

APPENDIX 15: MID DECISION NOTICE



Minister for Housing, Local Government and Planning Minister for Public Works

1 William Street
Brisbane Queensland
GPO Box 806 Brisbane
Queensland 4001 Australia
T: +617 3719 7170
E: housing@ministerial.qld.gov.au

DECISION NOTICE

Ministerial Infrastructure Designation for New Bundaberg Hospital

Decision details

Decision:	Ministerial Infrastructure Designation (MID) made under section 38 of the <i>Planning Act 2016</i>
Date of decision:	26 February 2024
Type of infrastructure:	Planning Regulation 2017, Schedule 5, Part 2: <ul style="list-style-type: none">Item 12: hospitals and health care services.
DHLGPPW reference:	MID-1222-0662

Premises details

Street address:	Bundaberg Ring Road, Thabeban, QLD, 4670
Real property description:	Lot 23 on SP212513
Local government area:	Bundaberg Regional Council (the council)

Infrastructure entity details

Infrastructure entity:	Queensland Health (QH)
------------------------	------------------------

Requirements

A notice of requirements included in the MID is at **Schedule 1**.

Submissions

A notice of how I considered the submission is at **Schedule 2**.

Advice to the entity

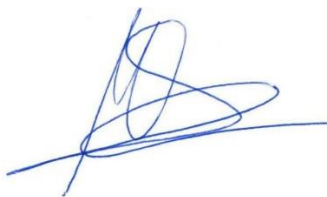
Despite the MID, the entity is responsible for determining what obligations exist under previous development approvals that apply to the premises.

Effective date

As set out in section 9(3) of the *Planning Act 2016*, the MID will take effect from the date the gazette notice for this MID is published in the Queensland Government Gazette.

Duration of MID

The duration of the MID is set out in section 39 of the *Planning Act 2016*.

A handwritten signature in blue ink, appearing to be 'MEAGHAN SCANLON', written over a horizontal line.

MEAGHAN SCANLON MP
Minister for Housing, Local Government and Planning
Minister for Public Works

Enc (2)

Schedule 1 - Notice of requirements included in the MID

Development under the MID is to be carried out in accordance with the requirements included in Table 1.

Table 1 – Requirements	
Plan of designation	
1.	The extent of development is to be carried out generally in accordance with the 'Plan of designation for Bundaberg Hospital', ref: MID-1222-0662 and included at Annexure 1 (Plan of designation).
Stormwater management	
2.	<p>(a) Prior to undertaking works to increase the site's impervious area, prepare a new or updated stormwater management plan (SMP).</p> <p>(b) The new or updated SMP must be certified by a RPEQ and should demonstrate the following:</p> <ol style="list-style-type: none"> i. be generally in accordance with the following sections of the Stormwater Management Plan and Flood Impact Assessment (Ref: 301050419 Rev B), prepared by Stantec and dated 25 November 2022, as included at Annexure 2: <ul style="list-style-type: none"> ▪ section 6 – Stormwater Quantity ▪ section 7 – Stormwater Quality ▪ Drawing CI-DA-501-01 Revision A – Post-Development Catchment Plan ▪ Drawing CI-DA-520-01 Revision A – Drainage Layout Plan. ii. a lawful point of discharge for internal site drainage iii. compliance with the State Planning Policy (SPP) water quality benchmarks iv. no actionable nuisance to downstream properties v. the design and management measures for the constructed wetland on site do not increase wildlife hazards and mitigate its natural wildlife attracting potential. <p>(c) Submit a copy of the new or updated SMP to the Department of Housing, Local Government, Planning and Public Works (DHLGPPW) (infrastructuredesignation@dsgilgp.qld.gov.au) and the council, as manager for Bundaberg Airport (ceo@bundaberg.qld.gov.au).</p> <p>(d) Implement best practice stormwater quantity and quality measures in accordance with the SMP.</p>
Flood management	
3.	The finished floor level for all new buildings and essential electrical services must be constructed to a minimum height of 29.2 metres Australian Height Datum.

Car parking	
4.	<p>(a) Prior to the commencement of use, provide car parking spaces at a minimum ratio of 3.71 spaces per overnight bed, including a minimum of 1% provision for persons with a disability (PWD).</p> <p>(b) 1% of parking spaces (excluding PWD and service vehicle bays) provided on site must be parking spaces for motorcycles.</p> <p>(c) Prior to the commencement of use, provide a minimum of 10 vehicle setdown spaces.</p> <p>(d) All new car and motorcycle parking spaces must comply with the relevant council or Australian Standards.</p>
5.	All vehicle manoeuvring and servicing areas are to be designed in accordance with the relevant council or Australian standards.
Bicycle parking	
6.	<p>(a) Prior to the commencement of use, provide:</p> <ul style="list-style-type: none"> i. 27 secure, covered bicycle parking spaces for staff ii. cycle parking spaces for visitors iii. end-of-trip facilities for staff.
Public transport	
7.	The proposed extension of Johanna Boulevard extension, East-West Connector Road and intersection of the East-West Connector Road and Kay McDuff Drive must be designed and constructed to accommodate a single unit, rigid bus of 14.5m in length.
8.	<p>(a) Prior to the commencement of use, liaise with the council and Department of Transport and Main Roads (DTMR) on the provision of two indented bus stops, a pedestrian crossing arrangement and footpaths on the East-West Connector Road.</p> <p>(b) All external works are to be constructed in accordance with the relevant council, DTMR or Australian standards.</p>
Workplace travel plan	
9.	<p>(a) Prior to commencement of use, liaise with the council and DTMR and prepare a Workplace Travel Plan (WTP).</p> <p>(b) The WTP must be prepared by a suitably qualified person and include/address:</p> <ul style="list-style-type: none"> i. promotion of active transport facilities and travel programs amongst staff, e.g., end-of-trip facilities, cycle training, car pooling, etc ii. safe pedestrian connectivity through the site and to/from parking areas iii. review of buses services in consultation with DTMR and private operators.

	<p>(c) The WTP must be submitted to DTMR (ministerialdesignations@tmr.qld.gov.au) and DHLGPPW (infrastructuredesignation@dsdilgp.qld.gov.au).</p> <p>(d) From commencement of use, implement the recommendations of the WTP.</p> <p>(e) Update the WTP with the growth and development of the hospital.</p>
Waste collection	
10.	<p>(a) Prior to the commencement of use, liaise with the council and prepare a waste management strategy (WMS).</p> <p>(b) The WMS must be submitted to the DHLGPPW (infrastructuredesignation@dsdilgp.qld.gov.au) and address the following:</p> <ul style="list-style-type: none"> i. number and size of bins ii. collection times iii. frequency of collection iv. management of on-site car parking spaces during refuse collection times. <p>(c) From commencement of use, implement the recommendations of the WMS.</p> <p>(d) Update the WMS with the growth and development of the hospital.</p>
External works	
11.	<p>(c) Prior to the commencement of use, liaise with the council and DTMR on the following works external to the site:</p> <ul style="list-style-type: none"> i. extension of Johanna Boulevard from its intersection with Eggmolesse Street to the western site boundary including two site accesses ii. construction of a roundabout at the intersection of Johanna Boulevard and the East-West Connector Road iii. construction of a roundabout at the intersection of Johanna Boulevard and Eggmolesse Street iv. construction of the East-West Connector Road, from the site's eastern boundary to Kay McDuff Drive including two hospital accesses v. construction of a roundabout at the intersection of the East-West Connector Road and Kay McDuff Drive vi. provision of a contribution to the upgrade of Bundaberg Ring Road and Kay McDuff Drive vii. pedestrian footpaths and bicycle paths/lanes along all new roads and intersections. <p>(d) All external works are to be constructed in accordance with the relevant council, DTMR or Australian standards.</p>
Bushfire management	
12.	<p>(a) Prior to the commencement of use, prepare a new Bushfire Hazard Assessment and Management Plan (BHAMP) or update the BHAMP (Ref. PR20294_BMP_Bundaberg Hospital, Version F), prepared by Green Tape Solutions, dated 28 September 2022, and included at Annexure 3.</p>

	<p>(b) The BHAMP must be prepared by a suitably qualified bushfire consultation and include/address the following:</p> <ul style="list-style-type: none"> i. the findings of Section 2 Bushfire Regulatory Framework, Section 3 Bushfire Assessment and Section 4 Bushfire Management Plan of the Green Tape Solutions BHAMP included at Annexure 3 ii. bushfire asset protection zone width calculations iii. the National Construction Code 2022 iv. a vegetation hazard class assessment v. hazard reduction burning vi. water supply for fire fighting vii. emergency vehicle access for fire fighting. <p>(c) A copy of the BHAMP must be submitted to DHLGPPW (infrastructuredesignation@dsdilgp.qld.gov.au) and Queensland Fire and Emergency Services (QFES) (sdu@qfes.qld.gov.au).</p> <p>(d) Carry out the development of the hospital in accordance with the recommendations of the new or updated BHAMP.</p>
13.	<p>(a) Prior to the commencement of use, prepare a bushfire emergency and evacuation procedure (BEEP).</p> <p>(b) The BEEP must be prepared by a suitably qualified person and address the following:</p> <ul style="list-style-type: none"> i. emergency procedures including the designation of buildings capable of being securely sealed for residents and staff refuge during bushfire events and mapped evacuation routes and emergency assembly point(s) ii. emergency team roles and responsibilities including contact details iii. location of emergency equipment for use by staff intending to defend the premises iv. evacuation drill schedule v. training of all staff to ensure awareness of procedures to be followed during potential bushfire events. <p>(c) A copy of the BEEP must be submitted to DHLGPPW (infrastructuredesignation@dsdilgp.qld.gov.au) and QFES (sdu@qfes.qld.gov.au).</p> <p>(d) Implement the recommendations of the BEEP.</p> <p>(e) Update the BEEP with the growth and development of the hospital.</p>
Ecology	
14.	No clearing of native mature trees, except for trees required to be removed for bushfire, stormwater or weed/pest management, is to occur within the area identified as 'Protected vegetation' as shown on the Plan of designation included at Annexure 1 .
15.	(a) Prior to undertaking any clearing work, prepare a Vegetation and Fauna Management Plan (VFMP)

	<p>(b) The VFMP must be prepared by a suitably qualified ecologist and include/address:</p> <ul style="list-style-type: none"> i. preclearing inspections (for fauna, hollows and nests) to be conducted by a suitably qualified person ii. if hollows, nests or other potential breeding places are identified, these are to be assessed by a suitably qualified person to determine if they are breeding places iii. staging and sequence of clearing and recovery procedures iv. presence of a qualified wildlife officer or suitably qualified ecologist during clearing operations v. measures to protect and recover fauna during clearing operations vi. measures to replace/relocate habitat and resources that will be lost, including nesting boxes in appropriate locations. <p>(e) must be prepared and submitted to DHLGPPW (infrastructuredesignation@dsgilp.qld.gov.au).</p> <p>(f) Carry out any clearing work in accordance with the VFMP.</p>
16.	<p>(a) Retain existing mature trees, except where:</p> <ul style="list-style-type: none"> i. required to be removed to facilitate the proposed development ii. it can be demonstrated, by a suitably qualified person, that the tree/s present an unacceptable safety risk. <p>(b) Prior to the commencement of work, undertake the necessary actions to protect vegetation that is not required to be cleared from construction impacts in accordance with the AS4970-2009 Protection of Trees on Development Sites.</p> <p>(c) Relocate any removed habitat features and resources (e.g. large woody debris, tree hollows, logs, rocks) required to be removed to facilitate the proposed development to adjacent areas.</p> <p>(d) Cleared vegetation must:</p> <ul style="list-style-type: none"> i. not be stacked or pushed against mature trees, habitat trees or tall immature trees that are not required to be cleared from construction impacts ii. not obstruct the flow of drains or watercourses.
17.	<p>Prior to the commencement of work, undertake a site inspection to confirm the presence of any invasive, declared or pest species (flora or fauna). If found, remove these in accordance with legislative requirements.</p>
Acoustics	
18.	<p>(a) Prior to the commencement of works for each new building, prepare an acoustic report or update the Acoustic Report (Ref. 301050442, Revision 003) prepared by Stantec, dated 2 November 2022.</p> <p>(b) The new or updated acoustic report must be prepared by a suitably qualified acoustic consultant and include/address:</p>

	<ul style="list-style-type: none"> i. the findings of Section 5 Noise Impact Assessments and Section 6 External Noise Intrusion Assessments of the Stantec Acoustic Report included at Annexure 4 ii. noise emissions from building services plant on adjoining sensitive receivers iii. screening, acoustic louvres and/or barriers to the perimeter of multi-storey carparks iv. impacts from external noise sources including the Bundaberg Clay Target Club and adjacent industrial uses v. findings from the detailed design of the development. <p>(c) A copy of the acoustic report must be submitted to DHLGPPW (infrastructuredesignation@dsdilgp.qld.gov.au).</p> <p>(d) Carry out the development of the hospital in accordance with the recommendations of the new or updated acoustic report.</p>
Design/ built form	
19.	<p>(a) The design of new buildings should include/incorporate:</p> <ul style="list-style-type: none"> i. variation in roof form ii. variation in façade materials, muted tones, and detailing iii. easy to identify building entrances iv. well disguised service elements v. non-reflective surface finishes, where possible.
Landscaping	
20.	<p>(a) Prior to commencement of landscape works, prepare a Landscape Concept Plan (LCP).</p> <p>(b) The LCP must include/address</p> <ul style="list-style-type: none"> i. retention and incorporation of existing vegetation, where possible ii. shade trees, seating, shelter and pathways iii. a planting palette that incorporates native and endemic species iv. a materials palette v. the findings of the BHAMP. <p>(c) A copy of the LCP must be submitted to DHLGPPW (infrastructuredesignation@dsdilgp.qld.gov.au).</p> <p>(d) Carry out landscaping in accordance with the LCP.</p>
Lighting	
21.	All external lighting must be installed and maintained to accord with Australian standards and shielded to minimise light spill to adjoining properties and surrounding vegetated areas.
22.	All aeronautical lighting must be installed, maintained and where required, shielded in accordance with the Advisory Circular – Guideline for heliports – design and operation (Ref AC 139.R-01 v2.0), prepared by the Civil Aviation

	Safety Authority (CASA) and dated December 2023, and all other relevant CASA regulations and standards.
Helipad and operational airspace	
23.	The design and operation of the helipad must be in accordance with the Advisory Circular – Guideline for heliports – design and operation (Ref AC 139.R-01 v2.0), prepared by the CASA and dated December 2023, and all other relevant CASA regulations and standards.
24.	Any gaseous plumes associated with the incineration of medical waste must not exceed 4.3 metres per second velocity into Bundaberg Airport’s operational airspace.
25.	(a) Following completion of construction works for each of the seven storey buildings, submit detailed elevations to the council (ceo@bundaberg.qld.gov.au) as manager of Bundaberg Airport. (b) In the event the proposed height of the completed buildings infringe on the obstacle limitation surfaces for Bundaberg Airport, submit the detailed elevation to CASA (airspace.protection@casa.gov.au).
Refuse plant and screening	
26.	Refuse storage bins and all new plant and equipment are to be stored behind fencing or screened from view from roads, adjoining premises, and open space.
Temporary worker’s accommodation	
27.	The occupation of the temporary worker’s accommodation must be limited to persons that are employed for the construction of the hospital.
28.	Within three months following the completion of construction of the hospital, remove all temporary worker’s accommodation and associated infrastructure from the site.
Construction management	
29.	(a) Prior to commencement of work, prepare a Construction Environmental Management Plan (CEMP). (b) The CEMP must be prepared by a suitably qualified person and include/address: <ul style="list-style-type: none"> i. an Erosion and Sediment Control Plan developed in accordance with the Best Practice Erosion and Sediment Control Document, prepared by the International Erosion Control Association and dated November 2008, and Queensland’s Construction Phase - Stormwater Management Design Objectives, prepared by the then Department of Infrastructure, Local Government and Planning and dated July 2017 ii. dust mitigation methods (such as use of water to suppress potential dust) and air quality management measures iii. hours of construction, vibration, and construction noise (including the default noise standards), in accordance with the <i>Environmental Protection Act 1994</i> (s440R & 440S)

	<ul style="list-style-type: none"> iv. construction waste control and management, in conjunction with a waste management plan if deemed necessary v. disposal and management of hazardous materials and regulated waste, including removal by a suitably licenced contractor where deemed necessary vi. chemical and fuel used during construction stored in bunded areas vii. access locations for and management of construction vehicle traffic (any construction parking off-site is subject to engagement with Council and relevant landowners) viii. appropriate machine hygiene measures ix. proximity of works to easements and services and any necessary design measures, additional analysis or safe work methods x. other required permits from the council, easement holders or utility providers xi. complaint resolution procedures, including who to contact and a record of how complaints have been addressed xii. a construction communication plan including: <ul style="list-style-type: none"> ▪ how neighbouring properties will be advised of construction and demolition activities for each stage ▪ how the appropriate extent of neighbouring properties to be notified will be determined ▪ timeframes for notification of construction activities, with notification to occur prior to works commencing. <p>(c) Submit a copy of the CEMP to DHLGPPW (infrastructuredesignation@dasilgp.qld.gov.au).</p> <p>(d) Construction of the development is to be undertaken in accordance with the CEMP.</p>
Information signage	
30.	<p>(a) Prior to the commencement of work, place an information sign on the site.</p> <p>(b) The information sign is to:</p> <ul style="list-style-type: none"> i. include the following details: <ul style="list-style-type: none"> ▪ a link to where a copy of the MID decision and CEMP can be viewed on the DHLGPPW website; and ▪ the name, postal and/or email address and a contact telephone number for the key contact/principal contractor ii. be positioned on the Johanna Boulevard frontage of the site and be clearly visible for a pedestrian iii. be non-illuminated and maintained at all times during construction.
Geotechnical conditions	
31.	As part of detailed design, undertake a geotechnical investigation that confirms the ground conditions and informs building requirements.

Acid Sulfate Soils (ASS)	
32.	<p>(a) If potential or actual ASS is identified during construction, an ASS investigation is to be carried out in accordance with the Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines v4.0.</p> <p>(b) Construction of the development are to be managed in accordance with the ASS management plan.</p>
Public utility services (services)	
33.	<p>(a) Prior to works commencing confirm the adequacy, capability and location of the existing infrastructure (water, sewer, electricity and telecommunications) to service the proposed development.</p> <p>(b) If reasonably required, the infrastructure should be upgraded to cater for the proposed development.</p> <p>(c) Connect the development to all relevant urban infrastructure.</p>
34.	<p>(a) Prior to the commencement of work, prepare a sewerage servicing plan (SSP) for the temporary worker's accommodation.</p> <p>(b) The SSP must be prepared by a suitably qualified person and include/address:</p> <ol style="list-style-type: none"> i. the waste water generation and anticipated flow rates of the temporary worker's accommodation ii. the type of on-site sewerage system proposed to service the greywater and sewerage generated by the temporary worker's accommodation, having regard to trade waste / regulated waste management iii. a maintenance regime for the operation of the waste water system that ensures compliance with the general environmental duty under the <i>Environmental Protection Act 1994</i>. <p>(c) Submit a copy of the SSP to DHLGPPW (infrastructuredesignation@dsgilgp.qld.gov.au).</p> <p>(d) Prior to the commencement of work, implement the recommendations from the SSP.</p>

Schedule 2 – Notice of how submissions were considered

Submissions received during Minister’s consultation

On 23 March 2023, the former Planning Minister gave a notice to the council and the landowner advising that they were proposing make the MID and inviting final submissions within 25 business days.

Public consultation actions were also conducted by QH inviting submissions between 28 March 2023 and 28 April 2023.

Five submissions were received during this period. The submissions were from the council, state Member of Parliament, a local business, local landowner and a local resident.

A summary of how I have considered the submissions is provided in the table below.

Matters raised	Response
Proposed Development	
<ul style="list-style-type: none"> The hospital should include services for high complex patient care and procedures, strong university affiliations and major teaching and research capabilities. Speciality services should be included in the hospital, such as urology, ear, nose and throat, pain clinic, etc. The hospital should include an MRI facility. 	<p>QH have advised that the hospital will include the following services:</p> <ul style="list-style-type: none"> a comprehensive range of care and services across medical, surgical, emergency, acute mental health, outpatient and diagnostic fields and in line with the projected health service demand for the Wide Bay catchment an MRI machine. <p>The master plan will allow for continued growth of services and opportunities for:</p> <ul style="list-style-type: none"> enhanced university affiliations teaching placements for medical students, interns, junior doctors and registrars a range of teaching and education opportunities for nursing and allied health staff expanded teaching capabilities increased research commitments.
<p>A public private partnership with the Friendlies Society Private Hospital should be considered.</p>	<p>The new hospital is not being delivered through a public private partnership.</p>
<p>Greater detail is need on the timing of future expansion works.</p>	<p>QH have advised that the timing and use of the future expansion buildings are unknown at this stage.</p>
Site selection	
<p>Having two separate hospital sites will increase costs and</p>	<p>The resourcing and operational costs associated with delivering services across two hospital campuses were considered by QH. QH have advised that:</p>

<p>require significant management of resources.</p>	<ul style="list-style-type: none"> • all acute and overnight beds will move to the new hospital site • the existing hospital will be accessed by low acuity patients who require non-urgent planned daytime services.
<ul style="list-style-type: none"> • Further detail is required on site selection and wider master planning of the area. • Land use and infrastructure planning for the local area did not envisage a new hospital in this location. 	<p>An extensive site selection process was undertaken by QH prior to selecting the site for the hospital that considered the long term needs of the region and relevant site constraints.</p> <p>QH have committed to scheduling a local precinct master planning workshop with DHLGPPW, the council and other key stakeholders once a managing contractor is appointed. The workshop will be to:</p> <ul style="list-style-type: none"> • discuss further land use and infrastructure planning for the broader site and surrounding area (particularly surrounding greenfield land) • consider how surrounding land can be protected from inconsistent or undesirable development that would be in conflict with a new land use vision for this area.
Infrastructure/site servicing	
<ul style="list-style-type: none"> • The site is located outside the Priority Infrastructure Area of the Local Government Infrastructure Plan. • The cost to upgrade infrastructure will be significant and should be provided by the State. • Trunk infrastructure should be adequate to service the hospital and emerging residential and industrial infrastructure. 	<p>QH have advised that they will work with council to determine how capital funds for local infrastructure upgrades are allocated. Further, QH anticipates that a formal infrastructure agreement with council may be pursued to allocate responsibilities for local infrastructure upgrades and seek potential agreement regarding funding considerations.</p> <p>Notwithstanding, the MID requires QH to confirm the adequacy of and connect to existing service infrastructure and where required, upgrade the infrastructure to cater for the proposed development.</p>
<p>Details on approval, land acquisition and easements for off-site infrastructure should be provided.</p>	<p>QH are required to obtain all necessary approvals for works outside the MID boundary.</p>
Traffic and transport	
<ul style="list-style-type: none"> • All works to road and paths should be undertaken in consultation with council and undertaken by the State prior to the commencement of use. 	<p>The MID requires QH to liaise with the council and DTMR prior to the commencement of use on the necessary works to the local and State-controlled road networks.</p>

<ul style="list-style-type: none"> The proposed intersection of the new East-West Road and Kay McDuff Drive should be a roundabout rather than a signalised intersection. 	
<ul style="list-style-type: none"> Raised pedestrian crossings should be included on all approaches of all new roundabouts. A roundabout should be included at the Emergency Department Access. Traffic calming measures should be included on the extension of Johanna Boulevard and new East-West Road. Street trees should be planted along new roads and paths. Pedestrian paths and cycleways should be included on the extension of Johanna Boulevard and new East-West Road. Connections should be provided to the external active transport network. 	<p>The provision of pedestrian and bicycle paths, raised pedestrian crossings, roundabouts at site access points, traffic calming measures and street trees will be considered by QH when liaising with the council and DTMR on works external to the site. The MID requires external works are to be constructed in accordance with the relevant council, DTMR or Australian standards.</p>
<ul style="list-style-type: none"> Covered bus stops should be provided. Pedestrian paths should be provided from bus stops to the main hospital entrance. 	<p>QH are in consultation DTMR on the provision of indented premium bus stops in each direction on the new East-West Road and a pedestrian crossing providing direct access to the main hospital entrance.</p>
<p>The service access on the East-West Road should be moved to the east of the future development area.</p>	<p>Given the timing and use of the future development area is unknown at this stage, this suggested amendment has not been included.</p>
<p>All required vehicle parking should be accommodated on site and free of charge.</p>	<p>The proposed six storey car park building will provide parking for both staff and visitors to meet expected demand. QH have advised that any costs associated with car parking would be to pay for the construction, operations, maintenance and future improvements of the car parks and would include concessional and staff rates.</p> <p>Further, QH will engage with the council on parking control measures for the surrounding road network.</p>

Stormwater management	
<ul style="list-style-type: none"> The stormwater report is inadequate and requires further detail to demonstrate no off-site impacts. Further detail should be provided on proposed stormwater detention measures. Further detail should be provided on mitigation measures for impacts from increased flood levels external to the site. Further detail is required on stormwater management from the northern site catchment and potential impacts on residential areas north of the site. 	<p>The submitted stormwater management plan (SMP) demonstrates that stormwater quantity and quality can be adequately managed on site. Final design of the stormwater management strategies will be undertaken alongside the continuing detailed design of the hospital.</p> <p>Notwithstanding, the MID requires QH to prepare new or updated SMPs prior to any work that increase the site's impervious area. The new or updated SMPs must be generally in accordance with the submitted SMP and demonstrate:</p> <ul style="list-style-type: none"> lawful points of discharge for internal site drainage compliance with the State Planning Policy water quality benchmarks no actionable nuisance to downstream properties. <p>This includes any off-site stormwater management strategies, impacts from changed stormwater velocity and external flood levels and final culvert sizing. QH are committed to continued engagement with council and relevant landowners as detailed design progresses.</p>
<p>The open drain along the northern side of East-West road should be designed and constructed as a vegetated channel using the principles of natural channel design.</p>	<p>QH intend to provide a channel which provides, as far as practical, a natural look while meeting hydraulic conveyance requirements.</p>
<p>Constructed wetlands have not been successful in the region and other options should be considered.</p>	<p>Where possible QH would look to achieve stormwater pollutant reduction through the naturalised channels and align with existing local treatment measures. Notwithstanding, QH are open to exploring alternative stormwater quality treatment options should detailed design determine the wetland to be unviable.</p>
<p>A flood access strategy should be developed during major flood events across the region.</p>	<p>QH have prepared an initial flood access strategy as part of the initial designs of the hospital with a focus on providing connectivity to key roads in close proximity of the hospital during flood events.</p>
<p>Further modelling data should be provided to council to compare against the Citywide TUFLOW model.</p>	<p>QH have advised that both the council TUFLOW model and a locally developed HECRAS model have been used in the stormwater management planning. QH intend to update the TUFLOW model as detailed design of the hospital progresses.</p>

Design and landscaping	
The design of new buildings should consider the character, design and climate of the Bundaberg Region.	The character and design of new buildings will be determined as detailed design of the hospital progresses. The MID requires the design of new buildings to include/incorporate: <ul style="list-style-type: none"> • variation in roof form • variation in façade materials, muted tones, and detailing • easy to identify building entrances • well disguised service elements.
Landscaping should be provided on site and incorporate existing mature vegetation where possible.	The MID requires QH to prepare a Landscape Concept Plan for the hospital which includes incorporating existing vegetation where possible.
Amenity	
The new hospital will result in noise impacts on neighbouring residential properties from construction and traffic. The acoustic assessment should include the impacts of the Bundaberg Clay Target Club and construction noise from adjoining industrial and residential land.	The submitted Acoustic Report determined that noise from the hospital was unlikely to impact on neighbouring residential properties. Notwithstanding, the MID requires QH to prepare new or updated Acoustic Reports as part of the detailed design for each new building. The new or updated acoustic reports must address impacts from external noise sources including the Bundaberg Clay Target Club and adjacent industrial uses. Further, the MID requires the preparation of a Construction Environmental Management Plan that addresses construction noise in accordance with the <i>Environmental Protection Act 1994</i> .
Ecology	
A condition of an existing development approval on the site required its dedication as a Reserve for Environmental Purposes to offset vegetation removal that occurred when the adjoining high impact industrial land was developed, as such any cleared vegetation should be offset by the State.	Despite the MID, QH are responsible for determining what obligations exist under previous development approvals that apply to the premises and seeking amendments to any conditions on existing approvals where necessary. It is noted the clearing of vegetation has been determined by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) to be a controlled action. QH will be required to comply with any decision under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EBPC Act).
Further detail is required on the controlled action determination by DCCEEW.	A decision on the controlled action has not yet been made by DCCEEW. Information on the referral and controlled action determination (DCCEEW ref. 2022/09397) by DCCEEW is available on their website.

Cultural heritage	
Further detail is required on the cultural heritage assessment and cultural heritage agreement.	QH have committed to undertaking continued collaborative engagement with the Port Curtis Coral Coast Trust as the current Registered Native Title Prescribed Body Corporate. The assessment of cultural heritage matters and preparation of the cultural heritage agreement remain ongoing.
Airport	
Potential impacts from building generated windshear on the airport should be considered.	QH have advised that the potential risk of building generated windshear will be considered during detailed design of buildings and an assessment by an appropriately qualified consultant undertaken, where necessary.
The constructed wetland on-site is not supported as it will attract bird and bat life.	The MID requires the constructed wetland on site to be designed and maintained to not increase wildlife hazards and mitigate its natural wildlife attracting potential. Notwithstanding, QH is open to exploring alternative stormwater quality treatment options should detailed design determine the wetland to be a risk to aircraft.

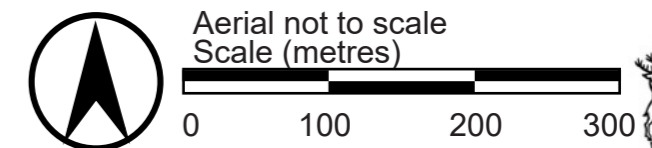
Annexure 1 to Schedule 1 – Plan of designation



Legend

- Built form envelope comprising buildings and structures not exceeding 1 storey
- Built form envelope comprising buildings and structures not exceeding 3 storeys
- Built form envelope comprising buildings and structures not exceeding 6 storeys
- Built form envelope comprising buildings and structures not exceeding 7 storeys
- Ground level car parking and vehicular circulation
- Substation
- Open space, covered pedestrian links, landscaping and associated structures
- Protected vegetation
- Vehicular ingress/egress
- Service and emergency vehicular ingress/egress only
- Temporary managing contractors facilities, worker's accommodation and car parking
- Designation boundary

Title: Plan of designation for New Bundaberg Hospital
Address: Bundaberg Ring Road, Thabeban, QLD, 4670
Reference: MID-1222-0662



Annexure 2 to Schedule 1 – Stormwater management

6. Stormwater Quantity

The following parameters and calculations detail the values adopted for the initial modelling onsite. Further detailed analysis and verification has been since been undertaken as discussed in Section 3.1, however the results below are presented as background to illustrate how the current proposal was derived.

6.1 Strategy Overview

Bundaberg Regional Council advised that the existing municipal stormwater drainage systems in many parts of Bundaberg are currently operating at or above capacity which results in downstream drainage issues. This is particularly the case north of the site for flows in the Saltwater Creek Catchment. The proposed drainage design as part of the New Bundaberg Hospital project will need to ensure there is no downstream worsening as a result of the development.

The detention strategy for the site differs between the northern and southern catchment. The Northern catchment is proposed to be mitigated primarily through catchment diversions within the development, with area previous draining north diverted south to reduce peak flows. Minor coincidental detention within the northern catchment is proposed to mitigate any nuisance flows unmitigated through catchment diversion. This strategy has the additional benefit of reducing the volume of stormwater being directed to existing problem areas downstream at Goodwood Road.

The southern catchment is proposed to be mitigated through onsite detention. Due the flat nature of the site, the proposed detention system will be constructed in the form of a shallow bund along the south/east boundary of the site. This bund will act to increase the depth of flooding marginally and holding water onsite for longer to reduce peak flows discharging from the site.

The detention system, wetlands and channel drains are proposed be integrated neatly into the landscape and landform design regime such that they are barely recognisable as engineering structures. Refer to the civil drawings for the extent of vegetated wetlands.

As discussed in Section 2.5, the distribution of flows from external catchments is proposed to be maintained at pre-development levels, however coordination with neighbouring landowners to bring forward the ultimate drainage strategy for the area will benefit the hospital development by reducing the requirements for conveyance of external catchments through the development site. It is recommended that such coordination be perused in future design phases.

6.2 Input Parameters

The rainfall intensities utilised in the stormwater calculations have been calculated for the site's coordinates using the Bureau of Meteorology's online IFD calculator. Fraction Impervious values and surface roughness have been extracted from the Bundaberg Citywide Overland Flow Path Study which utilise AI generated terrain classification to differentiate between surface classifications.

Table 6-1: Catchment Pre-development Parameters

Name	Mannings N	Fraction Impervious (%)
Open Space	0.03	0
Buildings	0.5	100
Low Density Veg	0.04	0
Mod. Density Veg	0.05	0
High Density Veg	0.06	0
Roads	0.016	100



High Density Crops	0.09	0
Crops Open	0.045	0
Med Density Crops	0.075	0
Low Density Crops	0.06	0
Waterbodies	0.03	0

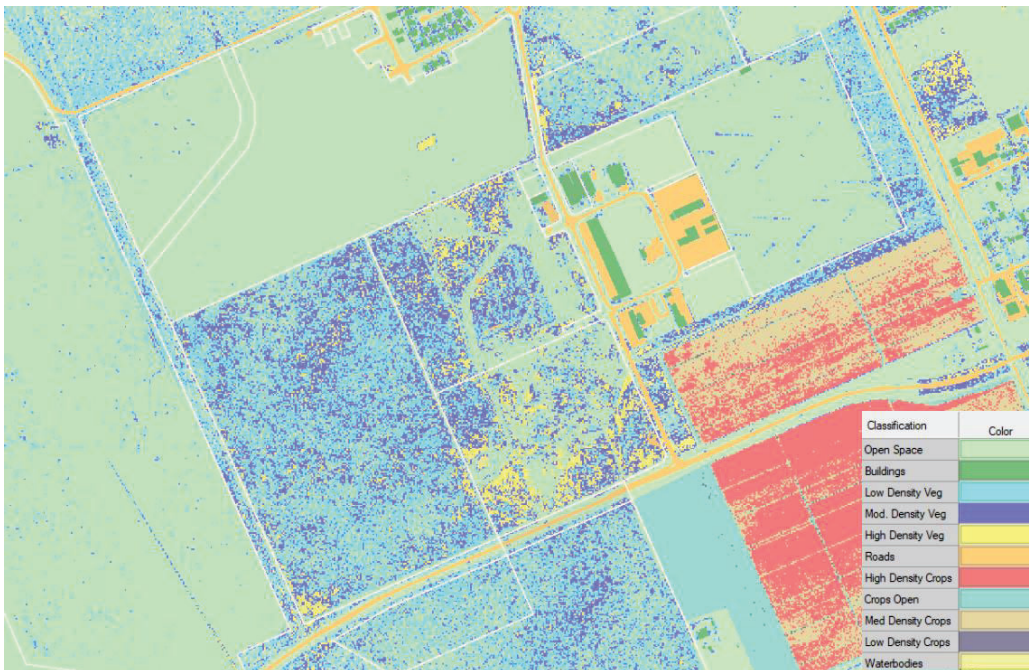


Figure 6-1: Initial Modelling Pre-Development Land Classification

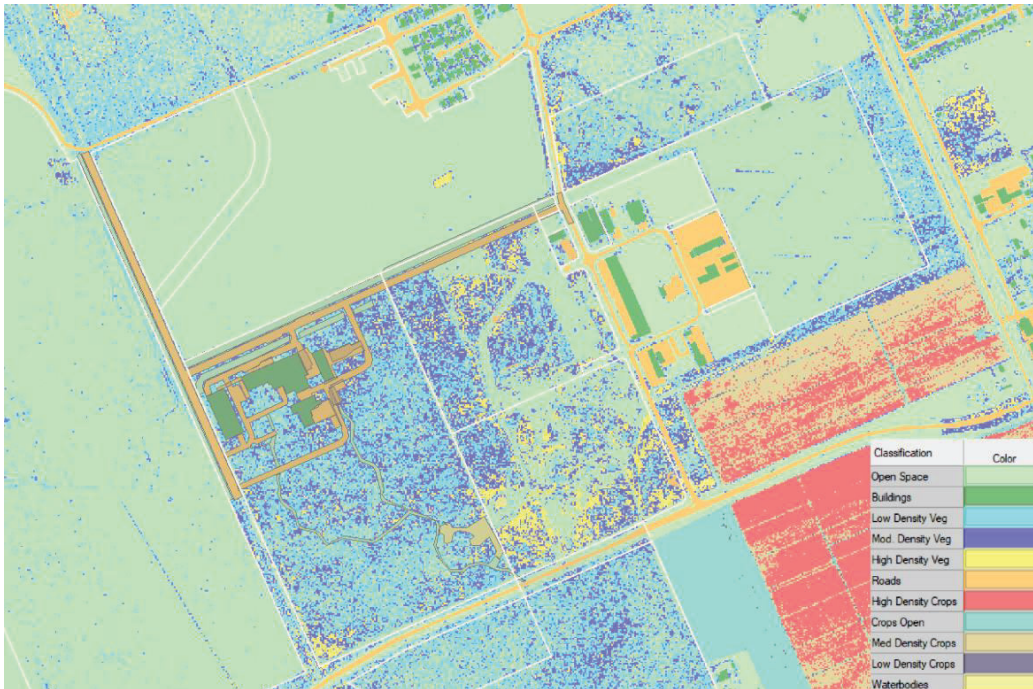


Figure 6-2: Initial Modelling Post-Development Land Classification

The rainfall temporal patterns from Australian Rainfall and Runoff (ARR) were utilised in a DRAINS model. The RAFTS hydrological method has been used with initial and continuing loss parameters mirroring the City Wide Flood Study, being Initial Imp 1mm, Initial Perv 25mm/h, Continuing Imp 0mm, Continuing Perv 1.5mm/h. A further sensitivity analysis was undertaken with 0mm loss for initial and continuing as per Council guidelines which anticipate fully saturated catchments resulting from pre-burst cyclonic rainfall.

6.3 Lawful Point of Discharge

It is a requirement that every development must have a lawful point of stormwater discharge. It is proposed to maintain the existing lawful point of discharge which is Kay McDuff Drive and the Bundaberg Ring Road. It is proposed to construct new drainage channels connecting to the existing points of discharge. Refer to the Pre and Post-Development Catchment Plan/s in Appendix E for the locations.

6.4 Proposed Stormwater Management Strategy

6.4.1 Catchment Description

The pre and post-development catchment areas are summarised in Table 6-2 below and on the catchment drawings within Appendix E.

It is proposed that the Southern catchments extends further North than currently, to divert additional stormwater away from existing flood issues to the east and offset the additional impervious areas created by the hospital.

Table 6-2: Pre & Post-development Catchments

Catchment Name	Pre-development (Ha)	Post-development (Ha)	Change (Ha)
Eastern Catchments	40.865	34.423	-6.442



Southern Catchments	60.279	66.721	+6.442
Total	101.144	101.144	0.0

6.4.2 Level of Serviceability

The following level of serviceability will be provided within the stormwater drainage system as per QLD Health Capital Infrastructure Requirements, Bundaberg Regional Council Design Guidelines and Queensland Urban Drainage Manual (QUDM) Third Edition 2013.

Table 6-3: Stormwater Drainage Serviceability

Development category	Design parameter	Design standard
Internal Roads	Minor drainage system	20 Year ARI (5% AEP)
	Major drainage system	100 Year ARI (1% AEP) + Trafficability in 0.2% AEP
Council Roads (New)	Minor drainage system	10 Year ARI (10% AEP)
	Major drainage system	100 Year ARI (1% AEP) + Trafficability in 0.2% AEP desirable
Buildings	Minor drainage system	20 Year ARI (5% AEP)
	Major drainage system	500 Year ARI (0.2% AEP) + 500mm freeboard

6.4.3 Proposed Stormwater Management Strategy

As discussed in Section 6.1, the Proposed Attenuation Strategy for the development site and associated modifications to existing flow conditions is to ensure non-worsening from the pre to post development scenarios.

The Northern catchment is proposed to be mitigated primarily through catchment diversions, with area previously draining north diverted south to reduce peak flows, as shown in Table 6-2. Minor coincidental detention within the northern catchment is proposed to mitigate any nuisance flows unmitigated through catchment diversion.

The southern catchment is proposed to be mitigated through onsite detention. The proposed detention system will be constructed in the form of a shallow bund along the south/east boundary of the site. This bund will act to increase the depth of flooding marginally and holding water onsite for longer to reduce peak flows discharging from the site. The bund will have a typical height of 400mm and minimum level of RL26.7. An outlet channel is proposed at the primary discharge point to the Bundaberg Ring Road. The Channel has an Invert level of RL25.68 and a width of 4.5m at the base and 8.5m at top.

The bund and channel are nominally shown on the earthworks plan CI-DA-100-01 in Appendix E.

The proposed Conceptual Stormwater Management Strategy has been prepared based on these investigations. The Stormwater Management Plan and Details have been included in Appendix E.

6.4.4 Mitigated Post Development Condition

The proposed stormwater quantity management strategy was modelled using a HECRAS model as established in the earlier sections. The model has demonstrated that the mitigated post-development peak flow rates do not exceed the pre-development peak flow rates.

The peak pre and post-development runoff hydrographs for the critical 1% AEP event at each the Southern Catchment at the Bundaberg Ring Road, the northern catchment at Eggmolesse Street and the eastern catchments at Kay McDuff Drive as established by HECRAS can be seen below. The Graphs each clearly show the effect of the proposed detention devices by illustrating the reduction of post-development inflow to outflow for the 1% AEP event.

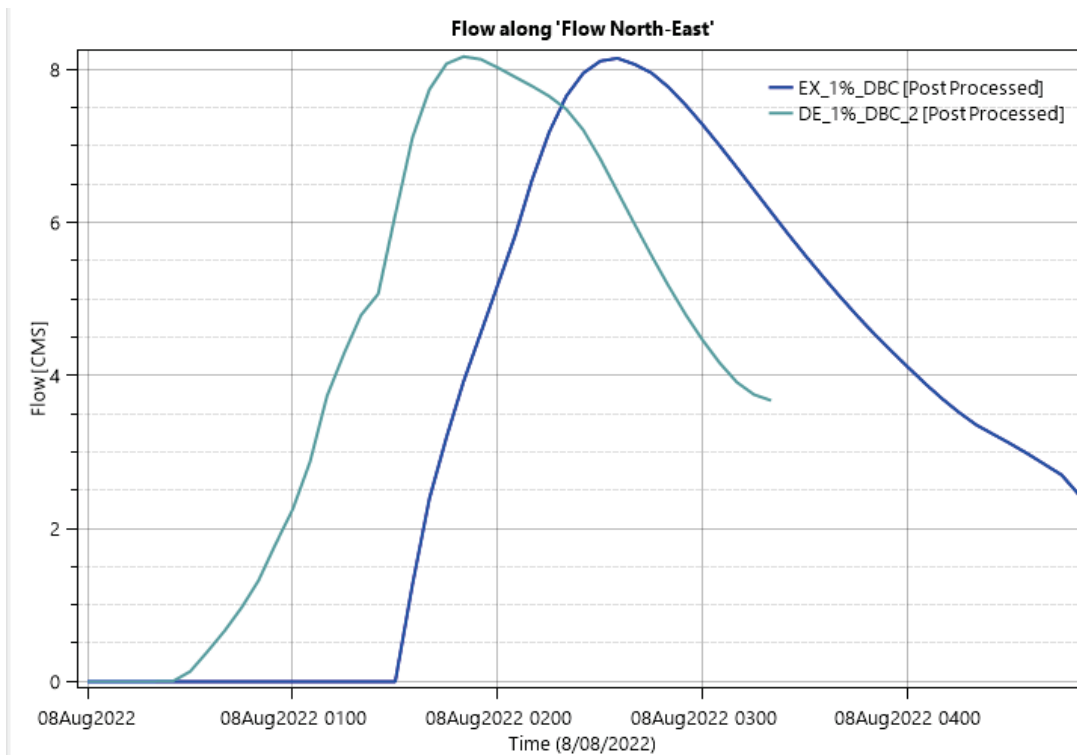


Figure 6-3: Eastern Catchment – Kay McDuff Drive Hydrograph Existing vs Design, 1% AEP

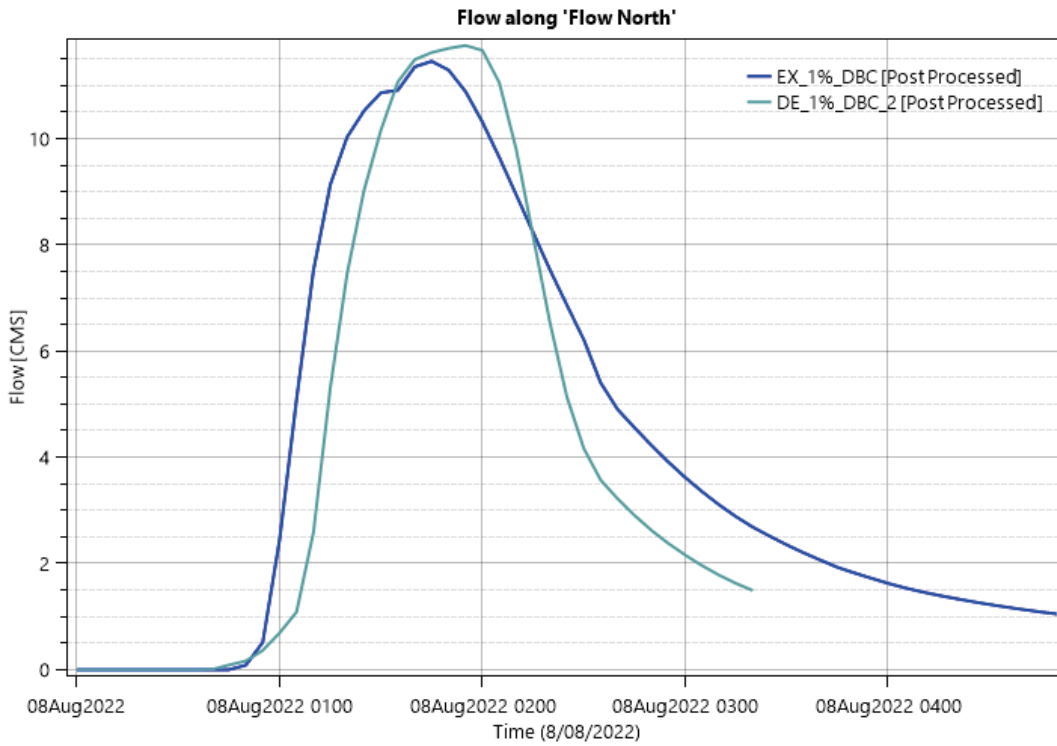


Figure 6-4: Northern Catchment – Eggmolesse St Hydrograph Existing vs Design, 1% AEP

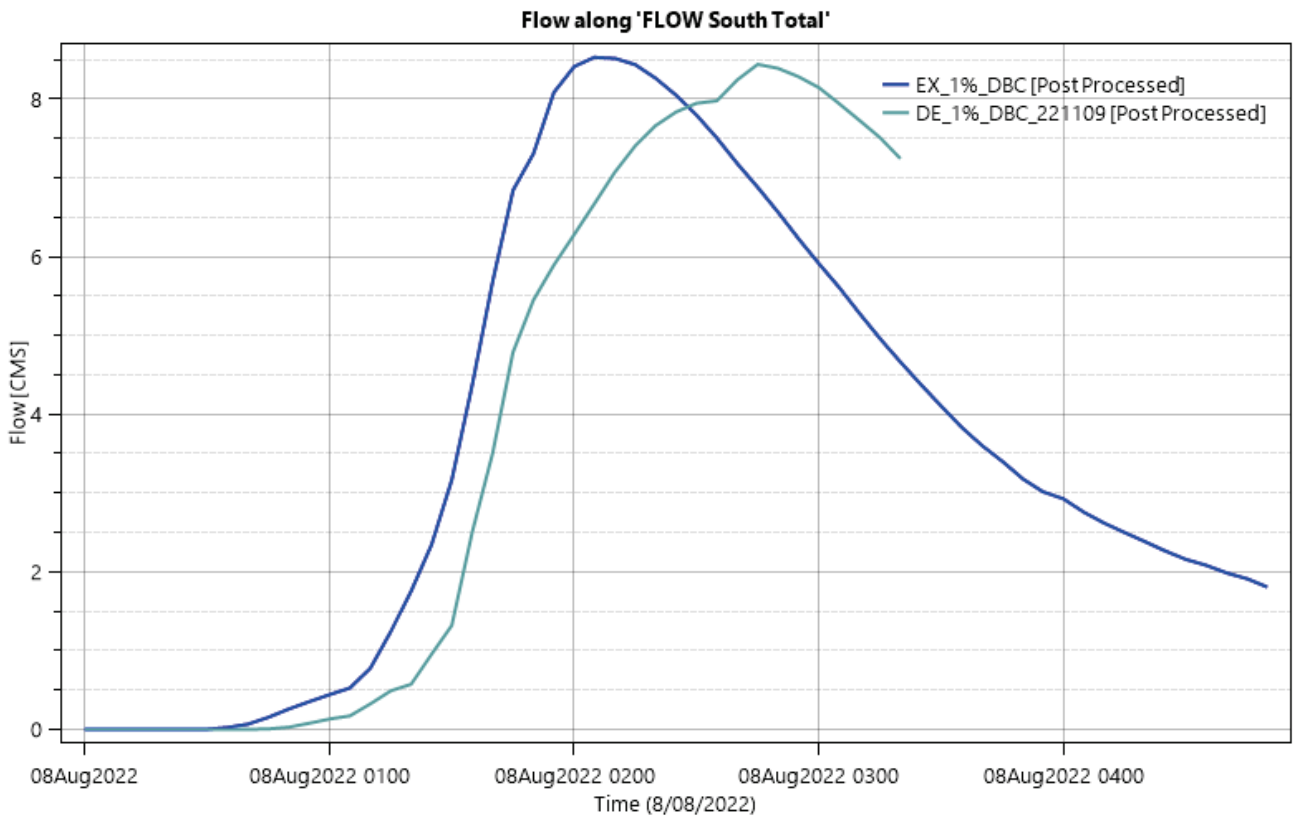


Figure 6-5: Southern Catchment – Bundaberg Ring Road Hydrograph Existing vs Design, 1% AEP



As can be seen in the figures above peak flows between the existing and proposed design scenarios are sufficiently mitigated back to pre development conditions.

As such, it has been demonstrated that the proposed stormwater quantity management strategy as depicted in the drawings in Appendix E and described above adequately meets the Bundaberg Regional Council and State Planning requirements in relation to stormwater quantity for each of the subject catchments and each of the lawful points of discharge.



7. Stormwater Quality

7.1 Stormwater Management Strategy – Operational Phase

It is a requirement that the proposed development manages stormwater in such a way that in the long term, the development achieves industry standard Water Quality Objectives thus reducing the impact the development has on receiving waters.

It will be demonstrated that the Water Quality Objectives (WQO's) in accordance with the State Planning Policy – Water Quality can be met by implementing appropriate the Stormwater Quality Improvement Devices (SQID's). The proposed system will be assessed by undertaking Pollutant Export Modelling to demonstrate the effectiveness of the treatment system in achieving the WQO's.

7.1.1 Operational Phase Water Quality Objectives

The WQO's selected for the site are listed in Table 7-1. These are based on Table B of Appendix B in the State Planning Policy 2014. As the development is located within Central QLD South, the minimum percentage reduction targets are based on the Central QLD South region.

Table 7-1: Site Water Quality Objectives

Minimum reductions in mean annual loads from unmitigated development	
Indicator	Central QLD South
Total Suspended Solids (TSS)	85%
Total Phosphorous (TP)	60%
Total Nitrogen (TN)	45%
Total Gross Pollutants >5mm (GP)	90%

It should be noted that these WQO's are long term objectives for a fully stabilised catchment with fully established water quality improvement devices throughout.

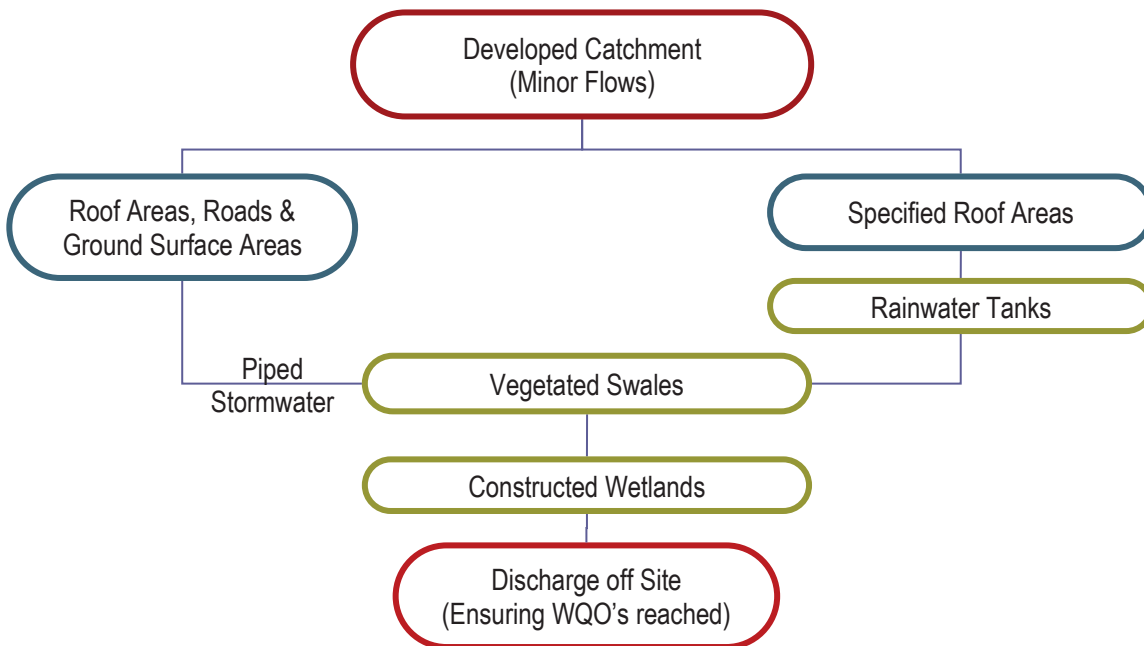
7.1.2 Water Quality Treatment Train – Operational Phase

Consideration of the requirement for safety, maintenance and visual amenity has been incorporated when establishing the proposed WSUD principles and devices to be utilised within the treatment system for this development.

The stormwater treatment train schematic is shown in **Figure 7-1**.



Figure 7-1: Typical Treatment Train Proposed



7.1.3 Pollutant Export Modelling

In order to demonstrate that the proposed treatment train meets the required WQO's, pollutant export modelling has been undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Software program Version 6.1 by eWater CRC. As such, Total Suspended Solids (TSS), Total Nitrogen (TN), Total Phosphorous (TP) and Gross Pollutants (GP) have been quantitatively modelled for pollutant exports using MUSIC.

Modelling has only been undertaken on the post-development proposal with SQID's installed so as to demonstrate the long term load reductions from a fully established catchment

MUSIC Program Setup

This section explains the setup of the MUSIC model with the detailed pollutant export calculations being included in the MUSIC results in Table 7-2.

For Music Modelling (using MUSIC 6.3) the following parameters have been used:

Table 7-2: MUSIC modelling parameters

Meteorological Data	
Rainfall Station:	39128 BUNDABERG
Period:	31/12/1963 - 31/7/2010
Time Step:	6 Minutes
Evaporation Data:	Bundaberg Monthly PET

Table 7-3: Catchment modelling parameters

Node Description	Area (Ha)	Percentage Impervious (%) / Area Impervious (Ha)	Land Use Rainfall and Pollutant Parameters (refer Appendix F)
Commercial CP south	0.295	1.00 0.295	Commercial/ Roof
Commercial Road (Road 7~9)	0.868	1.00 0.868	Commercial/ Roads
Commercial Roof (FSC)	0.549	1.00 0.549	Commercial/ Roof
Commercial CP North	0.387	1.00 0.387	Commercial/ Roof
Commercial (Road 7~4~6~5)	0.671	1.00 0.671	Commercial/ Roads
Commercial Ground Level (Road 7~9)	0.58	0.20 0.117	Commercial / Ground level
Commercial Road (Johanna_ Road 3~4)	0.486	1.00 0.486	Commercial/ Roads
Commercial Road (~C100 North)	0.498	1.00 0.498	Commercial/ Roads
Commercial Roof (Mental Health)	0.334	1.00 0.334	Commercial/ Roof
Commercial Road (Road 1 & 2)	0.249	1.00 0.249	Commercial/ Roads
Commercial Road (~Road 8 & 10)	0.276	1.00 0.276	Commercial/ Roads
Commercial Ground Level (Bunker Road 7~4~6~5)	0.533	0.20 0.105	Commercial / Ground level
Commercial Ground Level	0.556	0.20 0.114	Commercial / Ground level
Commercial Ground Level (ED)	0.425	0.50 0.214	Commercial / Ground level
Commercial Ground Level (Mental Health Road)	0.425	0.50 0.214	Commercial / Ground level
Commercial Roof (Clinical Building)	1.054	1.00 1.054	Commercial/ Roof
Commercial Roof (Bunker)	0.299	1.00 0.299	Commercial/ Roof
Commercial Road (~C100)	0.117	1.00 0.117	Commercial/ Roads
Commercial Road (~C99)	0.609	1.00 0.609	Commercial/ Roads
Commercial Road	0.861	1.00 0.861	Commercial/ Roads
Commercial Road (~C100 South)	0.042	1.00 0.042	Commercial/ Roads
Total:	10.114	0.83 8.358	

The parameters of each Land Use category are based on MUSIC Modelling Guidelines (2010). Copies of the parameters are included in Appendix F.

7.2 Stormwater Quality Improvement Devices

7.2.1 Landscaped Swale

Landscaped swales are vegetated areas where stormwater can flow in lieu of a conventional pipe stormwater system and remove sediment and nutrients in the process. This treatment consists of a vegetated centre invert, the stormwater dissipates over the vegetation, seeping into the ground and infiltrating as base flow.

Swales will be placed within the development as shown in CI-DA-520-01 in Appendix D and will have the properties in the MUSIC program as summarised in **Table 7-4**.



Table 7-4: Swale Properties

Node Description	Length (m)	Longitudinal Grade (%)	Base/ Top width (m)	Flow Depth (m)	Veg Height (m)
Swale - from C109	473	0.15	2.5/ 7.5	0.6	0.5
Swale - C112	115	0.15	4/ 10	0.6	0.5
Swale - C104	429	0.15	4/ 10	0.6	0.5
Swale - from C106	604	0.15	2.5/ 7.5	0.6	0.5
Swale - C103	155	0.15	4/ 10	0.6	0.5

7.2.2 Constructed Wetlands

The proposed treatment train consists of two separate constructed wetlands.

A constructed wetland has been proposed towards the western boundary of the site adjacent to the environmental buffer area as the major treatment for stormwater generated on site.

Wetlands are essentially shallow vegetated water bodies that remove pollutants from stormwater via sedimentation, filtration and biological processes. These processes are optimised by ensuring retention times between 48 and 72 hours, allowing water levels to rise during rainfall events and slowly discharge. Wetlands generally consist of an inlet zone, macrophyte zone and high flow bypass channel. The following sections detail the design parameters for each component of the proposed wetland.

Inlet Zone

The inlet zone has been designed to remove coarse sediments (>125 µm), so as to ensure that vegetation in the macrophyte zone is not smothered. In addition the inlet zone is used to control and regulate flows entering the macrophyte zone by allowing flows greater than the design flow (1 year ARI), to bypass. The inlet zone also functions as a storage area for settled sediments. The desirable frequency for desilting is once every five years. The modelling parameters used to represent the inlet zone are presented in **Table 7-5**.

Macrophyte Zone

The wetland macrophyte zone contains a sequence of changing bathymetry to create zones of vegetation consisting of ephemeral, shallow marsh, marsh and deep marsh species where fine sediments can be settled and soluble nutrients can be removed. Open water zones are located upstream and downstream of the macrophyte vegetation to allow for mosquito predators to seek refuge during drier periods when water levels are lowest. The modelling parameters used to represent the inlet zone are presented in **Table 7-5**.

Table 7-5: Wetland Properties

Parameters	Wetland Onsite	Wetland Offsite
Inlet pond volume	8240	3090
Area (sqm)	4140.5	5432
Initial Volume (m ³)	7809	2413



Extended detention depth (m)	0.2	0.2
Permanent Pool Volume (cubic metres)	7809	2413
Proportion vegetated	0.5	0.5
Equivalent Pipe Diameter (mm)	125	80
Overflow weir width (m)	10	3

7.3 Post-development Water Quality Results.

7.3.1 Operational Phase

A number of management measures have been considered with a focus on reducing polluted runoff volumes from the site. The WSUD principals proposed for stormwater treatment includes the following SQID's:

- Vegetated Swale
- Rainwater Tanks
- Constructed Wetlands

The effectiveness of the treatment devices proposed in the above section has been modelled using MUSIC with the overall treatment train efficiency results shown in **Table 7-6** below.

Table 7-6: Treatment Train Efficiencies

Indicator	Total Site Reduction	Load based Target WQOs	Target Achieved
Total Suspended Solids (TSS)	85.5%	85%	Yes
Total Phosphorous (TP)	79.3%	60%	Yes
Total Nitrogen (TN)	68.1%	45%	Yes
Total Gross Pollutants (GP)	92.6%	90%	Yes

From the results presented in **Table 7-6** it can be seen that the proposed SQID's mitigate the water quality impacts of the development and meet the required Water Quality Objectives thus ensuring stormwater quality is appropriately managed. The treatment train's conceptual design and its effectiveness are shown in Appendix D in more detail.

7.4 Maintenance Tasks & Responsibilities

To ensure that the proposed stormwater quality treatment train maintains its treatment effectiveness, maintenance is imperative to be undertaken including monitoring and rectification as required. The maintenance requirements are included in Table 7-7.

The following maintenance responsibilities are proposed for the various Stormwater Quality Improvement Devices to ensure they continue to operate as planned.



Table 7-7: Summary of SQID Maintenance Responsibility

Stormwater Quality Improvement Devices	Maintenance Responsibility	
	Defects period	Operational period
Swales	Landowner / Appointed Contractor	Facilities Management
Rainwater Tanks	Landowner / Appointed Contractor	Facilities Management
Constructed Wetland	Landowner / Appointed Contractor	Council

7.5 Wetland Hazard Assessment

7.5.1 Airport Overlays

The BRC Planning Scheme Overlay Code for Airport and Aviation Facilities specifies general outcomes for development works within proximity to the airport. Overlay Mapping extracts are shown below in Figure 7-2. As shown the site is impacted by the SPP Runway Buffer overlay, specifically being within the 3km Wildlife Hazard Buffer Zone.



Figure 7-2: SPP Runway Buffer Overlay

Drainage works and artificial waterbodies such as the proposed wetland located within the 3km buffer are required to be designed and installed to minimise bird and bat attracting potential. As such should a constructed wetland built within the site boundary would require additional measures to mitigate its natural wildlife attracting potential.

There are several potential measures to mitigate the hazard associated with artificial wetland. The Australian Airport Association has published measures include planting with Endophytic grasses, avoiding plants which produce attractive fruits and flowers, maintaining grasses at a short height of 200~300mm and structural measures such as netting over permanent ponds, installation of floating devices in permanent ponds and incorporating steep-sided concrete-lined batters to drains.

As shown in Figure 7-2 there are two treatment wetlands proposed, one within the site which falls just inside the 3km buffer zone and the primary wetland within Lot20/SP255543, which falls outside of the 3km buffer.

It is recommended that risk assessment be undertaken with the detailed design of drainage infrastructure within the site to determine the most approximate mitigation measures, whether those measures are needed and even whether the wetland can be constructed within the site at all.

As part of the conceptual design two design scenarios have been investigated to allow for outcome of the future risk assessment. Modelling has shown that both scenarios have the potential to achieve water quality objectives for the development.

Scenario 1, as documented on the engineering drawings includes a treatment wetland in the southeast corner of the site, just inside the 3km buffer and adjacent the existing onsite dam.

Scenario 2 removes the treatment wetland from within the site with treatment being undertaken by only swale drains, buffer strips, rainwater system and an increased offsite treatment wetland.

7.5.2 Mosquitos

The placement of standing waterbodies and wetlands present risks associated with the likelihood of attracting mosquitoes and associated mosquito-borne diseases such as dengue and malaria.

An initial desktop review indicates that the typical *Aedes Aegypti* mosquito will not typically travel more than 200m, while mosquitoes such as *Aedes Vigilax* and *Culex Annulirostris* (typically associated with wetlands and deltas) can travel over 5km.

It is recommended that as part of the detailed design for the site and wetlands that additional investigations be undertaken to confirm the likely species and risks associated with mosquitos and appropriate mitigation measures for mosquito control.

As a result this initial assessment treatment wetlands and associated standing water bodies have been placed as far away as possible from the hospital facility. With the primary treatment wetland being located over 1500m away from the clinical building and the secondary onsite wetland being located over 500m from the clinical building.

As discussed above in Section 7.5.1, allowance has been made for removing the onsite treatment wetland should detailed assessments determine the proposed onsite device isn't suited for the development.

7.6 Acid Sulphate Soils

Acid Sulphate Soils are typically encountered in Holocene sediment and below 5m AHD. The lowest area of the proposed works associated with the development is at an approximate RL 26m AHD.

The deepest excavation is not expected to be below RL 5m AHD, the natural surface is not below RL 20m AHD, and the site is not subject to Council's or Qld Government's ASS mapping. As such, acid sulphate soils are not expected to be a development issue.



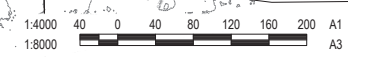
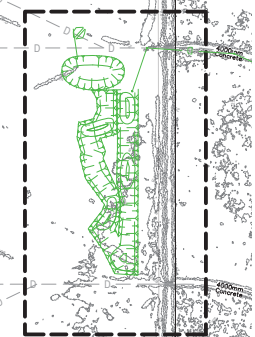
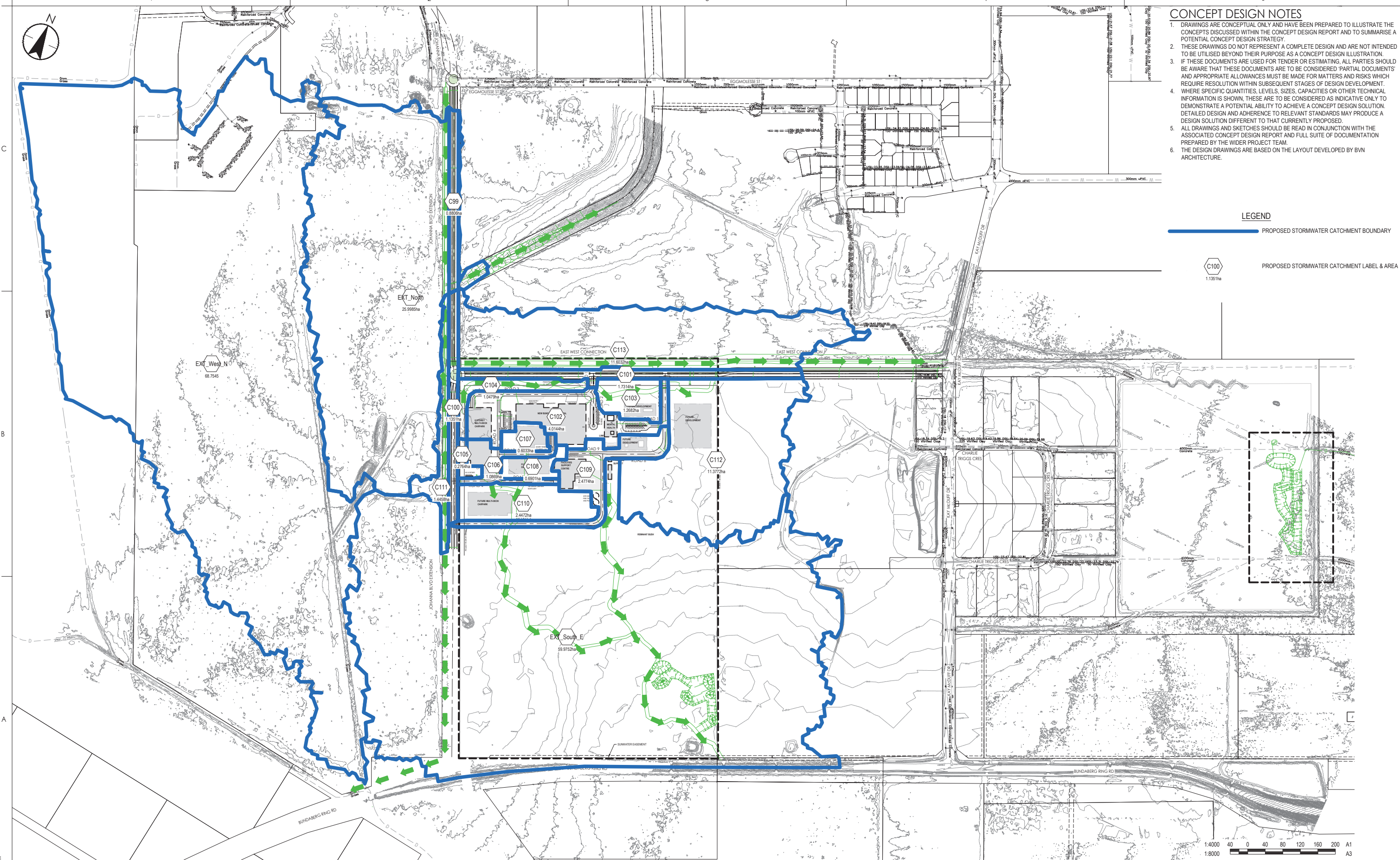


CONCEPT DESIGN NOTES

1. DRAWINGS ARE CONCEPTUAL ONLY AND HAVE BEEN PREPARED TO ILLUSTRATE THE CONCEPTS DISCUSSED WITHIN THE CONCEPT DESIGN REPORT AND TO SUMMARISE A POTENTIAL CONCEPT DESIGN STRATEGY.
2. THESE DRAWINGS DO NOT REPRESENT A COMPLETE DESIGN AND ARE NOT INTENDED TO BE UTILISED BEYOND THEIR PURPOSE AS A CONCEPT DESIGN ILLUSTRATION.
3. IF THESE DOCUMENTS ARE USED FOR TENDER OR ESTIMATING, ALL PARTIES SHOULD BE AWARE THAT THESE DOCUMENTS ARE TO BE CONSIDERED 'PARTIAL DOCUMENTS' AND APPROPRIATE ALLOWANCES MUST BE MADE FOR MATTERS AND RISKS WHICH REQUIRE RESOLUTION WITHIN SUBSEQUENT STAGES OF DESIGN DEVELOPMENT.
4. WHERE SPECIFIC QUANTITIES, LEVELS, SIZES, CAPACITIES OR OTHER TECHNICAL INFORMATION IS SHOWN, THESE ARE TO BE CONSIDERED AS INDICATIVE ONLY TO DEMONSTRATE A POTENTIAL ABILITY TO ACHIEVE A CONCEPT DESIGN SOLUTION. DETAILED DESIGN AND ADHERENCE TO RELEVANT STANDARDS MAY PRODUCE A DESIGN SOLUTION DIFFERENT TO THAT CURRENTLY PROPOSED.
5. ALL DRAWINGS AND SKETCHES SHOULD BE READ IN CONJUNCTION WITH THE ASSOCIATED CONCEPT DESIGN REPORT AND FULL SUITE OF DOCUMENTATION PREPARED BY THE WIDER PROJECT TEAM.
6. THE DESIGN DRAWINGS ARE BASED ON THE LAYOUT DEVELOPED BY BVN ARCHITECTURE.

LEGEND

- PROPOSED STORMWATER CATCHMENT BOUNDARY
- ⬡ C100
1.1351ha PROPOSED STORMWATER CATCHMENT LABEL & AREA



<p>Notes</p>	<table border="1"> <tr> <td>Issue/Revision</td> <td>By</td> <td>Appd</td> <td>YYYY.MM.DD</td> </tr> <tr> <td>A PRELIMINARY ISSUE</td> <td>LZHO</td> <td>AKS</td> <td>2022.08.19</td> </tr> </table>	Issue/Revision	By	Appd	YYYY.MM.DD	A PRELIMINARY ISSUE	LZHO	AKS	2022.08.19	<p>Issue Status</p> <p>CONCEPT DESIGN</p> <p>NOT FOR CONSTRUCTION</p> <p>This document is suitable only for the purpose noted above. Use of this document for any other purpose is not permitted.</p>	<p>Consultant</p>  	 <p>Stantec Australia Pty. Ltd. Level 3 52 Merivale Street South Brisbane, QLD 4101 Tel: +61 7 3029 5000</p> <p>Copyright Reserved</p> <p>The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden. The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.</p>	<p>Client Logo</p>  	<p>Client/Project</p> <p>WBHHS & JOHNSTAFF</p> <p>New Bundaberg Hospital</p> <p>LOT 23 SP212513 THABEBAN, QLD</p> <p>File Name: 301050419 CI-DA-501-01.DWG</p> <table border="1"> <tr> <td>LZHO</td> <td>KLJ/LZHO</td> <td>AKS</td> <td>2022.08.19</td> </tr> <tr> <td>Dwn.</td> <td>Dign.</td> <td>Chkd.</td> <td>YYYY.MM.DD</td> </tr> </table>	LZHO	KLJ/LZHO	AKS	2022.08.19	Dwn.	Dign.	Chkd.	YYYY.MM.DD	<p>Title</p> <p>POST-DEVELOPMENT CATCHMENT PLAN</p> <p>Project No. 301050419</p> <p>Scale 1:4000 @ A1</p> <p>Revision A</p> <p>Drawing No. CI-DA-501-01</p>
Issue/Revision	By	Appd	YYYY.MM.DD																				
A PRELIMINARY ISSUE	LZHO	AKS	2022.08.19																				
LZHO	KLJ/LZHO	AKS	2022.08.19																				
Dwn.	Dign.	Chkd.	YYYY.MM.DD																				

REVISION 1/1/1/2022 11:06:44AM BY: BQJ, LCHG
 P:\301050419\PROJECT DOCUMENTATION\CAD\DRAWINGS & DESIGN\WORKING DRAWINGS

Annexure 3 to Schedule 1 – Bushfire risk mitigation

4. Bushfire Management Plan

The SPP requires that where it is not possible to avoid a bushfire prone area, development mitigates the bushfire risk to people and property to an acceptable or tolerable level. This can be achieved through hazard reduction practices and emergency mitigation measures for any buildings bordering potentially bushfire-susceptible vegetation. These practices and measures include fuel reduction and management, road infrastructure to provide safe access and egress, appropriate building design and construction standards, procedures for fighting bushfires and fire intensity reduction management measures.

4.1 Agencies / Persons Responsible

The responsible fire authority is the Queensland Fire and Emergency Services (QFES), with the Rural Fire Brigade being responsible for bush fires and the Fire and Rescue Service being responsible for structural fires within urban areas. It is the responsibility of the proponent to ensure that the relevant measures required by this hazard report are in place prior to inspection by the Council and the building certifier, and to ensure that the measures are in place prior to enacting the approval. Furthermore, it is the responsibility of the proponent to ensure that a copy of this report is always on hand at the site.

4.2 Owner / Occupier Responsibilities

It is the responsibility of the owner of the proposed development to maintain the property in accordance with the conditions outlined in this report. The owner / occupier responsibilities include:

- Specified Asset Protection Zones (APZs) are to be maintained between buildings and retained vegetation. Details of the APZ are provided in **Section 4.5**;
- Low fuel loads are to be maintained surrounding the development by vegetation management (e.g. brush-cutting, slashing and mowing where practical) and removal of debris and rubbish;
- All access routes are to remain clear of obstacles to enable effective emergency vehicle access and egress; and
- No burning is to be undertaken on-site without a Permit to Burn as issued by the local Fire Warden (and approval if required, in writing, from Council).

4.3 Reporting and Auditing

This bushfire report is a controlled working document that is to be updated and revised to reflect adaptive management and constructive feedback. Some sections of the plan may be modified, new procedures may be implemented and responsibilities altered, depending on feedback and application.

This bushfire report will only ever be modified with the agreement of QFES or Council. This agreement allows for changes to the plan scope, as determined through consultation and the acceptance of the proponent. That is, where further actions are deemed necessary or where actions can be reduced in scope.

4.4 Siting of Buildings

In accordance with the SPP 2017, the proposed site design has considered the key principles when siting facilities. The relevant clauses that have been considered are:

- Maximise where practicable the building frontage setbacks from any hazardous vegetation; and,
- Site buildings so that elements of the development that are least susceptible to fire, are situated closest to the bushfire hazard (e.g. roads); and,
- Maintain vegetation clearance to achieve a BAL 12.5 separation distance from all development footprint boundaries.

4.5 Asset Protection Zones

The use of an APZ is the most effective defence against flame and radiant heat and to a lesser extent, ember attack. An APZ is to be located close to buildings, incorporating the defensible space and for managing heat intensities at the building surface.

The Asset Protection Zone for the development site is 27.2m from buildings to the hazardous vegetation. Establishment of the APZ for the site will require development of the following zones (Figures 6 and 7):

- an Inner Protection Zone (IPZ) of a 15-metre setback where near total vegetation clearing must be provided. The IPZ is to be an area maintained at a low fuel load. Scattered single tree can be retained under the condition they do not overhang the buildings, they are not located within 15m of an exposed window or door and they have limbs removed to a height of 2m. Retained trees cannot have connected canopies and need to have any fallen leaves or branches raked to maintain a low ground fuel load. Landscaping can occur within the IPZ but trees, shrubs and mulch should not be located adjacent to exposed windows or doors or underneath retained trees. Landscaping design should incorporate areas of lawn and discontinued garden beds to avoid fuel continuity.
- an Outer Protection Zone (OTZ) where 30% canopy cover can be retained between 15m and 27.2m from all buildings. Understory vegetation is to be managed to reduce fuel loads. Fuel loads are maintained at a level (usually less than 8 t/ha) where the intensity of an approaching bushfire would be significantly reduced. Revegetation and ornamental planting surrounding the site will be undertaken with screening low-flammability species (e.g. appropriate local natives) that are adapted to local conditions and enhance habitat values for wildlife.

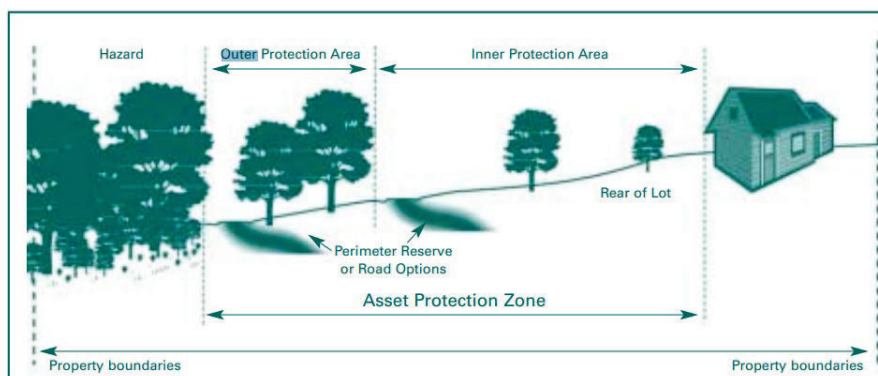
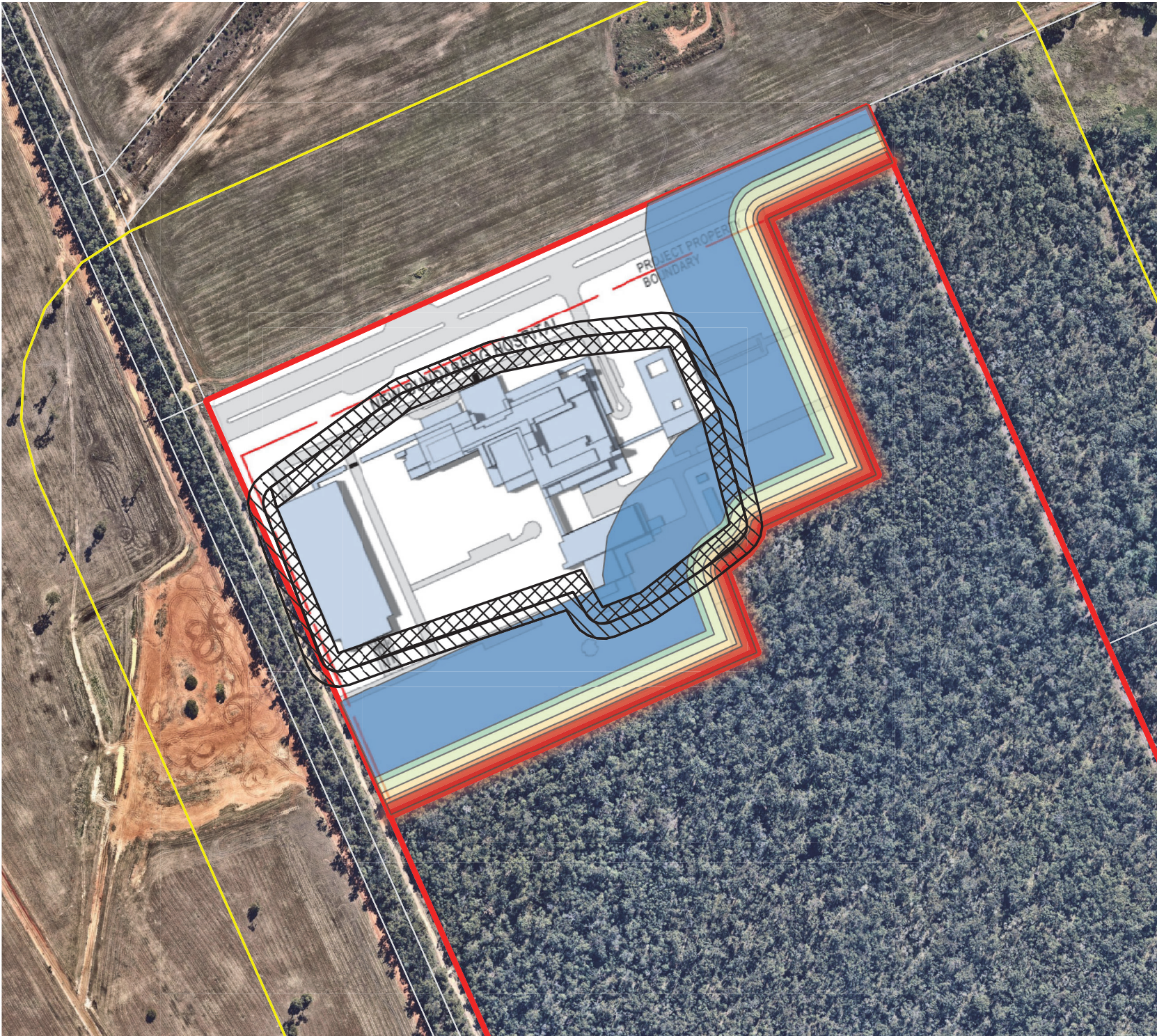












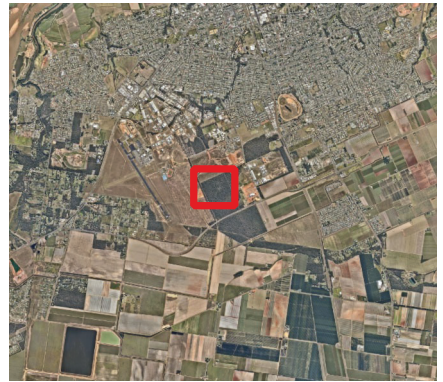
Plate 8: Components of an Asset Protection Zone



**Figure 7:
Bushfire Attack level And
Asset Protection Zone**

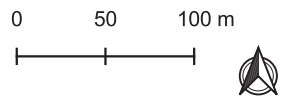
Project: PR20294_BMP_Bundaberg

-  Lot boundary
-  Bushfire Assessment area
- Bushfire Attack Level**
-  Flame zone
-  BAL - 40
-  BAL - 29
-  BAL - 19
-  BAL - 12.5
-  BAL - 10
- Asset Protection Zones**
-  Outer Protection Zone
-  Inner Protection Zone



Notes:
-Base map Copyright (c) Esri and its data suppliers.

Created By: MM
Date: 9/09/2022
Version: E



4.6 Access Roads

Access to the hospital shall be provided via an extension of Johanna Boulevard to be constructed within an existing dedicated road corridor and a new east-west connector road to Kay McDuff Drive along the northern boundary of the site. Internal access roads have been designed in a manner that provides safe and effective access and egress for emergency vehicles in the event of a bushfire. These roads can be included in the IPZ to provide suitable setback from hazardous vegetation.

4.7 Electricity Supply

The proposed development will have access to mains and emergency electricity supply. Where practicable, electrical transmission lines will be installed underground.

4.8 Water Supply

The proposed facilities must include a dedicated high flow reticulated water supply to for firefighting and ensure that bushfire emergency can be dealt with quickly by the relevant fire team.

4.9 Climate Change and Fire Weather – Projections for 2020 and 2050

Climate change can act in two ways to affect fire behaviour. First, it might exacerbate the fire-weather risk of any given day, leading to increased frequency or intensity of extreme and very extreme fire-weather days. Second, an increase in the accumulated fire risk over a year might represent a longer fire season and a reduction in the number of days suitable for prescribed burning.

It is recommended to review this document and associated bushfire procedures at the site over the coming decades in response to any potential increases of bushfire risk from climate change.

4.10 Emergency Response Procedures

An onsite fire management and evacuation strategy shall be developed and available to implement in the event of an emergency. In the event of a pending fire emergency, assistance is to be obtained by contacting dialling 000.

Annexure 4 to Schedule 1 – Noise management

5. Noise Impact Assessments

5.1 Building Services Plant

5.1.1 Mechanical Plant

Noise emissions from all building services plant is required to comply with the relevant environmental noise limits outlined in **Section 4.1**.

At this stage, specific details regarding mechanical plant selections and finalised locations are not typically available; therefore, detailed calculations of proposed selections are not practical or possible to undertake. In lieu of this, preliminary calculations have been conducted based on first principle formulation to estimate the maximum permissible sound power levels (L_w) for the combined plant which is expected to comply with the environmental noise criteria at each noise sensitive receptor identified.

The preliminary assessment has been based on the minimum distance between the nearest noise sensitive locations and midpoint of each proposed development. Noise attenuation factors such as sound source directivity, building shielding effects, noise barriers, opening locations and sizes or other noise control measures have not been applied. The maximum permissible sound power level of combined plant during each defined period are detailed in **Table 10** and considered the cumulative effects of noise emissions from each building to the location of the nearest noise sensitive receptor.

Table 10: Maximum permissible sound power level of combined building services plant

Building	Period	Applicable noise limits ¹⁾ at nearest boundary ²⁾ , $L_{Aeq,T}$ dB(A)	Maximum permissible sound power level of combined plant – L_w , dB(A)
Main Hospital Building	7 AM – 6 PM	42	80
	6 PM – 10 PM	40	78
	10 PM – 7 AM	35	73
Mental Health Building	7 AM – 6 PM	42	81
	6 PM – 10 PM	40	79
	10 PM – 7 AM	35	74
Facilities Support Centre	7 AM – 6 PM	42	83
	6 PM – 10 PM	40	81
	10 PM – 7 AM	35	76
Multi-storey Carpark	7 AM – 6 PM	42	74
	6 PM – 10 PM	40	72
	10 PM – 7 AM	35	67

NOTES:

1) Noise limits established in accordance with EPA 1994 - Section 440U Air-conditioning equipment

2) Nearest noise sensitive uses have been considered as the nearest Low density residential and Emerging community zones defined by the BRC Planning Scheme, west and south of the site, respectively.

5.1.2 Emergency Backup Generators

Based on the current architectural drawing set, a generator plant room is proposed for the Level 01 of the Facilities Support Centre.



Due to the infrequent operation of generators, it is considered unreasonable to assess noise emissions against the noise limits established in the Environmental Protection (Noise) Policy 2019, which would normally apply since there are no specific requirements pertaining to emergency generators under EPA 1994.

It is assumed that any emergency backup generator/s provided as a part of this project will primarily operate during testing regimes within daytime hours (i.e., 7 AM – 6 PM) and only operate during night-time periods (i.e., 10 PM – 7 AM) under emergency situations (i.e., power-loss following bushfire / storm / flood etc.). Stantec considers that a reasonable environmental noise impact outcome is to assess operations against the daytime noise limit of $L_{eq} 42 \text{ dB(A)}$ (i.e., daytime measured background noise level $L_{A90} 37 \text{ dB(A)} + 5 \text{ dB}$) at the boundary of the nearest noise sensitive receptor.

Noise control devices, such as silencers / mufflers and plant space acoustic attenuators and louvres, as well as vibration isolation treatments to reduce structure-borne noise impacts to be investigated as the design progresses and plant selection details are provided. Further, due to the central location on the site, it is likely that noise mitigation measures will need to be appropriately determined for compliance with site specific noise levels (e.g., at outdoor open areas, nearest building facades etc.) and, hence, are likely to result in compliance at the nearest external uses.

5.1.3 General Recommendations for Building Service Plant

It is noted that the above results are preliminary only, where the primary purpose is to assess the viability of the project from a noise emissions perspective. Therefore, a development approval condition **should not** be imposed based on the limiting sound power levels stated above.

Instead, noise emissions from the relevant items described in the above sections shall be further assessed during subsequent design stages of the project, when specific details regarding the source type (e.g., operative periods, sound power levels, designated location, etc.) are developed. Necessary details and information for thorough completion of the noise impact assessment shall be requested from and coordinated with the design team. The requirements (if any) and the extent of noise control measures should be evaluated and specified during such stages to ensure the noise limits defined in this report are met.

Generally, costing provisions shall be made for the following:

- Noise barriers or acoustic louvres;
- Acoustic attenuators;
- Sound absorptive wall linings to internal and external plant spaces;
- In-duct linings; and / or
- Quiet and/or containerised equipment selections and/or selections with custom silencer / muffler / attenuation options.

In addition to compliance with noise limits applicable outside the project site, source noise levels shall be appropriately designed to provide a reasonable degree of acoustic amenity to outdoor areas of the proposed developments. Therefore, the following is also recommended;

- Plant room openings are generally located on the roof (vertical); and
- Weak acoustic paths, such as openings, louvres, intake or discharge paths, doors, lightweight partition elements and minimised.

5.2 Carparks

5.2.1 Multi-storey Carpark

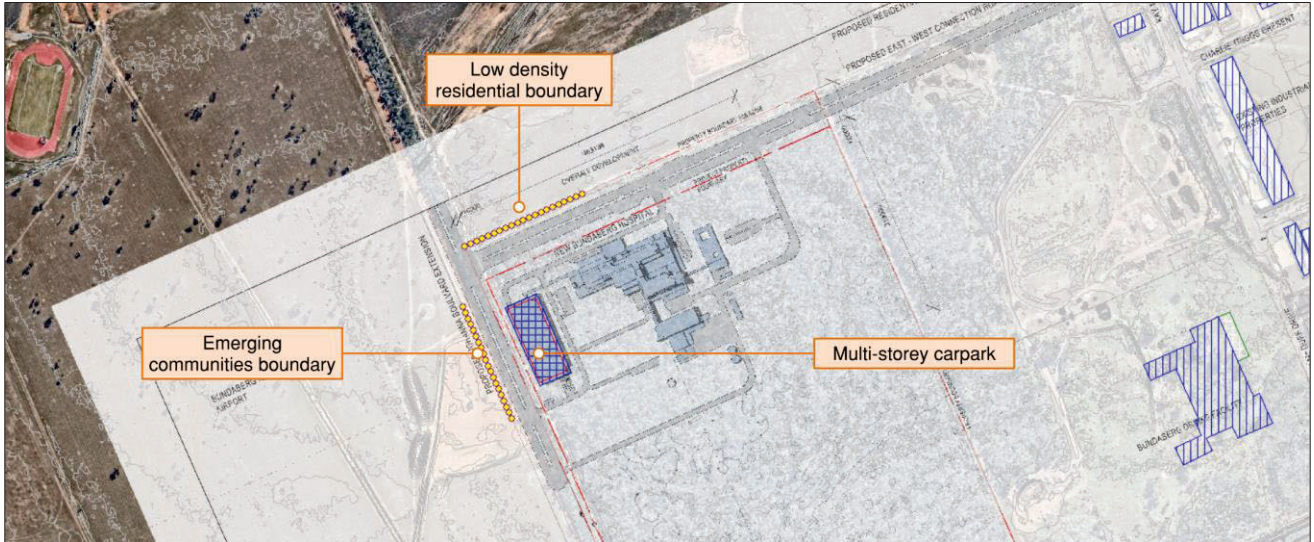
A multi-storey carpark is proposed for location towards the north-west corner of the site. Based on the information documented on the current architectural drawings (refer to **Table 2**), ≈ 1350 vehicle bays are proposed with the facility primarily accessed via “main access west” from the Johanna Blvd extension.

Noise emissions from vehicle movements associated with carparks are formed by a combination of successive noise events. The complexity of these noise events can be difficult to accurately simulate as individual noise sources (i.e., vehicle parking bay turnover rates, location of noise event due such as motion (acceleration, deceleration), idling points, ignition, door slams etc.), which have the potential to influence the general acoustic environment at nearby noise sensitive locations.



For thorough assessment of carpark noise emissions, an acoustic simulation model was developed using SoundPLAN v8.2 (refer to **Figure 6**) to determine potential noise impacts on future development (low density residential and emerging community boundaries).

Figure 6: Acoustic simulation model layout



Reference has been made to the technical research paper “*Prediction of parking area noise in Australian conditions*” from the Australian Acoustical Society Conference (Nicol and Johnson, 2011) and parking lot study “*Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks*” (Bavarian Landesamt für Umwelt, 2007, 6th edn, BAYLFU). Correction factors described by Nicol and Johnson (in section “*Application of BAYLFU to Australian Conditions*”) were applied carpark noise emissions in the acoustic simulation model.

Refer to **Appendix C** for further details regarding the acoustic simulation model used for the purpose of assessing carpark noise emissions. As a conservative approach to assessment, the following was also considered:

- No barriers / screening to the perimeter on all levels (although it is likely to be provided to some extent to meet general safety requirements).
- Noise emissions assessed against the Environmental Protection (Noise) Policy 2019 – Acoustic Quality Objectives outdoor noise limits for residential uses.

Based on the inputs defined, the following maximum noise levels provided in **Table 11** are predicted at the nearest noise sensitive receptor boundaries.

Table 11: Predicted noise levels at noise sensitive boundaries resulting from carpark noise emissions

Location	Applied noise limits, dB(A)			Highest predicted noise levels, dB(A)		
	L _{eq,1hr,day}	L _{eq,1hr,eve}	L _{eq,1hr,night}	L _{eq,1hr,day}	L _{eq,1hr,eve}	L _{eq,1hr,night}
Emerging Community boundary	50	50	35	47	44	41
Low Density Residential boundary				41	38	35

NOTES:

1) EPP 2019 does not define an outdoor noise limit for the night-time period. The measured L_{A90,1} + 3 dB has been applied.

Noise predictions are predicted to comply with the nominated environmental noise limits at the nearest noise sensitive boundaries for all periods excluding at Emerging Community boundary during the night-time period; however, as previously noted barriers / screening to the perimeter of the carpark were not considered. Further, vehicle turnover rates during this period are expected to be conservative.

For compliance during this period, it would be necessary to provide full height screening or acoustic louvres the first three (3) levels to the western perimeter of the multi-storey carpark. The remainder of the carpark (excluding entry / exit points) shall have a 1 m (h) barrier.



The following noise control measures are generally recommended to minimise potential impacts from the proposed car park:

- General slab gradings shall be constructed as flat as is practicable to minimise engine noise / strain.
- Minimise speed bumps where in proximity to noise sensitive uses.
- Ensure gutter drain covers are sufficiently recessed to the grade of the driveway / slab and well fabricated to minimise additional noise as vehicles drive over.
- Consider application of sound absorptive linings to the underside of the carpark soffits to minimise reverberant noise build up.
- Screening / acoustic louvres / barriers to the perimeter of the carpark which interrupt the direct line of sight to all noise sensitive receivers will generally assist with noise emissions from site vehicle operations.

The extent and performance of acoustic treatments necessary for mitigating noise impacts to surrounding noise sensitive uses shall be further investigated during the design stages of the project.

5.2.2 General Site Parking

The architectural drawings indicate several on-grade carparks across the site; however, it is generally expected that these will be used for short-term / emergency visits, with most traffic directed to use the multi-storey carpark. Noise emissions from these areas are not expected to significantly contribute to the ambient acoustic environment at surrounding noise sensitive uses.

5.3 Loading Docks

A loading dock is proposed adjacent to the Facilities Support Centre.

Based on the proposed location relative to the nearest noise sensitive boundaries (≈ 280 m to low density residential zoning), general layout and screening offered by the Facilities Support Centre, expected delivery vehicle types (assumed medium rigid vehicles and vans) and frequency of vehicles, noise impacts from the loading dock are not expected to significantly contribute to the ambient acoustic environment at surrounding noise sensitive uses.

5.4 Helicopters / Helipad

A rooftop helipad will be provided for Emergency Medical Services helicopters (EMS) to access the NBH. Arrival / departure flights from EMS will occur over the low-density residential zoning (Edenbrook Estate).

In our experience, EMS helicopters access sites on an infrequent basis which can occur at any time of the day; however, are relatively short in duration. Whilst every effort can be made to minimise noise impacts on surrounding community areas, impacts are often unavoidable. As a general recommendation, the surrounding community should be well informed of such operations / activity.

To minimise noise impacts on the surrounding community, the following shall be considered:

- Arrival and departure routes are likely to have the least significant impact on community uses when occurring from the east and/or south assuming this does not impact the Bundaberg Regional Airport flight paths;
- The steepest approach practicable reasonable for arrival and departure manoeuvres shall be employed to maximise distance from sensitive uses, especially when used of routes from the north and west are essential;
- The helipad should only be used by EMS helicopters for emergency purposes only; and
- Maintenance, repair works or refuelling shall not occur onsite unless required under critical situations.



6. External Noise Intrusion Assessments

6.1 Road Traffic Noise

6.1.1 Assessment Overview

The QLD Government State Planning Policy – [Interactive Mapping System](#) indicates that a portion of the NBH site will be situated within a Transport noise corridor – State-controlled Road; however, based on the proposed layouts, the NBH and associated buildings are well removed from any part of the transport noise corridors,

Where buildings proposed for the project are situated within the respective noise contours, these shall be designed to comply with the requirements outlined by SDAP SC1 and TMR Policy (refer to **Section 4.2**).

With the aid of environmental noise modelling software (SoundPLAN), acoustic assessment of road traffic noise impacts has been conducted in accordance with TMR Code, to determine both the façade performance requirements to achieve internal noise level objectives, as well as any screening requirements required to satisfy external noise limits in occupiable spaces (where applicable).

6.1.2 Noise Modelling

To predict noise impacts, calculations were made using the recognised CoRTN algorithm assisted by a three-dimensional computer model of the site created within SoundPLAN 8.2 acoustic software. The computer model was created as a representation of the existing and future site, which incorporates the following inputs:

- Calculation algorithms – SoundPLAN implementation of accepted noise prediction standards;
- Terrain elevation – A 3D representation of the existing terrain and at completion of construction;
- Ground surface corrections – Areas of soft (absorptive) and hard (reflective) ground;
- Roads sources – The placement of each road source as a source line and the input of traffic flow parameter;
- Buildings – Detailed implementation of the proposed building from drawings (i.e., layout, height, floors), and
- Sensitive receptors – Locations where the noise limits are to be assessed.

Refer to **Appendix C** for further details regarding the acoustic simulation assumptions and inputs.

6.1.3 Predicted Noise Levels

The noise simulation model was used to predict the $L_{10(1hr)}$ noise levels from road source at 1 m from the façade. The highest predicted noise levels per façade are presented in **Table 12**.

Table 12: Predicted facade noise levels

Building	Façade	Maximum predicted façade noise levels range, $L_{10(1hr)}$ dB(A) ¹⁾
Main Hospital Building	North	46
	East	57
	South	57
	West	56
Mental Health Building	North	45
	East	54
	South	54
	West	54

Notes:

1) In accordance with TMR Policy, a correction of + 1.7 dB has been applied (further discussion provided in **Appendix C**). Predictions are inclusive of façade noise correction (i.e., + 2.5 dB) as per CoRTN.



6.1.4 Building Envelope Performance

Based on the predicted noise levels outlined in **Section 6.1.3** and the internal noise targets set by the SDAP SC1 and TMR Policy (i.e., $L_{eq(1hr)} \leq 35$ dB(A)), the building envelope shall be sufficiently designed to provide the following minimum noise reduction levels outlined in **Table 13**.

Table 13: Maximum noise reduction performance of façade for compliance with SDAP SC1

Building	Façade	Maximum noise reduction performance of façade, dB(A) ¹⁾
Main Hospital Building	North	11
	East	22
	South	22
	West	21
Mental Health Building	North	10
	East	19
	South	19
	West	19

NOTES:

1) The difference of L_{Aeq} and L_{10} was found to be closely correlated (0.4 dB average difference). (R. Brown, "An assessment of the relationship between the $L_{10(18hour)}$ noise level parameter and other road traffic noise level parameters", Proceedings of Acoustics, 3-5 November 2004, Gold Coast). A correction for L_{10} to L_{eq} values has not been applied.

Based on the above, it is expected that road traffic noise intrusion can be sufficiently controlled through standard façade design and achieve in compliance with SDAP SC1 and TMR Policy requirements. However, Stantec note that noise impacts from other sources generated on site may require improved façade performances to those stated in the table above. This shall be investigated during the design stages of the project.

6.1.5 Outdoor Spaces for Recreational Use

At the current stage of the project design, the location of outdoors spaces for recreational purposes have not been finalised. However, based on predicted façade noise levels, site noise levels resulting from road traffic noise are expected to remain below the outdoor / passive area noise limits nominated by the TMR Policy.

6.2 Bundaberg Regional Airport

Intermittent noise impacts from aircraft operating from the Bundaberg Regional Airport are expected; however, since the project site is not located within any of the ANEF noise contours (refer to **Figure 5**), the level of impact is expected to be negligible.

