthworks
- Detail excavation – batters, footings, beams, in-ground service reticulation
- Compaction as required
- Subbase and asphalt to asphalt paving
- Installation of retaining walls, kerbs & gutters
- Backfilling to retaining walls & kerbs
- All in ground stormwater & subsoil drainage including pits, lids, grates, orifice plates
- Identification and relocation of underground services

6.3 Vehicular Accessible Areas

- Bitumen pavement to be provided to all at grade parking areas outside of the multistorey Carpark in accordance with Australian Standard
- Bollards to be provided in all required carpark areas in accordance with AS 1428:1and AS/NZS 2890.1:2004
- Waterproofing and subsoil drainage to be provided
- All subsurface drainage including pits, trenches, grates and associated hydraulic connections provided

6.4 Design Standards and Sources of References

The Contractor shall refer the following codes and standards to form the basis of the civil design and ensure strict compliance with all relevant standards including but not limited to:

- National Construction Code (NCC)
- Australian Rainfall and Runoff
- Austroads: Guide to Road Design and Guide to Pavement Technology
- AS 3500 National Plumbing and Drainage Code

- AS 1345 The Identification of Piping, Conduits, and ducts
- AS 1742 (Set) Uniform Traffic Control Devices
- AS 2890.1 Parking Facilities – Off-street car parking
- AS 2890.2 Off-street commercial vehicle facilities
- AS 2890.6 Off-street parking for people with disabilities
- AS1428.1 (Set) General Requirements for Access – New Buildings
- AS 1141 Methods for Sampling and Testing Aggregates Part 11 – Particle Size Distribution by Dry Sieving
- AS 1152 Test Sieves
- AS 1289 Methods for Testing Soils for Engineering Purposes
- AS 1729 Geotechnical Site Investigations
- AS 3798 Guidelines on Earthworks for Commercial and Residential Development
- AS 1348 Road and Traffic Engineering – Glossary of Terms
- AS 1348 Road and Traffic Engineering Part 1 – Road Design and Construction
- AS 4678 Earth-retaining Structures
- AS 1657 Fixed Platforms, Stairways, Walkways and Ladders
- AS 2150 Hotmix Asphalt – A Guide to Good Practice
- AS 2891 Methods of Sampling and Testing Asphalt
- AS/NZS 3661.1 Slip Resistance of Pedestrian Surfaces
- AS 3725 Design for Installation of Buried Concrete Pipes
- AS 1260 PVC-U Pipes and Fittings for Drain, Waste and Vent Application
- AS/NZS 2566.1 Buried Flexible Pipelines – Structural Design
- AS 3996 Access Covers and Grates
- AS 4058 Precast Concrete Pipes (Pressure and Non-Pressure)
- AS 5065 Polyethylene and Polypropylene Pipes and Fittings for Drainage and Sewer Applications
- AS 1379 Specification and Manufacture of Concrete
- AS 3610 Formwork for Concrete
- NAASRA Guide to Traffic Engineering Practice: Parking (Part 11) and any other related Australian Standards

DIT Documents:

- Disability Access in the Pedestrian Environment
- Road Design Standards and Guidelines
- DIT Standard Specification for Supply and delivery of Pavement Materials
- DIT Standard Specification for Excavation and Reinstatement of Roads
- Master Specification, various parts, including modified worksections
- DIT Amended NATSPEC worksections

Codes, acts and regulations:

- “Stormwater Pollution Prevention – Code of Practice for the Building and Construction Industry,”
- Environmental Protection Agency, website www.environment.sa.gov.au
- Local Government and Planning document: SA Planning Requirements
- Construction Safety Act
- Workcover Authority Procedures and Instructions
- National Construction Code (NCC)

- Environmental Protection Act 1993
- Environmental Protection Regulations 2009
- Environment Protection (Water Quality) Policy 2015
- Local Government (Stormwater Management) Amendment Act 2007
- Stormwater Pollution Prevention (EPA) 1999

In addition, the following standards and guidelines must be referenced in developing the civil design:

- AS 3500.3 (2021) Plumbing and drainage Part 3: Stormwater drainage
- AS 3996 (2019) Access covers and grates
- AS 1428.1 Design for access and mobility, Part 1: General requirements for access – New building work
- Australian Rainfall and Runoff (2019)
- Austroads Guide to Road Design Part 5A Drainage
- Storm drainage design in small urban catchments – ARRB Special Report No. 34, Argue, 1986
- Bureau of Meteorology data. Available URL: http://www.bom.gov.au
- Australian Runoff Quality, A guide to Water Sensitive Urban Design, Engineers Australia, 2006
- Urban Stormwater – Best Practice Environmental Management Guidelines, CSIRO, 2006
- Guidelines for Urban Stormwater Management, Government of South Australia, 2002

6.5 Design Datums

The following survey control shall be used by the Contractor for civil design purposes.

- Height datum: m AHD
- Coordinate system: AMG

6.6 Existing Services Infrastructure

The Contractor shall be responsible for the identification of the extent, protection, or relocation of any existing service infrastructure by liaising with the following authorities, including but not limited to:

- Local Council
- SA Water
- SA Power Networks
- Telstra
- NBN
- DIT
- Origin Energy

In addition, the Contractor shall as a minimum conduct the following:

- Site inspection
- Before you Dig Australia
- Archived project records search.

6.7 Civil Design Criteria

The Contractor shall ensure that civil design conforms to the following statutory authorities design guidelines and standards:

- Local Council
- Department of Infrastructure and Transport (DIT)
- Environmental Protection Agency (EPA)
- Australian Standards and National Construction Code of Australia
- SA Water

6.8 Civil site investigations

The Contractor shall ensure that the following mandatory site investigations are completed and used to inform the detailed design:

- General site Dilapidation Survey with accurate locations and condition of all existing underground services within and adjacent the site including accurate confirmation of depth and location using potholing.
- CCTV survey of all stormwater pipes which will be retained and incorporated into the works to confirm that the condition and capacity is acceptable.
- Arborist report of existing trees and landscaping.
- Geotechnical site investigation and reporting including interpretative report in accordance with AS1729.
- Site history investigation and reporting for soil contamination which will be used to information the site-specific sampling and testing plan for soil contamination.
- Soil contamination investigations and testing.

7 URBAN DESIGN AND LANDSCAPE ARCHITECTURE

Landscape, Urban Design and Public Realm elements are to be designed and delivered in accordance with the ODASA Principles of Good Design.

Urban Design elements and street furniture are to consider whole of life, durability, and asset management requirements (OPEX).

7.1 Design Principles

The general design principles are as follows:

- Create links between the new landscaping treatment and furniture and the existing landscaping and building elements to maintain a strong visual landscape character.
- Collaborate with site maintenance personnel to get the best outcomes and manageable landscape maintenance into the future.
- Develop a planting palette that uses reliable and proven plants that are well suited to the Adelaide environment.
- Give preference to the use of local materials.

7.2 Design Objectives

The general design objectives are as follows:

- All landscape design and construction shall be of high quality and in accordance with the local authority requirements and appropriate Australian Standards, codes, etc.

- Use trees that will shade the western façade of the carpark in summer and provide warmth and sunlight in winter.
- Use CPTED principles to design safe, comfortable, and inviting spaces for users and visitors that discourage inappropriate behaviour.
- Ensure the landscape design is compliant with all safety requirements.
- Ensure the landscape and urban design is fully coordinated and integrated with road infrastructure and utility services to compliment without compromising structural integrity, functionality, or access.
- Ensure the landscaping strengthens the local character of the area by responding to the social, cultural, and environmental characteristics.
- Create seasonal and visual interest with the choice of plants and avoid over fussy or a complex landscape design.
- Use sustainable solutions in terms of materials choices, water use (infiltration or re-use), plant selection and protection from weather elements.
- Landscaping completed as part of the works is to be designed with species selected that:
  - are proven to be appropriate for the locality and local soil conditions.
  - do not require ongoing irrigation.
  - prioritise local native species; and
  - provide smaller native plants and shrubs, as well as trees, to create habitat for smaller native birds.
- To ensure consistency and integration, selection of plant species shall be agreed with the relevant authority that will be responsible for ongoing maintenance of the asset.
- The landscaping species and details are to be detailed within the Concept Design report for review and acceptance by the Department.

7.3 Services

The following considerations shall apply to all services:

- All services shall be located prior to designing the landscaping around the carpark.
- Future services that may impact upon the proposed landscaped area should also be checked.

7.4 Planting

The plants of all landscape areas shall be as follows:

7.4.1 Groundcovers:

- Species that grow to 300mm in height.
- Minimum size container for planting: Tubestock - 150x50x50mm.
- Minimum plant height for planting: 70mm – prostrate plant, 100-200mm – other groundcovers.

7.4.2 Shrubs and Grasses:

- Species that provide a range of forms, textures and grow from 400mm to 1500mm in height.
- Minimum size container for planting: General Nursery Stock – 150mm - 20 Litres.
- Minimum plant height for planting: 200 – 400mm.

7.4.3 Trees:

- Species with clean single trunks and with various habits.
- Minimum size container for planting: 100 Litre.
- Minimum plant height for planting: 1.8m plant height / 35mm trunk calliper 300mm above top of rootball.

7.4.4 Existing Trees:

- Existing trees identified for removal and trees to be retained shall be clearly indicated on a landscape demolition plan.
- An Arborist (Cert III) and licenced tree contractor shall be engaged to remove trees, and the necessary approvals are required to be in place prior to any removal.
- Retained trees shall be appropriated protected to Australian Standard AS 4970 Protection of Trees on Development Sites until all construction works have ceased.

7.4.5 Soil:

- Existing soil shall be deep ripped and amended to a suitable growing media for the planting palette.
- Imported soil shall conform to Australian Standard AS4419 Soils for Landscaping and Garden Use and be appropriate for the proposed planting palette.

7.4.6 Mulch:

- Imported mulch shall be a course hardwood mulch with minimum fines, minimising whole-of-life costs.
- A minimum depth of 100mm shall be proposed in the landscape design.

7.5 Irrigation

Irrigation of all landscape areas shall be as follows:

- A prequalified irrigation designer shall be engaged to design the appropriate irrigation system that is fit for purpose.
- The irrigation system shall be automatic and designed to fit with the current operating system that the site has in place.
- Low-cost passive Water Sensitive Urban Design shall be incorporated into the landscape design for supplementary watering of plants.

7.6 Paving

Paving of all landscape areas shall be as follows:

- All paving shall be designed to Australian Standard AS1428 Design for Access and Mobility and AS2890 Parking Facilities – for equity of access.
- All paving shall match existing paving treatments to retain a strong visual character of site precinct.
- Design a pathway network that has good passive surveillance and a clear line of sight for CCTV opportunities.

7.7 Walls

Walls of all landscape areas shall be as follows:

- All new walls shall be constructed using materials sympathetic to materials used for existing building and other hard structures to retain a strong visual character of site precinct.
- All new walls shall be designed to enhance, safety, microclimate, vistas and senses of enclosure and privacy.

7.8 Furniture

Furniture for all landscape areas shall be as follows:

- Designed to fit within the general landscaping of the site.
- Furniture styles should be chosen to form a commonality across the site precinct.
- Furniture must be low maintenance and resistant to vandalism.
- Seating should maximise the use of shade.

7.9 Lighting

The lighting of the landscape areas shall be as follows:

- Lighting types should be chosen to form a commonality across the site precinct.
- Enhance the qualities of the precinct for night-time safety.
- Assist with wayfinding throughout the area.
- Provide additional security measures around buildings and the landscaped areas.
- Designed to Australian Standard AS 4282 Control of the Obtrusive Effects of Outdoor Lighting.
- Not exceed Australian Standard AS 1158 Road & Public Space Lighting.
- Be designed so that no lighting shall be directed at the sky.
- Provide opportunities for CCTV mounts.
- Prevent light spill over adjacent properties.

7.10 Wayfinding Signage

Wayfinding signage shall be as follows:

- Ensure safe, efficient, and legible circulation routes for pedestrians, cyclists, and people with disabilities with the use of wayfinding signage and visual cues.
- In accordance with the PTSA Wayfinding Rulebook for public transport projects, statutory and Lead Agency requirements.

8 MECHANICAL SERVICES

8.1 General

The building air conditioning and mechanical ventilation system will include, ventilation, and smoke control and incorporate:

- Compliance with the Building Code of Australia, AS 1668, AS3666 and all relevant Australian Standards
- Minimise maintenance costs
- Proven design
- Reliability; and durability

- Ecologically Sustainable Development (ESD) principles

8.2 Filtration

Ventilation systems shall be provided with panel filters except car park supply.

8.3 Hours of operation

Hours of operation of the carpark shall be:

- 24 hours
- 7 days a week

8.4 Mechanical Ventilation systems

- Toilet and bicycle store ventilation is to be provided by a common toilet exhaust system with a minimum exhaust rate of 10l/s per sqm for amenity areas.
- Plant rooms are each to be provided with a natural and mechanical ventilation system as required for operation of plant and electrical equipment.
- All natural and mechanical ventilation systems required by relevant authorities will be provided.

8.5 Smoke Exhaust

- Generally, the building shall be provided with a smoke exhaust pressurization system that meets NCC and AS1668.1 requirements or alternate solutions in accordance with a fire engineered approach.

8.6 Testing & Commissioning

Testing & commissioning will be carried out in accordance with CIBSE and ASHRAE requirements.

Before commencing commissioning and testing, the following will be carried out:

- Pressure and leak test all riser ductwork and pipework – remediate leaks
- Provide manufacturer’s test certificates for all proprietary equipment
- Check all power and control wiring for correct operation of equipment
- Run all air handling systems with temporary filters. Clean out all units, plenums, and the like
- Prepare a commissioning management plan and submit it to the Superintendent for approval. Balance air systems to -0% + 10 % of specified quantities

9 ELECTRICAL SERVICES

9.1 General

The building electrical services and systems are to be designed and installed in accordance with all relevant Australian Standards, codes, and authorities’ requirements.

The electrical services will include:

- New power feed for the project
- Main Switchboards
- Submains
- Main Distribution Centres
- Distribution Boards

- General light and power sub circuit cabling
- Lighting Fittings
- Emergency and Exit Lighting Fittings
- Power connections to all electrically operated equipment
- Power for all data / comms
- Energy metering (Supply Authority, NABERS and IGRAT)
- Standby Power
- Lightning Protection System
- Earthing
- External floodlighting and power supply to external signs
- Solar Photovoltaic grid-connected system, 50kW
- Electrical Vehicle provisions as per NCC 2022 section J9D4 and DIT guide note "Electrical Vehicle Charging Provisions in Government Building Projects. Provision of 4 no. electrical charge points for vehicles inclusive provision of space and demand within switchboard and conduits to nominated areas. The provision excludes cabling and equipment which is to be supplied by others.
- GPO’s to be provided at each floor level. all Lift lobbies, and external to stairwells
- Irrigation system for landscaping

9.2 General Power Provisions

Lightning protection shall be provided as required in accordance with AS 1768.

Toilet areas shall be provided with a double GPO adjacent to vanity basins.

RCD protection shall be provided to meet the requirements of AS/NZS 3000 for all GPO circuits, appliances, and internal and external lighting circuits.

EMI and RFI levels shall meet the requirements in the relevant Australian standards.

Power Quality Harmonics will be as stipulated by the supply authority and relevant Australian standards.

9.3 Lighting

All luminaires within the car park shall have no component lower that the maximum vehicle height within the car park, be securely fixed and cables protected from any sharp edges.

Enclosed car parks shall be designed in accordance with AS/NZS 1680.2.1-2008, Table D1-11, and DIT requirements, as summarised below:

- Entrances, during daytime first 15m 800lux
- Entrances, during daytime next 4m2 160lux
- Entrances, during night-time 160lux
- Pay Stations 200lux
- Help phones, displays (if applicable) 200lux
- Staff/ equipment rooms 200lux
- Stair/ Lift Cores 160lux
- Primary access paths (pedestrians) 160lux
- Aisles, ramps, circulating roads (vehicles) 40lux
- Normal parking spaces 40lux
- Parking spaces for disabled 40lux

The following lighting requirements shall be provided.

- Lighting to be fully weather/bug proof (including cable entries) to IP66 and IK08 rating.
- Lighting to be sourced from local suppliers/manufacturers (ease of maintenance).
- Security lighting around the perimeter of the building to be dusk to dawn.
- Security lighting of all floors to be 24/7, unless daylight sensors permit/control otherwise.
- Remote monitoring to Exit and Emergency Lighting to be formally investigated and documented, prior to Tender.
- Rooms/spaces where Monitoring PC and the like are proposed to be located, are to be Air-Conditioned, and sealed from dust entry (including sealing of the floor).
- Operational lighting (as/if a vehicle enters a typical/upper unoccupied floors), to be movement activated.
- Consider pedestrians accessing a darkened level and provide occupancy sensors to mitigate this safety risk.
- Lighting switch zones to be grouped to meet IGRAT and Green Star requirements.
- Lighting uniformity shall be in accordance with AS1680.
- All lighting is to be energy efficient LED fittings to AS1680.
- Programmable lighting control system, controlled by the BMCS, may be provided to allow switch zoning and control to meet BCA, IGRAT and Green Star.
- External lighting for vehicular areas is to comprise of low glare pole mounted light fittings in accordance with AS 1158, and for undercover areas, LED time switch from lighting control system c/w override facilities at the local distribution board.

9.4 Emergency and Exit Lighting

Provide building emergency and exit luminaire system, as an extension of the existing site-wide computer monitored system.

Emergency exit luminaries are designed and installed to AS 2293.

9.5 Communications

Dedicated data and security telecommunications rooms and risers voice, data and security cabling is to be provided. New fibre-optic run from Hospital main communications room.

9.6 Standby Power

Standby power shall be provided to support the following equipment as a minimum:

- 1 lift
- 100% essential fire safety services
- Security and Access Control systems
- Carpark ticketing, control, and boom gates systems
- 100% ventilation (including life safety services)
- 50% internal lights
- When mains power has been interrupted the generator will take load progressively. Under normal circumstances the essential services will be fully transferred within approximately 120 seconds of power failure
- Diesel fuel storage for a maximum of 24 hours of continuous operation shall be provided if a standby diesel generator is required

10 SECURITY SERVICES

10.1 General

Security service shall be in accordance with DIT and Lead Agencies security specifications and requirements.

10.2 Access Control

A proximity card security system is to be provided as an extension and compatible with the existing security system. The system monitors intruder alarms at the building perimeter, fire stairs, plant rooms, roof top, bike cage, car park vehicle entry and exit.

Access control is to be provided on the boom gates entry and exits to the carpark and bike facilities.

Car park vehicle control/payment systems need to be fully documented prior to tender and approved by the carpark operator and Client Agency.

All fire stair doors shall be fitted with electric strike with card readers, for release in fire mode for compliance with the re-entry requirements of the NCC.

A local UPS will be sized to support the base building security system.

Security panels, BMS panels and associated security equipment, to be located in controlled areas, not in publicly accessible spaces.

ICT systems (ICT Switches, and the like) where deployed throughout the carpark, need to be ‘Hardened’ type, or provided with dust proof/conditioned Data/Comms cabinets.

10.3 CCTV

A CCTV security system is to be provided as an extension to the existing sitewide system and to be developed and signed off by the Client Agency, prior to tender.

- Cable pathways to be established and signed off by the Client Agency.
- Client selections of CCTV Equipment to be formally investigated and documented, prior to Tender.
- Interconnecting of CCTV into the existing facility to be formally investigated and included in the documentation, prior to Tender.

Digital CCTV cameras shall be fixed and PTZ type 3-megapixel colour with a digital hard disc-recording device, with hard drive capacity sufficient to provide 30 days continuous recording on all channels at high resolution full frame rate.

Coverage to include for building and carpark entrances, foyers, fire stair egress and lift cars.

Cameras shall be robust for exterior use, as necessary.

Cameras recording to be activated by motion detectors.

Intercom system shall be provided for entry and exit to the carpark and ground floor lobby entry with capacity to expand to the remaining of the lobby levels at a later date.

A local UPS will support the main system and field panels will incorporate internal batteries.

11 LIFT SERVICES

11.1 Lift Type, Capacity and Plant Requirements

All lifts will feature machine room less (MRL) installations.

Lift manufacture to be confirmed following tender to major manufacturers – Kone, Schindler, Otis.

Provision will be made for disabled people to comply AS1735 Part 12 (NCC Compliance).

Lift finishes shall be of a high commercial quality and durability, suitable for a 24/7 operating car park.

11.2 Lift Design Specification

Lift performance shall be based on population (1 person / 30 m2) in line with NCC Table D1.13 with waiting times of <=35 seconds and cater for expected traffic at peak times.

Five-minute handling capacity > 14% of the building's population, based upon 30sqm per person over the building.

Lift speed is to be minimum 1.6 m/s, to be confirmed with final traffic study. Each passenger lift is to have a rated capacity of minimum 17 passengers, to be confirmed with the design development and final performance study.

Levelling accuracy of +_5mm to be provided.

Recommended lateral vibration shall be less than 20mGal.

Passenger lift openings shall be located at ground level and each occupied level of the buildings.

11.3 Passenger Lift Car Size

Passenger lift car size is to be approximately 1450mm wide x 1950mm deep x 2400mm height.

Lift car doors are to be fire rated and centre opening with minimum clear entrance dimensions of 1100mm wide x 2100mm high.

- All cars to be disabled compliant in accordance with AS1735.12.
- One lift is to have capacity for ambulance stretcher.

11.4 Lift Car Control and Finishes

Each lift car is to have two car button control panels with the following provisions:

- Fire service, emergency call
- Independent service key switch

Each passenger lift car is to have internal finishes from the manufacturer's standard range generally and including:

- Rubber tile floor
- Embossed stainless steel doors & frames
- Rear & Side walls to have embossed stainless-steel panels with handrails
- Suspended ceiling panel incorporating recessed low energy LED down lighting
- Landing doors, door frames, landing button stations & hall lantern faceplates shall be flush finished in an embossed stainless steel to the full depth of the jamb

12 HYDRAULIC SERVICES AND STORMWATER MANAGEMENT

12.1 General

The building Hydraulic services and systems are to be designed and installed in accordance with all relevant Australian Standards, codes, and authorities' requirements.

All fittings shall be WELS (water efficient labelling scheme) and brass fittings to be manufactured (D.R. brass).

Shower, WC and locker facilities are provided to the ground floor for staff facilities.

Rainwater recycling provisions to be provided as required to achieve 5-star IGRAT or Green Star rating.

Water recycling provisions to be provided as required to achieve 5-star or Green Star rating. Blackwater treatment and reuse is not included.

A stormwater collection and reuse tank shall be provided, suitably sized for non-portable reuse such as water flushing reuse within the building or fire systems.

A water supply point and backflow prevention value is to be provided for irrigation of surrounding landscaping.

12.2 Sanitary Plumbing and Drainage

Provide toilet amenities, with hot and cold-water provisions, in accordance with NCC requirements.

Water conserving sanitary fixtures including flow-controlled tapware and minimum flush fixtures will be installed.

12.3 Stormwater Drainage and Rainwater Plumbing

Stormwater drainage to be provided in accordance with Authority requirements, DIT requirements, the local council and NCC.

Water quality control devices shall be provided on the stormwater outfall in accordance with Council requirements.

Provide internal gutter and downpipe system in accordance with requirements for 1:100 storm intensity of 5-minute duration.

The stormwater catchment for these works comprises the roof areas, hardstand, and landscape areas. The stormwater design is to consider –

- Catchment assessment (hydrology and hydraulics)
- Existing stormwater system assessment
- Establish on site detention requirements
- Review opportunities and obligations for WSUD
- Present to DIT a concept design for new pipe network and sizes/layout
- Contingency plan for accidental spills
- Management of ground water ingress
- The critical storm duration must be identified
- The ‘design’ storm is a 100-year ARI

The contractor is required to provide a detailed design basis report for the proposed stormwater drainage solution that includes all design assumptions, design calculations and layout plans of the proposed solution.

A Stormwater management plan to be provided along with associated report and calculations designed in accordance with the local council development guides and engineering guidelines.

12.4 Flood management

Modelling and design are required to consider the impact of 1 in 100-year flooding across the site to ensure water does not impact new buildings or flood adjacent properties.

12.5 Existing site stormwater infrastructure

Investigate location, capacity, and condition of existing stormwater systems within the site.

Design and allow for the redirection of existing stormwater systems where required to ensure all underground infrastructure is accessible for future replacement and maintenance.

Ensure there is no reduction in capacity and the system is capable of providing drainage to all existing buildings on the site.

The contractor is to ensure that there is no flooding or damage to existing site buildings or infrastructure due to the new carpark.

CCTV surveys will be required for all existing underground stormwater infrastructure to be retained

12.6 Cold Water System

Provide cold water supply and service to the building in accordance with Authority requirements and BCA.

Domestic water supply shall be provided to all fixtures and usage points at minimum pressures in accordance with AS3500.

Control valves are provided on main runs, branch lines and individual groups so as to facilitate shut down of any section for maintenance with a minimum of interruption.

12.7 Hot water system

The hot water service shall be accordance with AS 3500 National Plumbing Code.

The hot water service shall be zoned to match the cold-water system with.

Hot water heaters are provided as required for the anticipated load and the service reticulates to the various fixtures within the development. Hot water heaters are preferred to be electric.

Control valves are provided on main runs, branch lines and individual groups so as to facilitate shut down of any section for maintenance with a minimum of interruption.

Pipework is to be copper tube with aluminium foiled sheathed mineral wool sectional lagging, except for pipes located in walls or cupboard spaces with pre lagged insulated copper tube.

Hot water temperature in public spaces will be limited to 42 degrees C, at basin taps and showers to prevent scalding.

13 FIRE SERVICES

13.1 General

Fire services will be designed to comply with the latest requirements of the following authorities, standards, and codes:

- South Australian Metropolitan Fire Service
- SA Water
- AS 1670 Fire Detection and Alarm Systems
- AS 1668 – Part 1 Smoke Management
- AS 1851 Maintenance of Fire Protection Equipment
- AS 2118 Automatic Fire Sprinklers
- AS 2419 Fire Hydrant Installations
- AS 2441Fire Hose Reel Installation
- AS 3000 Wiring Rules
- AS 4118 Fire Sprinklers
- Building Code of Australia
- All other Codes & Standards required by the above
- Performance Based Fire Engineered Solutions, which modify current Statutory Authority requirements

The latest revision of each of the above will be used.

The building fire protection system is to be designed and installed in accordance with all relevant Australian Standards, codes, and authorities' requirements.

- A fire indicating panel to indicate the zone of the detector that has alarmed is provided
- Smoke hazard management in accordance with AS1668 and fire engineered solution
- Smoke detectors shall be of the photo electric type & shall be currently approved by all authorities having jurisdiction over the works
- Fire hydrants and hose reels shall form part of the combined sprinkler and hydrant and hose reel system

13.2 Fire Systems

Smoke detectors are provided in accordance with AS1670/1668, pending finalization of the fire engineered solution.

13.3 Controls

In the event of fire, the fire system shall automatically carry out the following functions with alarms through the BMCS:

- Sound the local alarm.
- Transmit an alarm to the Fire Station.
- Cause the mechanical systems to go into fire mode.
- Interface with the Control & Indicating Equipment (CIE) Panel.
- Interface with the Sound system for emergency purposes (SSEP) via the master fire indicator panel; and
- Interface with the BMCS system via Control and Indicating Equipment Panel and security system.

PA facility will be at MECP to allow announcements either floor by floor, or whole of building.

13.4 Fire Hydrant Hose Reel System

Provide Fire Hose Reel and internal building fire hydrant system supply and service to the building in accordance with Authority requirements and NCC.

The combined sprinkler/hydrant/hose reel system is required to be a pressurised system, fed from the booster pumps. Pressure reducing valve sets are included where necessary to contain the maximum pressure allowed by the Fire Brigade.

Hydrants in the fire stair and hose reels on the floor level are provided throughout the complex using 65mm hydrant valves with plastic cap and chains along with 36 metre hose reels or as required by the fire engineering.

Fire Hydrants will be located in the required Fire Stair landings to gain full coverage.

Fire Hose Reels will be generally within 4 metres of required Fire Exits for the fire hose reels in the building.

The design and location of fire hose reels should be secure and prevent opportunities for vandalism.

13.5 Fire Services Test Water Reclamation

The water used in regular fire services testing shall be recovered and reused for non-potable uses within the building.

13.6 Fire Engineering

The Project is to be designed and built in accordance with the requirements of the Building Code of Australia. There will be instances through the design development process whereby an alternative solution will be developed in order to gain this compliance.

Some instances where this will be developed include but are not limited to: Travel distances to egress points within the floor plate.

14 ENVIRONMENTALLY SUSTAINABLE DESIGN

14.1 Environmental Requirements

General

- The Project shall be designed and constructed to minimise environmental nuisance and harm and direct and indirect impacts to the environment (native and non-native vegetation, the local community, and other important environmental areas).

Water Quality

- The Commissioner / Principal / Department encourages (where practical) improvements in stormwater runoff quality using Water Sensitive Urban Design (WSUD) within the Project constraints.
- The operational outcomes of the Works shall achieve water quality that does not cause environmental harm and that is no worse than existing.
- Where this cannot be achieved, the Proponent shall detail why and demonstrate that all reasonable and practicable measures have been incorporated to prevent or minimise any resulting environmental harm.

Vegetation

- Priority shall be given to the retainment of native vegetation and vegetation providing amenity to neighbouring residences and the local community.
- The design and construction methodology shall minimise the impacts to tree protection zones and identify alternatives or remediation measures to avoid vegetation removal. Consideration of alternatives and justifications for impacts need to be documented in Design Report (or similar e.g., decision register).
- Priority shall be given to delivery of vegetation removal offsets via replacement plantings. Trees removed shall be replaced by semi-mature trees provided at offset rates stipulated in the Department's Environment and Heritage Technical Manual, Part 4 Vegetation.

Contaminated Soil

- The reuse of contaminated fill on site, in accordance with EPA requirements, to minimise landfill disposal costs and achievement of sustainability objectives is only allowed if the material is deemed as suitable by the Geotechnical Engineer.

Light Spill

- Roadway lighting shall be designed to minimise light spill to neighbouring properties, achieving the voluntary light spill criteria of AS1158 through use of directional lighting and louvre.

Noise & Vibration

- Noise and vibration mitigation measures shall be provided to ensure there is no additional environmental harm to the local community (sensitive receivers, other buildings), heritage features, fauna, and flora.
- Noise assessment and treatments for road noise shall be provided in accordance with *Clause 3.9 Traffic and Car Park Layout.*

- Property façade treatments shall only be provided to achieve noise mitigation requirements where applicable noise criteria cannot be achieved via treatment at the source.
- Noise levels of any plant (Generators, Fans, etc.) to meet EPA requirements.

14.2 Energy Modelling

For SA Health capital works projects the base building shall be designed, constructed, and commissioned to achieve a 5-star IGRAT or Green Star Design Rating.

Certification of the building's energy performance will be undertaken by an independent assessor appointed by the Principal.

New technology or new applications of existing technology should be used where possible in order to deliver a benchmark ESD project.

14.3 The Building Fabric – Material Selection

The selection of materials shall be carefully considered to ensure:

- Materials such as concrete and steel will contain a proportion of post-consumer recycled materials.
- Timber from forests with identified sustainable management practices shall be used throughout.
- Low VOC products will be used where practical – in particular, carpet and paint to provide a healthy working environment.
- Zero ozone depleting substances will be used for building fabric insulation and all refrigerants.
- Non-recyclable waste generated during construction shall be minimised to below 20%.

14.4 Water Conservation

Water consumption shall be reduced significantly by adopting the following water saving initiatives:

- Water minimisation and re-use – the buildings have been designed to minimise the consumption of water using fittings that are 4 and 5 Star rated, dual flush toilets with 3/4.5 L flush and utilising recycled water.
- 0.5L low volume flush urinals.
- Efficient landscape irrigation utilising recycled water will be installed.
- Rainwater harvesting system will be utilised for toilet flushing, irrigation, and operational wash-down activities where practicable.
- Roof collected stormwater tanks for Fire Systems (for the carpark and/or the facility), and Non-potable water reuse to be considered.
- Recover and reuse, for non-potable purposes, the water consumed in regular fire services tests.

14.5 Energy Performance

An integrated approach to the building services and envelope design shall produce an extremely efficient building design. This shall be achieved through the use of:

- Energy efficient vertical transportation systems will be proposed.
- LED lighting with daylight compensation controls and motion detection technology to control lighting provide the opportunity to significantly reduce energy consumption whilst maintaining uniformity and quality.

- A sophisticated metering strategy will be developed to ensure energy performance can be tracked, evaluated, and optimised on a frequent basis.

14.6 Heritage Requirements

The Department encourages (where practical) reasonable effort to avoid damage, disturbance and interference to any State Heritage Buildings and Aboriginal heritage sites, objects, or remains within the multistorey carpark site area.

Should this be unavoidable, the Project Team shall demonstrate that all reasonable and practicable measures have been considered to prevent or minimise any resulting harm to Aboriginal heritage values prior to construction.

Preliminary assessment of the proposed site is required to be undertaken to indicate that there are no known Aboriginal heritage sites, objects, or remains within the area to be developed.

In addition, the likelihood of encountering Aboriginal heritage during works has been assessed as being low and there is a risk of uncovering aboriginal archaeology submit a section 23 request to undertake ground disturbing activities and relevant authorisations under the Aboriginal Heritage Act 1988 shall be lodged as required.

14.7 Sustainability Requirements

Note for infrastructure projects the project is not required to obtain a rating under the Infrastructure Sustainability Council of Australia (ISCA) rating scheme.

Minimum Sustainability Requirements

Greenhouse gas reduction initiatives must be identified and implemented such that a final estimate (based on and submitted with as built drawings and information), demonstrates a minimum reduction of 10% in whole of life greenhouse gas emissions, relative to the initial estimate prepared in accordance with PC-ST1 Sustainability in Design, Clause 7.

Sustainability Initiatives

The following Principal-nominated sustainability initiatives shall also apply to the project:

- Investigation and implementation of strategies to reduce Portland cement to the maximum extent practical across the project. Refer to PC-ST1 Sustainability in Design Clause 4 – Mandatory sustainability initiatives.
- Investigation and implementation of feasible strategies to reduce embodied emissions and increase recycled content in the project’s asphalt use, including but not limited to the increased use of recycled asphaltic products (RAP), use of warm mix asphalt and recycled soft plastics.
- Inclusion of a photovoltaic 50 Kw Solar System and connection to a local electrical storage system or the electrical grid.

Appendix 1

Addendum to DIT Multistorey Carparking Design and Construction Standards for Public Transport – Standard AM5 DOC -003705

Government of South Australia
Department for Infrastructure and Transport

Addendum to DIT Multistorey Carparking Design and Construction Standards for Public Transport - Standard

Asset Management

AM5-DOC-003705

DOCUMENT AMENDMENT RECORD

REV	CHANGE DESCRIPTION	DATE	COMMENTS
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1. Introduction

Public Transport South Australia (PTSA) is a Directorate within the Department for Infrastructure and Transport responsible for the delivery of public transport services.

2. Purpose

The purpose of this addendum is to outline the fundamental scope requirements for the design and construction of multistorey carparks at public transport precincts. This standard is to be read in conjunction with DIT Multistorey Carparking Design and Construction Standards.

3. Scope

This addendum applies to all new or upgraded multistorey carparking designed and constructed for public transport.

4. Definitions

Precinct - an area designated for specific or restricted use, including a station, tram stop, bus stop or interchange. Additional amenities are included and may comprise the following elements; shelters, passenger facilities (e.g. toilet facilities, waiting areas and bike cages) boarding areas, landscaping, pedestrian access, car parking and entry/exit ways.

Park and Ride – infrastructure designed for commuters to park their vehicles and then transfer to public transportation to continue their journey to their destination. The facility is aimed to reduce traffic congestion and air pollution by encouraging the use of public transport for commuting purposes.

5. References

- Disability Standards for Accessible Public Transport (DSAPT)

6. Governance and Management of Change

The Governance and Management of Change process must include the following documents:

- Engineering and Design Management Framework Part 1 & Part 2;
- AM4-DOC-000936 – Naming and Numbering Conventions for AMPRN Rail Assets and Infrastructure;
- Management of Change process to contact the appropriate operator maintainer;
- AM5-DOC-003408 – Drafting requirements for SAPTA Drawings;
- AM5-DOC-003726 Public Transport Asset Management Handover Requirements;
- AM3-DOC-003714 - Bus Infrastructure Engineering Waiver Management – Engineering Procedure;
- AM5-DOC-003717 - Design Decision Record - Engineering Procedure;
- Handover process to be conducted by the project manager; and
- PTS-MS-05-AM-PRC-00000091 – Asset Management Technical Data Requirements.

7. Design and Construction

For the design and construction of a multistorey carpark at a public transport precinct, the following standards must apply;

7.1. Accessibility and Safety Requirements

- Disability Standards for Accessible Public Transport (DSAPT);
- CS2 DOC 003518 - Tram Stop Pedestrian Access - Tram System;
- AR-PW-PM-SPE-00129006 - Station Pedestrian Access – Train System;
- CS3-DOC-003358 - Standard - Bus Stop Pedestrian Access;
- CS1 DOC 002336 - Lifts For Public Transport Infrastructure;
- AR-PW-PM-SPE-00129004 - Station Overpasses – Train System;
- CS2 DOC 003442 - Tram Stop Overpass Tram System; and
- CS3-DOC-003361 - Standard - Bus Precinct Overpass.

7.2. Communications, ICT and Security

- AR-PW-PM-SPE-00129016 – Design – Stations – Passenger Information Systems;
- PI6-DOC-003515 - Public Transport Standard Bus and Tram Passenger Information;
- PI5-DOC-003512 - Public Transport Standard – Security Systems – Engineering Specifications;
- CE5-DOC-003514 - Public Transport Standard Equipment Room – Engineering – Design;
- CE5 DOC 003525 - Communications Network Principles & Practices For Public Transport Engineering Standard; and
- PTS-MS-10-SG-STD-00000094 – Pit and Conduit Standard for Signalling and Communication Cables – Engineering Standard.

7.3. Electrical and Lighting

- CS5-DOC-003511 - Public Transport Standard Electrical Infrastructure Engineering Design; and
- TP4-DOC-003507 – Standard - Earthing and Bonding for Rail.

7.4. Direction and Signage

- AM5-DOC-003712 - PTSA Wayfinding Rulebook;
- AR-PW-PM-SPE-00129010 - Station Signage and Pavement Marking – Train System;
- CS2-DOC-003445 -Tram Stops Signage and Pavement Marking Tram System; and
- CS3-DOC-003359 Standard - Bus Precinct Signage and Pavement Marking.

7.5. Sustainability

- AR-PW-PM-SPE-00129018 - Station Landscaping – Train System;
- CS2 DOC 003449 - Tram Stop Landscaping Tram System;
- CS3-DOC-003364 Standard - Bus System Landscaping;
- CS5-DOC-003595 - Technical Standard Photovoltaic Power Supply Systems;
- Water Sensitive Urban Design (WSUD); and
- For canopy cover requirements for pedestrian paths refer to Pedestrian Access Standards respectively in clause 7.1.

7.6. End of Trip Facilities

End of trip facilities to be included at multistore carparks must include the consideration of the following standards for all modes of transport.

- AR-PW-PM-SPE-00129008 - Station Toilet Facilities – Train System;
- CS3-DOC-003366 Standard - Bus System Toilet Facilities;
- AR-PW-PM-SPE-00129013 - Station Bicycle Facilities – Train System;
- CS2 DOC 003448 - Tram Stops Bicycle Facilities - Tram Systems; and
- CS3-DOC-003362 - Standard - Bus Stop Bicycle Facilities.

7.7. Gate and Access

Facilities to access metro cards and ticketing information should be included in the design for a multistorey carpark.

For ease of data to public transport services, carpark counting information should be included in the form of a display sign and vehicle detection at each carpark.

7.8. Other

- Carparks in this area will be subject to the Private Parking Areas Act 1986 and signage must be installed to reflect this;

- Carpark category for public transport must be category ‘User Class 1’ in accordance with AS/NZS 2890.1 and for disability requirements refer to AS/NZS 2890.6.
- For the permission of access for vehicles to travel in the carpark, the minimum height between the floor and overhead obstruction must be a minimum of 2300mm. An appropriate warning sign of the clearance must be signposted at all entrances.