Emily Han

From: Jeffrey Lyons <JeffreyLyons@ausgrid.com.au>
Sent: Wednesday, 9 March 2022 8:07 AM
To: Emily Han
Subject: RE: DA/2022/105, 2 Heritage Drive Chisholm Ref Trim 2017/26/326

Hi Emily,

My apologies.
Ausgrid's GIS information has not been updated to reflect the current DP.
I will arrange for it to be updated.

Thankyou

Regards,
Jeff Lyons
Engineering Officer | Design Hunter | Asset Management

Ausgrid Connecting communities, empowering lives

53 Weakleys Drive, Beresfield NSW 2322
jeffreylyons@ausgrid.com.au
(02) 49101719 (51719) | 0409 079 685

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From: Emily Han <emily@revelop.com.au>
Sent: Tuesday, 8 March 2022 3:29 PM
To: Jeffrey Lyons <JeffreyLyons@ausgrid.com.au>
Subject: RE: DA/2022/105, 2 Heritage Drive Chisholm Ref Trim 2017/26/326

Hi Jeff

As per attached Deposited plan and titles, there is no existing easement as shown as green in Ausgid drawing.

Is there something we are not aware of ?

Regards,

Emily Han
Senior Development Manager
BArch MSc(PM)
GradCert in PropDev

Parramatta:
Suite 506, Level 5, 55 Phillip St, Parramatta NSW 2150
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From: Jeffrey Lyons <JeffreyLyons@ausgrid.com.au>
Sent: Tuesday, 1 March 2022 7:21 AM
To: Emily Han <emily@revelop.com.au>
Subject: RE: DA/2022/105, 2 Heritage Drive Chisholm Ref Trim 2017/26/326

Hi Emily,

The information provided in Ausgrid's original response is obtained from Ausgrid's GIS.
It may be confirmed by contacting the NSW Land Registry.

For Activities Within or Near to the Electricity Easement:
Purpose Of Easement
There is a proposed/preliminary easement (Purple Area) and an existing easement (Green area) within the boundaries of Tigerhawk Dr, Heritage Dr, & Settlers Blvd. The purpose of the easement is to protect the distribution assets and to provide

adequate working space along the route of the cables for construction and maintenance work. The easement also assists Ausgrid in controlling works or other activities under or near the distribution cables which could either by accident or otherwise create an unsafe situation for workers or the public, or reduce the security and reliability of Ausgrid's network. *Currently there are no Ausgrid assets within the proposed and existing easements.*

Regards,
Jeff Lyons
Engineering Officer | Design Hunter | Asset Management

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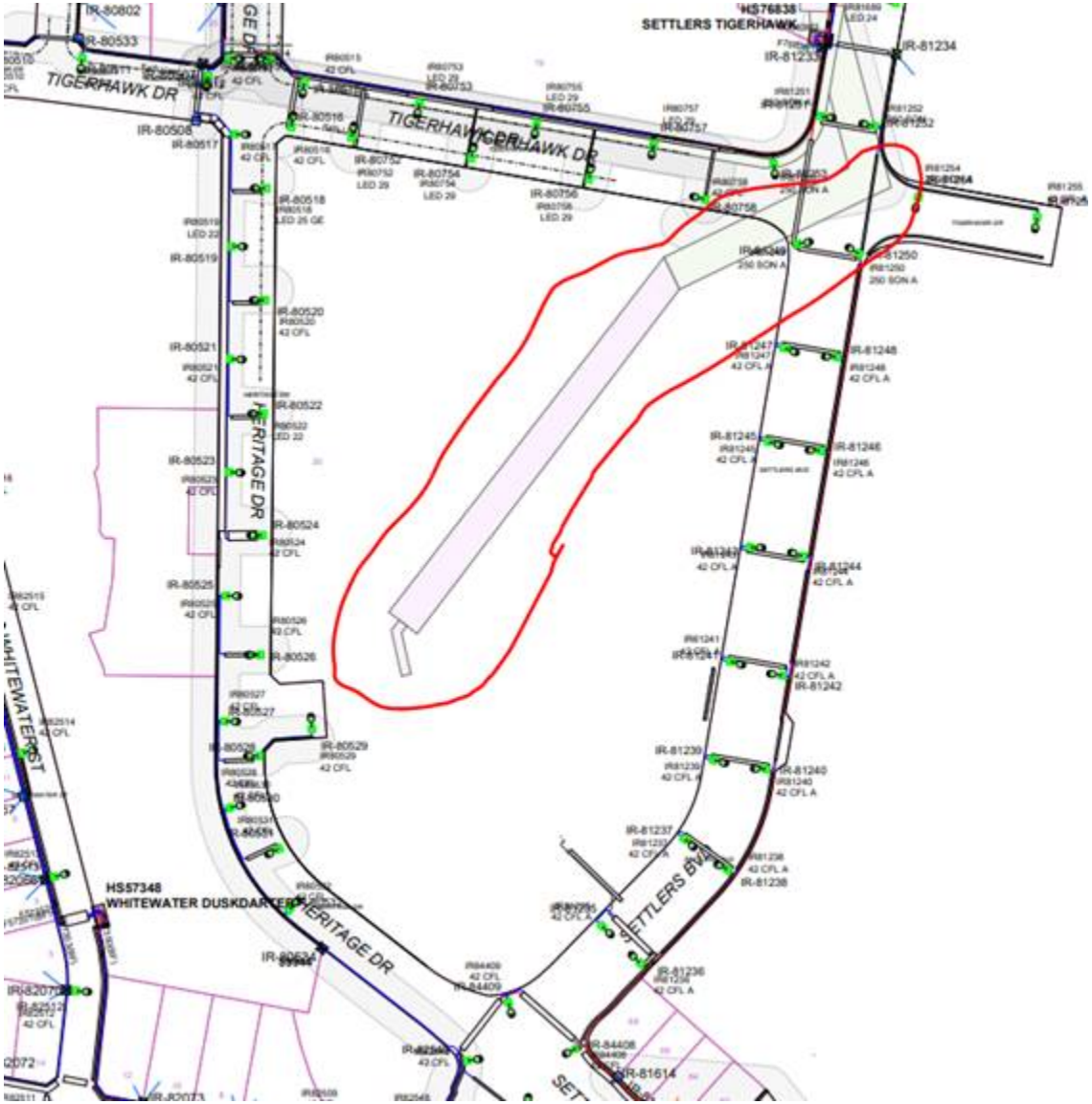
From: Emily Han <emily@revelop.com.au>
Sent: Monday, 28 February 2022 4:05 PM
To: Jeffrey Lyons <JeffreyLyons@ausgrid.com.au>; Brian Gibson <brian.gibson@maitland.nsw.gov.au>
Cc: Jonathan Hwang <jonathan@revelop.com.au>
Subject: DA/2022/105, 2 Heritage Drive Chisholm Ref Trim 2017/26/326

Hi Jeffery

Thanks for the response letter for the subject DA.
Regarding services location plan, as attached and circled below, may I check with you what this purple and light green colour represent within our site.



Regards,

Emily Han

Senior Development Manager

BArch MSc(PM)

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15 June 2022

Maitland City Council
285–287 High Street
PO Box 220
Maitland NSW 2320

Attention: Brian Gibson- Principal Planner

Re: **Response to additional information request**

Address: **4 HERITAGE DRIVE CHISHOLM NSW 2905**

Application No: **DA/2021/1702**

Dear Brian

We refer to the additional information request via email on 19/5/2022 regarding subject application, we hereby would like to submit the documents and detailed response as per table attached.

The above and attached satisfies the issues raised by Council.

No.	Council's comment	Applicant's response
1	Integrated Development The application was lodged as Integrated Development under section 4.46 of the Environmental Planning & Assessment Act, 1979 in relation to the NSW Rural Fires Act, 1997 and the proposal incorporating a Special Fire Protection Purpose under s100B (Child Care Centre). The General Terms of Approval (GTAs) have been sought from the NSW Rural Fire Service however to date no response has been received. Council is following up the matter and will advise once a response has been received.	Noted and acknowledged.
2	State Environmental Planning Policy (Transport and Infrastructure) 2021 (i) Chapter 2: under clause 2.48 the application was referred to Ausgrid. A response was received raising no objections to the proposed shopping centre subject to satisfaction of its requirements (attached at Appendix 1). This information is for your notation. (ii) Chapter 2: under clause 104 the application was referred to Transport for NSW as a Traffic Generating Development. A response was received advising Council of matters to be considered in any	Noted and acknowledged. As per response, there is no existing easement within the site. Ausgrid has been contacted and acknowledged that GIS information is to be updated to reflect current DP. Response letter to address TfNSW has been submitted on 2/6/2022 prepared by McLaren Traffic Engineering.

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	determination of the development application (attached as Appendix 2). You are required to respond to the issues raised by the TfNSW in its response. See additional comment below under Engineering.	
3	State Environmental Planning Policy (Biodiversity and Conservation) 2021 (i) Chapter 2: Clause 2.6(1) – a permit (in the form of development consent) is required to remove vegetation in accordance with clause 2.10(1), however insufficient information has been provided to enable a determination. (ii) Chapter 4: Clause 4.9(5) – information has not been provided demonstrating the land does not contain koala use tree species or is not core koala habitat. See additional comment below under Ecology.	Vegetation removal has been approved under previously approved DA18-1526. Same set of conditions under Flora and Fauna shall be imposed for this development application. Flora and Fauna report prepared by EPS dated 8 Dec 2021 concluded that suitable habitat for Koala was not recorded and no indications of Koala presence were observed. Given an approval already exists for removal the Legislative requirements have been met and this consent would simply refer to that previous approval or copy the terms of said approval
4	State Environmental Planning Policy (Industry and Employment) 2021 Chapter 3: under clause 3.6 (Granting of consent to signage) – insufficient information has been provided to undertake an assessment against the provisions of the SEPP.	Signage will be submitted as separate DA including Building Sign, Directional Sign and pylon sign. Please include condition that signage shown in elevations are not part of the approval.
5	SEPP (Resilience and Hazards) 2021 Chapter 4: Clause 4.6 – The Preliminary Site Contamination Investigation (2003) report and the Preliminary Environmental Site Assessment (2020) report have not demonstrated Council can be satisfied the land is suitable for the purpose of the development as proposed. Council is not satisfied having regard to the contamination and remediation of the site for the purposes of granting consent. Council notes the Preliminary Site Investigation reports provided with the application (PSIs dated 2003 & 2020), however found gaps exist with the information provided and is not in a position to be satisfied the land is suitable for the intended purpose.	Refer to updated PSI prepared by ECS consultants dated 2/6/2022. Soil samples were taken as part of this updated report and confirmed that the site is suitable for retail centre including childcare and residential subdivision.

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	The 2003 PSI is a dated investigation not specific to the site and proposed land use. The PSI recommended further investigation. The 2020 report, which is also not specific to the site and proposed land use, does not detail any remediation or validation works. The report notes former land uses/operations and indicates a 'Skin and Hide Merchant' (tannery) may have also been present on the site. No soil samples were taken as part of this PSI. Council requires a revised PSI addressing the above, which provides direct analysis of the site's suitability for the proposed development having regard to historic land uses and remediation or validation works.	
6	Maitland Local Environmental Plan 2011 (i) Clause 2.1: (Land use zones) – the development site is zoned B1 'Neighbourhood Centre' and R1 'General Residential' land. Development consent is sought for a Mixed Use Development within the B1 zoned land. A Mixed Use Development is permissible with consent in the B1 zone however is prohibited in the R1 zone. Confirmation is required that no part of the Mixed Use Development will encroach the R1 zoned land. Clause 5.3 of the MLEP2011 may be an alternative approach. (ii) Legal & Physical Access – provision and timing of the unnamed road for access to the development is required to ensure there are no permissibility issues, i.e. the road is to be constructed over R1 land for which access to the shopping centre is contingent on. (iii) Clause 4.4 (Floor Space Ratio): the FSR for the site is 0.3:1 under subclause (2) and the Floor Space Ratio map. The proposed development has an FSR of 0.29:1 and is therefore compliant, it should be noted however with further development proposed in relation to the Pad sites only 272m² is available.	Zone boundary line between B1 and R1 zone was provided by GIS officer Ian Kowalke. Refer to Deposited Plan of subdivision and zone boundary line overlaid prepared by LDS. There is a small encroachment of the B1 zoned land into lot 12. However, this falls within the future road corridor and thus is not an issue as no future developed lot will have a split zoning. Clause 5.3- development near zone boundary is to be applied, refer to response letter from URBIS. MLEP zoning map is to be updated to MGA2020 coordinate system to be consistent with overlaid plan prepared by LDS. Transfer granting easement over own land will be registered in future for creation of an easement where both lots are held by the same owner. Link road will be constructed on R1 land at first stage under DA/2022/105. Further DA condition of consent under the subject DA would be acceptable to the effect that the link road is to be constructed and dedicated to council as a public road prior to the use and occupation of the subject development

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	Please confirm the Pad sites are subject to a separate development application.	It is confirmed that pad sites are subject to future development application.
7	Construction and Operational Details Details are required for the following: (i) Construction Steps – having regard to comments below regarding clarification being sought for the construction of the unnamed road under DA/2021/105, advice is sought regarding the intended approach to the sequence of construction. This information will inform the need for conditions should consent be granted. (ii) Detail how the integration of online shopping for the supermarket and other stores through dedicated pick up areas in proximity to support 'store to boot' (the 'Pick up Area' adjoining the access off Settlers Blvd is noted however unclear if this is for the purpose of on-line shopping). (iii) Hours of Operation – details are required for the operation of the shopping centre and individual aspects including the Tavern, Supermarket, Car Wash, Basement Car Park, Medical Centre, Child Care Centre, and Recreation Facility (Indoor), loading dock. Consider design outcomes/controls to manage differing hours of operation and CPTED principles and conflicts (acoustic, lighting, etc).	Two stage construction is proposed, link road being 1st stage and the rest will be 2nd stage under DA/2021/105. Condition to be imposed not to occupy shopping centre until linen plan is registered for subject subdivision. 6 pick up parking spaces for store to boot are proposed with dedicated lane as shown on ground level plan. Refer to item 4.8 (table 5) of Statement of Environmental Effects submitted for operating hour. Outdoor F&B tenancy T1 to T6 are to be 9am to 12am to be consistent with Tavern opening hour. **Land Use** / **Proposed Hours** Supermarket and Mini Major: 7:00am to 10:00pm, 7 days per week Liquor: 9:00am to 10:00pm, 7 days per week Gym: 24 hours, 7 days per week Learn to Swim: 7:00am to 10:00pm, 7 days per week Medical: 7:00am to 10:00pm, 7 days per week Child care centre: 7:00am to 7:00pm, Monday to Friday Car wash: 7:00am to 7:00pm, 7 days per week Tavern: 9:00am to 12:00am, 7 days per week
8 ARCHITECT	Urban Design <u>Transport Integration</u> The Development Application fails to meet the objectives of the 2010 Activity Centres and Employment Clusters Strategy (ACECS) for multi-modal transportation integration. Under the strategy, the Chisholm Local Activity Centre has the following principles: *"The central location will enhance accessibility with connections to public transport, provision of an adequate road network supported by safe, pleasant pedestrian and cycleway links. Creating a place that residents can connect with and form a strong identity with is essential to ensuring Chisholm grows into a viable local centre supporting a vibrant new community."; and*	<u>Transport Integration</u> Consideration has been given to how both pedestrians and traffic circulate and access the centre to ensure there is both an enhanced accessibility while reducing, where possible conflicts between vehicular movements and pedestrian circulation both within and from external connections external to the centre. Primary to this is the enlarged pedestrian spine linking both external public transport and the adjacent school. This is a unique feature that both breaks up the extent of parking and provides a safe and pleasant connection between Tigerhawk Drive and the main entry to the centre.

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	"To create a walkable neighbourhood with convenient access to employment, retail premises, community facilities and other services, with less dependence on cars for travel." External pedestrian and traffic access arrangements require resolution having regard to the relationship between the school, the proposed shopping centre and bus stop and pedestrian zebra crossing.	Pedestrian connections have been considered between the adjacent Childcare Building and both Heritage Drive and Settlers Boulevard, connecting to existing pedestrian linkages where possible. We have provided accompanying diagrams showing the extent of the pedestrian connections. We have taken the view that a pedestrian 'dog leg' from the main pedestrian spine and the existing pedestrian crossing in Tigerhawk Drive is appropriate for safety reasons and discourages pedestrians, and in particular children, running from the spine linkage directly across the road. The 'dog leg' aims to slow this movement. Refer to updated architectural drawing A02.03- Rev D.
	<u>Public Transport</u> Having regard to other comment, consideration be given to providing access for public bus services through the development site such that a drop off and pick up zone is provided in conjunction with the local services (Hunter Valley Bus Services). This will support best practice outcomes by fully integrating public transportation and other modes of transport as a priority within the shopping centre layout in order to achieve the vision of the ACECS. The following is recommended for inclusion. •A shaded bus stop that encourages public transportation use and which prioritises access to an entrance of the centre. • Priority spaces for taxi/uber/other rideshare capabilities. • Bicycle parking racks to be provided in key locations including the gym and an area with high levels of surveillance near the entrance of the supermarket.	<u>Public Transport</u> Given the location of public transport in the form of Busses currently stopping in Tigerhawk Drive, we would not like to encourage additional pedestrian/bus conflicts by introducing public transport within the development precinct. That said we have made provision for the appropriate integration of taxi and mini bus drop-off and pick-up along with an allocated area for on-line delivery pick-up often undertaken by bikes or mopeds. Bicycle racks have been provided as noted. Accessible parking spaces have been distributed to take advantage of the various facilities. Refer to updated architectural drawing A02.03- Rev D.
	<u>Pedestrian Connectivity</u> (i) The alignment of the pedestrian access points for the shopping centre on the western boundary with the pedestrian ramps opposite should be reviewed. The main driveway entry aligns with the pedestrian ramp opposite but does not provide suitable pedestrian access.	<u>Pedestrian Connectivity</u> (i) Pedestrian connectivity from the western boundary has been reviewed and adjusted as per accompanying diagram (ii) Pedestrian entry located south of the driveway entry at Heritage Drive has been incorporated

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	(ii) The pedestrian entry located south of the driveway entry at Heritage Drive should incorporate (iii) Consider design changes at the pedestrian entry off Heritage Driveway to signal it as a focal point for pedestrian access. (iv) The accessibility ramps from the unnamed road to the south and the shopping centre to the north should be reviewed in terms of width for passing. (v) Some of the access ramps appear to be circuitous and unintuitive, and duplicate access with the adjoining stairway access.	(iii) The feature ramp and landscape treatment adjacent to Heritage Drive provides a unique focal point for access to the centre from the west (iv) The ramps adjacent to the Medical Centre have been increased in width (v) Both the ramp adjacent to the Medical centre and the ramp from Heritage Drive have been designed to integrate with landscape on both sides and provide an interesting and pleasant movement pattern for pedestrians without being dominant and visually obtrusive.
	<u>Design</u> (i) The external landing for the medical centre should be improved to incorporate seating and the like. (ii) Review the access way adjoining the CMO, DDA WC, Parents Room and Lift / Stair access on the Ground Floor Plan. In particular it is suggested the Lift / Stair should have a more open entry point with improved casual surveillance and direction finding. (iii) Improve the presentation of T7 to the internal spaces, noting it has an access door between it and the adjoining Mini Major and common wall with the access way (refer to above point). (iv) Noting the elevation of the residential development to the south, details are required of proposed roof plant or proposed measures for screening. Typical details are also required of the proposed solar panels. (v) Improve the interface of the north-west corner with the adjoining pedestrian pathway through lower window sill heights and improved visual connectivity at the street level. (vi) Consider improved connection between the western elevation of the Tavern and the adjoining parkland.	(i) Refer to Landscape Plans with seating integrated with planting edges - Refer to LP06. (ii) The plans have been updated to consider more fully the access way adjoining the CMO, DDA WC, Parents Room and Lift/Stair Refer to Architectural plans A2.03 Rev D. (iii)Refer to updated ground floor plan for amended T7 with relocated CMO, exposure and surveillance concern is resolved. (iv)Refer to updated roof plan indicating the screen around the roof plant, detail subject to acoustic assessment when equipment selection is finalised at construction certificate stage. Solar panel layouts are shown on roof plan. (v)Proposed use for this corner tenancy is swim school, given the privacy requirement of the users, windows sill heights are at high level. (vi)The western elevation of the Tavern is dominated by large seating terrace that is raised above the adjacent street pedestrian area and provides a better outlook over the adjacent parkland. The connection to the adjacent parkland is via the designated stair and ramp and pedestrian access across Heritage Drive.

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	(vii) Address the identified acoustic issues (below) with a revised design of the proposed Tavern.	Refer to Architectural plans A2.03 Rev D. (vii)Our view is the Tavern and its adjacent terrace predominantly is western facing. The return terrace to the south can be contained through louvre screen to limit the acoustic issues with the adjacent residential. Refer to Architectural plans A2.03 Rev D.
	<u>Bulk & Scale</u> (i) Please review the bulk and scale of the corner element at the intersection of Tigerhawk Drive and Heritage Drive. The current design with the elevated awning does not create a human scale outcome. (ii) Having regard to comment elsewhere, the bulk and scale at the southern boundary with the residential development opposite requires greater detail for assessment (to ensure the interface is appropriate).	<u>Bulk and Scale</u> (i) The awning at the intersection of Tigerhawk Drive and Heritage Drive has been lowered while still maintaining windows at an acceptable height for privacy to the Learn to Swim facility (ii) The Southern elevation has been updated and greater detail added. Refer to west elevation A09.04 Rev-C and A100.90 Rev-A Perspective View.
	<u>Pad Sites</u> The Pad sites are noted. In discussions with the Planning Panel it was made clear considerations of the design and access for these sites is inconsequential for this application where they are proposed to be subject to a separate application. If the Pad site is to be considered for use under this application then all relevant details need to be provided. Council however recommends design considerations be incorporated for this application where possible, otherwise any later design may warrant a reconfiguration of the car park and associated aisles.	It is confirmed that pad sites are subject to future development application. Parking requirement and impact analysis will be done at the time of separate DA application.
	<u>Cross Sections</u> Cross section details are required through the development and to extend to the adjoining road network and land uses opposite. The purpose of the cross sections is to consider the bulk and scale of the development and the transition/relationship with adjoining land uses (particularly the interface between the R1 and B1 zones).	Refer to updated north-south and east-west section AA to GG (drawing A11.01 to A11.05) prepared by BN demonstrating bulk and scale and relationship with adjoining land uses.
	<u>Sustainability</u> (i) The introduction of EV parking is supported, additional parking at the Shopping Centre Ground Floor level (or the capacity to introduce at a later time) to be considered.	(i) 5 EV parking spaces are proposed, located in basement. Additional spaces will be considered based on user demand analysis.

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	(ii) Consider additional sustainable measures such as battery storage and increased solar panel coverage on the roof. (iii) Provide details of grey and blackwater reuse and WSUD features. (iv) Provide details of energy efficient lighting.	(ii), (iii) Refer to Statement of Environmental Effects section 7.2 Ecologically Sustainable Development for commitments: ▪ Five (5) electric vehicle parking spaces; ▪ Solar panels on the roof with a target of 500KW; ▪ 5 x 34,000L rainwater tanks to enable rainwater reuse; and ▪ 6-star green start and NABERS (iv) Proposed building is designed to have maximum daylight at central mall area as indicated in section AA of architectural while complying with Section J of NCC for building fabric and building sealing. Emergency efficient lighting will be used throughout the building by selection of light fittings, motion sensors and diffused skylights at Construction Documentation stage.
	<u>Pedestrian Connectivity</u> Detailed analysis is required of the pedestrian infrastructure and connectivity to the west and east. Consideration should be given to improved outlook and linkages to the existing park.	A pedestrian diagram has been provided to assist an understanding of the connectivity in and around the development. Refer to Architectural plans A2.03 Rev D.
9	CPETED Having regard to other comments, a CPTED review of the basement car park is required in terms of: (i) The hours the basement car park will be open to the public (ii) The hours of operation for the car wash area (iii) The suitability of the DDA WC opening into the car park aisle (a better outcome is for the amenities, if required, to be located in the foyer of the Lift / Stair / Travelator for improved casual surveillance and lighting). (iv) The Lift / Stair access at the Ground Floor should be reviewed for improved casual surveillance and direction finding. (v) Consider the implications of the design of the Pad sites	(i)Basement carpark will be opened from 7am to 12am which is in line with Taven hour and for the convenience of outdoor food precinct (ii)carwash operating hour is from 7am to 7pm (iii)DDA WC opening is relocated to foyer, refer to updated architectural plans A02.02 Rev-B (iv)Refer to stair and lift lobby improved surveillance (v)Refer to updated landscape plans with Temporary amenities, including a gravel pathway, seating and pot plants included – Refer to LP07. Provisions such as Security patrol, CCTV within amenities corridor and basement, well-lit

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<table>
<tr><td></td><td></td><td>lighting, time limit senor DDA WC and safety convex mirror at blind corner to be imposed to improve crime prevention.

Refer to attached Plan of management for Tavern.</td></tr>
<tr><td>10</td><td>Social Impact Assessment

A Social Impact Assessment is required for the proposed Tavern & Liquor Store to address the impact of a licensed premises in the locality and to consider the density of similar operations in the area.</td><td>Refer to Social Impact Assessment prepared by URBIS.
Based on this assessment, the proposed liquor uses are likely to have a low – neutral impact on the community</td></tr>
<tr><td>11</td><td>Access
Please review the consistency between plans for the access ramps, i.e. the ramps as shown on the landscape plans are at 1 in 14 whilst the architectural plans detail 1 in 19, 1in 18, and 1 in 26.</td><td>Refer to updated architectural and landscape plans for consistent ramp gradient.</td></tr>
<tr><td>12</td><td>Acoustic
<u>Truck loading</u>
In accordance with the EPA Noise Policy for Industry, the period in a day over which assessments are made are: day (7 am to 6 pm); evening (6 pm to 10 pm); or night (10 pm to 7 am). It is noted, the time between 6am – 7am is classified as night time.

The acoustic report assesses the impact of evening (6pm to 10pm) only, therefore, it is assumed that truck loading will not occur during night time periods. Clarification is required of the proposed operating hours of the loading dock.

<u>Tavern</u>
The acoustic report assesses noise generation using the following assumptions:
- Proposed operating hours of 9.00am to 12.00am
- 500 patrons internally
- 25 patrons on external terrace
- Music sound pressure level within the venue (internally) of up to 75dB(A)
- Typical music sound spectrum as follows:

<table><tr><td>Noise source</td><td>63Hz</td><td>125Hz</td><td>250Hz</td><td>500Hz</td></tr><tr><td>Amplified music</td><td>71</td><td>77</td><td>70</td><td>72</td></tr></table></td><td>Refer to updated acoustic report with specific recommendation regarding Tavern prepared by Acoustic logic.</td></tr>
</table>

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	The report also suggests some recommendations, including: - 'Heavy' glazing with acoustic seals - Installation of acoustic barriers - Installation of noise limiting devices - Operational controls, including limiting patrons, signage and closing windows. The recommendations do not outline the specific controls required to mitigate noise nuisances and does not detail the extent of how the controls will reduce noise impacts, and instead, recommends a more detailed acoustic assessment be undertaken. As appropriate conditions of approval are not able to be developed without a succinct and detailed assessment and recommendations, an amended acoustic report providing more detailed assessment and recommendations with regards to the potential noise impact and control measures for the operation of the tavern is required. Specific recommendations to be included in the report are to outline: - *The construction standard (RW rating) to which glazing/acoustic seals/building materials are to be constructed with.* - *Specifics of the proposed acoustic barriers, including length, height, proposed materials, and be detailed in amended plans.* - *The location and details of operation of the proposed sound limiting device, including the dB(A) limit the device is to be set to* - *While it is noted that operational controls may prevent possible noise nuisances, operational controls should be used as a last resort. Elimination of noise and design controls should take precedence.* Note, the amended report is required to determine suitable conditions. A second acoustic assessment would be required after construction to certify the actual noise levels are consistent with the report.	
13	Ecology <u>Trees</u> Please address the avoid and minimise principle by demonstrating:	Vegetation removal has been approved under previously approved DA18-1526. Same set of conditions under Flora and Fauna shall be imposed for this development application.

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	- how the retention of the trees has been considered as part of the proposal? - Why retention of these trees was not feasible? <u>Flora and Fauna assessment (EPS 2021)</u> The flora and fauna assessment does not consider the potential impacts on the southern Myotis (*Myotis macropus*). Due to the presence of one hollow-bearing tree with a small hollow within 200 metres of a water body, this hollow-bearing tree is potential roosting habitat for this species and should be considered in the impact assessment. Further ecological surveys and reporting is necessary including: - Stagwatch of the hollow-bearing tree for no less than one hour (30 minutes before and 30 minutes after last light) to identify potential species using the hollow during optimal weather conditions (no rain, minimum wind) - Deployment of one Anabat recorder during the stagwatch (for no less than one hour) aimed in direction of the hollow to record any species of microbat utilizing the hollow - Anabat analysis to identify what species of microbat may be roosting in the hollow - Update of the report including o Section 5. Flora and Fauna (methodology) o Section 6. Results o 7.Discussion and Impact Assessment o Likelihood of occurrence table (Appendix 1); and 5-part test (Appendix 2) to include Southern Myotis in the assessment In addition, the following recommendations are to be updated in the report and incorporated in any conditions of consent. - The hollow-bearing tree (HBT) should be inspected by a qualified ecologist prior to the removal of the tree. Any species identified as utilizing the hollow will determine the timing of the removal the hollow-bearing tree and clearing activities should only occur outside of the breeding season for the resident fauna. - Hunter Wildlife should be contacted prior to the removal of the HBT to ensure that they have capacity to care for any injured fauna. - Ensure that a suitably qualified and licensed ecologist (who is vaccinated for Australian bat lyssavirus) supervises the removal of HBT. Any bats	We request the recommendation in this RFI are to be conditioned as per of development consent.

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	found must only be handled by a person vaccinated for lyssavirus and be relocated the following night in adjacent vegetation. - Check for fauna in the hollow before clearing and remove them before beginning operations if possible. - Before felling HBT, tap along trunk using an excavator or loader to scare fauna from the hollows. Repeat several times to encourage any species present to self-relocate. - After clearing, re-check to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be safely relocated to nearby habitat. - If taking the HBT tree down in stages, the non-hollow-bearing branches should be removed before the hollow-bearing branches are removed. - Preferably, logs from the felled trees should be distributed into areas of vegetation nearby (drainage reserve directly west of the site) to be retained and provide additional potential habitat for ground dwelling fauna such as reptiles and small mammals. - The removal of the HBT should be offset by the placement of one Nestbox in adjacent vegetation to ensure no net loss of hollow. - The Nestbox should provide habitat for microbats and be constructed of durable material. - The Nestbox should be installed prior to the removal of the HBT by a qualified ecologist or arborist, at least 3-4 metres from the ground. - GPS location of the Nestbox should be provided to council	
14	Engineering <u>Traffic Impact Assessment</u> Address the issues identified by Transport for NSW regarding the SIDRA modelling. <u>Pedestrian Linkages</u> Having regard to comment elsewhere, concern is raised as to the walking distance from shops/facilities to bus stops. Consideration should be given to closer/direct access points for bus users (particularly for elderly and disabled bus users) adjacent to the building entrance doors.	Response letter to address TfNSW has been submitted on 2/6/2022 prepared by McLaren Traffic Engineering. Refer to response letter prepared by McLaren traffic engineering dated 2/6/2022. Proposed bus stop located at Tigerhawk drive is 130m from nearest shop which is consistent with Section 93 (Housing For Seniors) SEPP- transport services are not to be located more than 400m.

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	<u>Road Design, Traffic & Transport</u> (i) Access to the site from the NE and Eastern Chisholm precincts, which is a large portion of the URA, does not have a dedicated main access. The applicant should consider providing access from Settlers Boulevard from a right turn median ramp for light vehicles.	(i) Refer to response letter prepared by McLaren traffic engineering dated 2/6/2022. Maitland Council DCP Part F – Urban Release Areas – Chisholm Neighbourhood Centre Section 1.3 states that "*Driveway entry points on Settlers Boulevarde and Tigerhawk Drive shall be left in / left out with concrete median separation on the centreline."*
	(ii) It is noted that the application for subdivision of the land to the south includes with a 12m wide road which will provide legal and physical access to the shopping centre. It is recommended this road should be constructed as part of the shopping complex development.	(ii)Two stage construction is proposed, link road being 1st stage and the rest will be 2nd stage under DA/2021/105. Condition to be imposed not to occupy shopping centre until linen plan is registered for subject subdivision.
	(iii) Concern is raised as to the ultimate use for the land at NE part of the site and its traffic and pedestrian integration impacts.	(iii)Refer to updated architectural plan A02.03 Rev-D for pedestrian linkage around the site.
	(iv) The suitability of the pedestrian crossing at the top of the driveway ramp off Heritage Drive is to be reviewed in terms of site distance and conflict, noting vehicles accelerating up the ramp will have limited vision of pedestrians entering the walkway due to the walls, balustrade and landscaping either side.	(iv) Refer to response letter prepared by McLaren traffic engineering dated 2/6/2022.
	<u>Parking & Vehicle Access</u> (i) Clarification is required of whether the angled parking on the through road is proposed as part of this DA for the Shopping Centre of the subdivision DA.	<u>Parking & Vehicle Access</u> (i)Parking has been updated to parallel parking, these parking are part of communal use, not specifically dedicated for shopping centre.
	(ii) Turning movements for the largest service vehicles expected to enter and exit the site shall be provided showing the service bay entry at the rear of the commercial development.	(ii) Refer to Annexure D of the submitted Traffic & Parking Impact Assessment dated 23 December 2021 (MTE Report) for swept paths. Largest vehicle will be Articulated Vehicle.
	(iii) A 1 metre clearance from the back of the 30 degree angled parking to the dish drain is required.	

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	This should be shown on the typical section for Road 01. (iv) A review of the car parking is required, noting an assessment determined: • 630 general spaces (claimed 653) • 14 accessible spaces • 10 parents • 5 ev spaces Total – 659	(iii)Parking has been updated to parallel parking, 1m clearance is achieved. (iv)Refer to response letter prepared by McLaren traffic engineering: 126 spaces within the basement including: • Five (5) x EV spaces; • Four (4) disabled spaces • 117 standard car parking spaces. • • 535 spaces on the ground floor including: • 10 x parent spaces; • 10 x disabled car parking spaces • 1 x mini bus space • 514 standard car parking spaces. • In addition to the above, there are six (6) direct to boot spaces. Based upon the above, there are 661 spaces available for the site (not including the six [6] direct to boot spaces). This is consistent with the MTE Report. The estimated parking demand of the site is some 644 spaces based upon Council's DCP and 617 spaces based upon TfNSW parking rates. Furthermore, there are 18 on-street parking spaces provided along the New Link Road (previously 21 spaces) frontage.
	(v) Please detail on the architectural and landscape plans the location of the bicycle parking spaces. <u>Stormwater Management</u> Amended plans required to address the following: (i) Concern is raised with regard to the SW discharge point on Heritage Drive, Council's road pipe system is sized for 10% ARI (10yr Storm). Council will need to see data and a visual representation of the gutter flow widths, depths and overland flow paths for 1% ARI (100yr storm) to assess how the stormwater runoff from the development works with or affects the surrounding pipes, pits and roads as well as downstream elements. (ii) Concern is raised as to windswept/lightweight litter gross pollutants, will the shopping centre be	(v) Refer to updated architectural plans and landscape plans for 78 bicycle parking. (i)As demonstrated in Table 1 of the Stormwater Management Plan Report, OSD has been provided so that the predevelopment flows for the 1EY, 10% AEP (10 year ARI) and 1% AEP (100 year ARI) are not exceeded by the development for each of the distinctive catchments that exist on the site. Therefore, the capacity of the overland and underground stormwater systems downstream should not be compromised by the development. (ii)Maintenance procedures and intervals of the stormwater system has been provided in

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	undertaking regular car park sweeping and collection?	the Stormwater Management Plan Report, centre management will be doing regular cleaning and rubbish collection as part of maintenance schedule.
	<u>Geotech & Earthworks</u> Details of the boundary interfaces are required having regard to retaining walls and batters (refer to comment elsewhere).	Refer to landscape plans Refer to LP09 for typical sections along Tigerhawk Drive.
	<u>Footpaths</u> The plans show awnings and overhanging structures over road reserves, the applicant should have these removed or redesigned to be within the boundary of the development site.	Proposed awing is part of public domain feature it is to provide weather protection, activation of street, articulation, and focal design of corner element and streetscape.
15	<u>Landscaping</u> The following information is required: (i) Photomontages and cross sections of the rear elevation to Heritage Drive are required to review the suitability of the screen planting addressing the adjoining residential development.	(i)Refer to DA/2022/105, screen planting are proposed along lot 13 road reserve of subdivision DA. Refer to these planting shown in updated LP04 and LP05 drawings. Also refer to Architectural south elevation drawing A09.02 Rev-C prepared by BN for acoustic panel fencing at loading area within retail centre.
	(ii) Detailed cross sections are required for the pedestrian interfaces / landscape outcomes, to enable a review of the relationship between landscaping and retaining in terms of scale, etc. Consider options for regrading the Pad site area (in conjunction with two storey forms) to reduce the reliance on retaining walls.	(ii)Refer to LP09 typical section of retaining wall for pedestrian interface along Tigerhawk drive. Future pad site will be part of proposed carpark level as per earthwork plan, Refer to landscape plan LP07 for tiered retailing wall with planting selection. Also refer to architectural 3D visualisation plan A80.01. Amendments are not required.
		(iii)Refer to updated landscape plans LP09. (iv)The pathway is designed to blend in with natural landscape features and canopy structure above, refer to photomontage view from entry. We prefer to maintain the current pathway. (v) Refer to landscape plans for

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	(iii) Minimise hard surfaces and duplication of walkways. (iv) Consider straightening the pathway from Tigerhawk Drive to the Shopping Centre entry (pedestrians tend to take a direct line so whilst the meandering pathway is an attractive feature the reality of use is likely to be different). (v) Consider an interim use of the Pad site to create an informal meeting place or improved appearance through large potted plants or interpretative artwork. (vi) More trees should be planted in the carpark to provide shade for cars and mitigate the Urban Heat Island (UHI) effect in line with the Maitland DCP guidelines. Note, the guidelines state there should be no more than 10 parking bays before a break with planting (this is the bare minimum for any tangible gains in thermal comfort).	Temporary amenities, including a gravel pathway, seating and pot plants included – Refer to LP07. (vi) Landscape plan is compliant with Rural Bush Fire Service referral response and CPTED guidelines. These compliance take precedence over UHI guidelines.
16	Sequence of development with DA/2022/105 As previously noted, the unnamed road to link Settlers Blvd and Heritage Drive is required to support the development proposed under both this DA and DA/2022/105. Use of the road for the proposed shopping centre can only be permitted once the works have been completed and the linen plan registered should consent be granted for DA/2022/105. It is recommended the unnamed road be proposed in both DAs, such that it can be constructed under either application and not hold up the other development pending registration of the linen plan under this application.	Two stage construction is proposed under DA/2022/105, link road being 1st stage and the rest will be 2nd stage of that DA. It is not required to include link road in retail centre DA. Condition to be imposed not to occupy shopping centre until linen plan is registered for subject subdivision. Transfer granting easement over own land will be registered in future for creation of an easement where both lots are held by the same owner.

We look forward council to expedite the process of assessment and development approval at your earliest.
I can be contacted on 8203 0362 should you require anything further or to discuss this matter.

Kind Regards,

Anthony El-Hazouri

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Director
Revelop Building and Developments Pty Ltd

Attachments:

1. Updated architectural plans prepared by BN
2. Updated landscape plans prepared by Moir Landscape Architects
3. Preliminary site investigation report prepared by ECS
4. Traffic response letter prepared by McLaren Traffic engineering
5. Social Impact Assessment Report prepared by URBIS
6. Updated Noise Emission Assessment prepared by Acoustic Logic dated 8 June 2022
7. Response letter from Ausgrid for easement
8. Overlaid plan of zone boundary and registered deposited plan prepared by LDS
9. Plan of Management for Tavern prepared by Revelop
10. Vehicular swept path prepared by McLaren Traffic engineering
11. Response letter for zone boundary by Urbis

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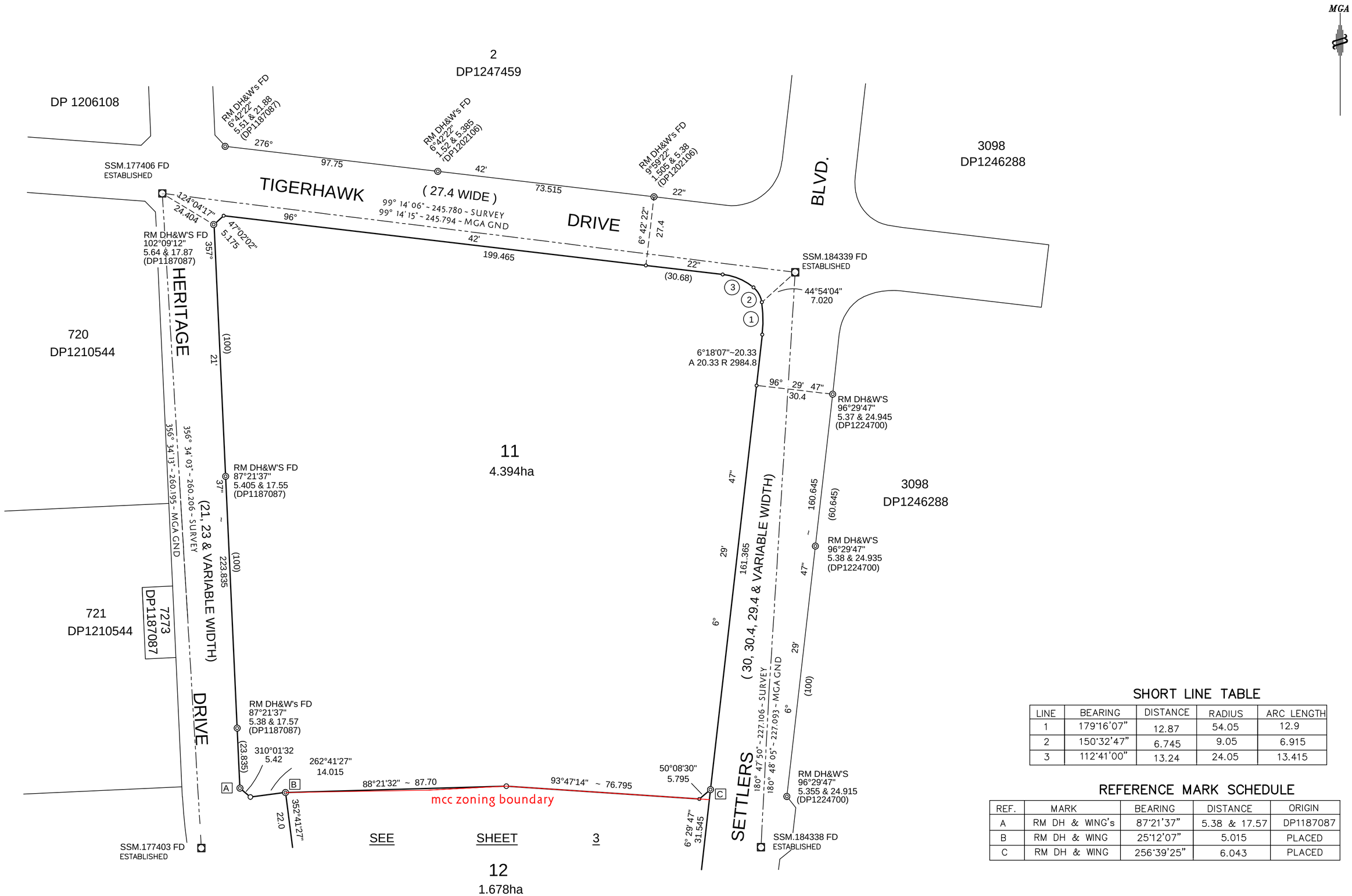


SHORT LINE TABLE

LINE	BEARING	DISTANCE	RADIUS	ARC LENGTH
1	179°16'07"	12.87	54.05	12.9
2	150°32'47"	6.745	9.05	6.915
3	112°41'00"	13.24	24.05	13.415

REFERENCE MARK SCHEDULE

REF.	MARK	BEARING	DISTANCE	ORIGIN
A	RM DH & WING's	87°21'37"	5.38 & 17.57	DP1187087
B	RM DH & WING	25°12'07"	5.015	PLACED
C	RM DH & WING	256°39'25"	6.043	PLACED

SURVEYOR Name: BRIAN LESLIE JAMES BLIGHT Date: 19/10/21 Reference: 6636-DP	PLAN OF SUBDIVISION OF LOT 1 D.P.1224700	LGA: MAITLAND Locality: CHISHOLM Reduction Ratio 1: 1000 Lengths are in metres. Registered:	DP1280255

URBIS

ANGEL PLACE
LEVEL 8, 123 PITT STREET
SYDNEY NSW 2000

URBIS.COM.AU
Urbis Pty Ltd
ABN 50 105 256 228

Brian Gibson
Principal Planner
Maitland City Council
Email: brian.gibson@maitland.nsw.gov.au

Dear Brian,

REQUEST FOR ADDITIONAL INFORMATION – ITEM 6 - 20 HERITAGE DRIVE, CHISOLM

This letter has been prepared on behalf of Revelop in response to the request for additional information to DA/2021/1702. This Development Application (DA) seeks to construct a mixed use development including commercial premises with retail premises, supermarket, mini major and liquor shop, recreational facility (Indoor) with gym and swimming pool, food and drink premises with pub, centre based child care facility (112 children), health services facility with medical centre, car wash and signage at 20 Heritage Drive, Chisolm.

The purpose of this letter is to respond to Item 6 of the request for additional information received by Maitland City Council on 19 May 2022. Item 6 is as outlined below:

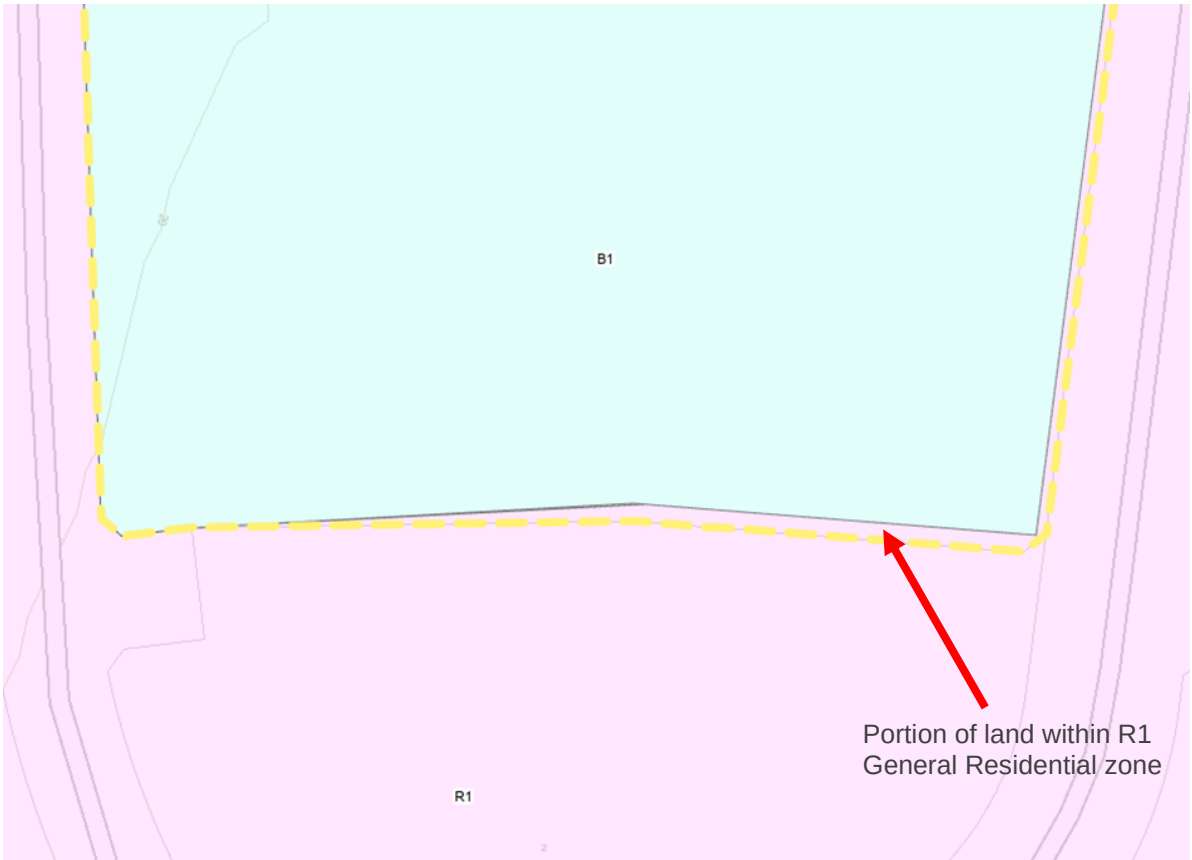
> *6. Maitland Local Environmental Plan 2011*
>
> *(i) Clause 2.1: (Land use zones) – the development site is zoned B1 'Neighbourhood Centre' and R1 'General Residential' land. Development consent is sought for a Mixed Use Development within the B1 zoned land.*
>
> *A Mixed Use Development is permissible with consent in the B1 zone however is prohibited in the R1 zone. Confirmation is required that no part of the Mixed Use Development will encroach the R1 zoned land. Clause 5.3 of the MLEP2011 may be an alternative approach.*
>
> *(ii) Legal & Physical Access – provision and timing of the unnamed road for access to the development is required to ensure there are no permissibility issues, i.e. the road is to be constructed over R1 land for which access to the shopping centre is contingent on.*
>
> *(iii) Clause 4.4 (Floor Space Ratio): the FSR for the site is 0.3:1 under subclause (2) and the Floor Space Ratio map. The proposed development has an FSR of 0.29:1 and is therefore compliant, it should be noted however with further development proposed in relation to the Pad sites only 272m² is available.*
>
> *Please confirm the Pad sites are subject to a separate development application.*

The response to item 6 has been addressed below.

The proposed commercial land uses and built form of the shopping centre are wholly contained within the B1 Neighbourhood Centre zone as verified by the attached Survey Plan (**Attachment 1**).

A small portion of the site (Lot 11 DP 1280255) (eastern and south-east edge) falls within the R1 General Residential zone (R1 Zone) as a result of a misalignment of zoning from the subdivision. The proposed land uses and elements of the proposal outside the B1 Neighbourhood Centre zone are isolated to associated landscaping, pedestrian walkways, and road reserve. These elements are permissible within the R1 Zone. However, as these uses could be characterised as being part of or ancillary to the predominant purpose of the development for which consent is sought, they could be considered prohibited as noted by Council.

Figure 1 Land zoning



Source: Maitland Local Environmental Plan 2011

Given the above, we propose to utilise clause 5.3 Development near zone boundaries of the Maitland LEP 2011 to enable Council to grant development consent to the small areas of the development that fall within the R1 Zone.

In terms of the operation of clause 5.3 we note:

- the distance of the boundary between the two zones is less than 20 metres (clause 5.3 (2))
- the land is not RE1, C or W zoned land (clause 5.3 (3(a))

– the land is not within the coastal zone (clause 5.3 (3(b)) and

– does not relate to sex services or restricted premises (clause 5.3 (3(c)).

Clause 5.3 (4) reads:

> *(4) Despite the provisions of this Plan relating to the purposes for which development may be carried out, development consent may be granted to development of land to which this clause applies for any purpose that may be carried out in the adjoining zone, but only if the consent authority is satisfied that—*
>
> *(a) the development is not inconsistent with the objectives for development in both zones, and*
>
> *(b) the carrying out of the development is desirable due to compatible land use planning, infrastructure capacity and other planning principles relating to the efficient and timely development of land.*

Each of these subsections have been considered below.

Clause 5.3(4)(a):

The proposed development is consistent with the B1 zone objectives, as previously established in the Statement of Environmental Effects and table below. In addition, the proposed development is consistent with the R1 zone objectives as it will enable associated commercial land uses and service the day to day needs of residents in a well located and servable location. The table below outlines the zone objectives and consistency of the proposal.

Table 1 Zone objectives

Objective	**Comment**
B1 Neighbourhood Centre	
To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood.	The Chisolm Shopping Village is a planned local centre that serves retail needs for the growing population of the urban release area. In addition to the retail services it will provide a child care centre, medical centre, gymnasium and food and drink premises to cater for the day to day needs of the community. The small-scale nature of the centre is consistent with the local hierarchy of centres noting that Thornton Shopping Centre is clearly a higher order centre as it supports greater community facilities, a public school, sporting fields and is within walking distance of Thornton Rail Station. The B1 zone prevents the centre from becoming a higher order centre

Objective	Comment
To provide retail, business and community facilities to meet the needs of a growing population.	Notwithstanding the first zone objective, it has always been the intention that the scale of Chisholm Shopping Village will support a level of retail that can grow according to the needs of a growing population. The level of floor space proposed is consistent with the resolution of Council when it progressed the original planning proposal for the site in May 2010 to apply what is effectively a GFA cap on the commercially zoned land and is compliant with the floor space ratio (FSR) control prescribed by the MLEP 2011. An Economic Impact Assessment has been prepared as an appendices to the SEE, that demonstrates Chisholm Shopping Village can serve the needs of the growing population and without significant long-term economic impacts
R1 General Residential	
To provide retail, business and community facilities to meet the needs of a growing population.	As per above the Chisolm Shopping Village is a planned local centre that serves retail needs for the growing population of the urban release area.
To provide for a variety of housing types and densities.	The development of Chisolm Shopping Village over a small portion of the adjacent R1 zone does not impact upon the ability of the adjacent site to develop in accordance with this zone objective. This is because the adjacent land will form part of a future public road that will be dedicated to Council. The proposal is therefore generally consistent with this zone objective.
To enable other land uses that provide facilities or services to meet the day to day needs of residents.	The development of the Chisolm Shopping Village over small portion of R1 zoned land enables land uses that will meet this objective which includes retail services, child care, medical centre, gymnasium and food and drink premises.

Clause 5.3(4)(b):

The proposed development is desirable due to compatible land use planning, infrastructure capacity and other planning principles relating to the efficient and timely development of land. The portion of R1 land in question, could not be developed in isolation and will contribute to the delivery of a new neighbourhood shopping centre to service Chisholm. The R1 land is adjacent to road reserves or future roads and would in theory always be used for landscaping and pedestrian walkways.

In summary, the minor works outside the B1 zone boundary are permissible in their own right, however, due to land use characterisation related to the shopping centre it is prudent to utilise the zone boundary flexibility clause within the MLEP.

Yours sincerely,

Naomi Ryan
Senior Consultant
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PLAN OF MANAGEMENT – OPERATION, ALCOHOL AND HOUSE POLICY

Chisholm Family Tavern

ADDRESS: 4 Heritage Drive Chisholm 2905

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1 INTRODUCTION

1.1 PURPOSE

The purpose of this Plan of Management (POM) is to outline the performance requirements and expectations involved with the sale and supply of liquor at the ChisholmTavern. This POM has been developed with having regard to the relevant matters under the following documents:

- Statutory conditions attached to the premises' Liquor License;
- Relevant matters under the Liquor Act 2007 and the Liquor Act Regulations;
- Responsible Promotion of Alcohol Product Guidelines (Liquor & Gaming NSW);
- Prevention of Intoxication on Licensed Premises Guidelines (Liquor & Gaming NSW); and,
- Intoxication Guidelines (Liquor & Gaming NSW).

1.2 STAFF REVIEW

Prior to the operation of the premises, all staff involved with the sale or supply of liquor including management, floor staff and bar staff will be made familiar with this Plan of Management, during their employment induction. All staff involved with the sale or supply of alcohol or provision of security are required to sign a register stating they have been acquainted with the POM. The register to be kept with this plan at all times.

1.3 OPERATION OF PLAN OF MANAGEMENT

The Chisholm Tavern is to operate in accordance with this POM and may be amended following consultation with NSW Police. A copy of the POM, as well as the liquor license and development consent is to be kept on premises and available upon request by persons in a position from Liquor and Gaming NSW, Police, Council Officer and the Independent Liquor and Gaming Authority.

1.4 LIQUOR LICENSE

An application for a liquor licence will be sought separate to the development application process. The Tavern will operate in accordance with the liquor license issued for the premises.

2 SIGNAGE

Provisional signs will be appropriately located and will be prominently displayed in the venue, regarding the sale and supply of alcohol, restricted areas and the sale and supply of alcohol to intoxicated persons.

+ All signs required by Liquor & Gaming NSW will be affixed to all necessary areas of the premises.
+ Signs will be on display at exits requesting patrons to leave in a quiet and orderly fashion.
+ A sign will be displayed near the main public entrance off Heritage Drive with the name of the licensed premises, the name of the licensee, the type of license held.

3 HOTEL OPERATION

3.1 HOURS OF OPERATION

Liquor will be sold in accordance with the following hours;

+ Monday to Sunday 10:00am to 12:00am (Midnight)

The Liquor Act 2007 prohibits the sale of liquor by takeaway after 11pm (Mon to Sat) and 10pm on Sundays.

3.2 AVAILABILITY OF FOOD

The premises will be open for lunch and dinner every day. Lighter meals will also be available at all times. A range of dining options and styles will be available to cater for market demand.

3.3 VENUE ENTERAINMENT

Live entertainment will be provided at times for patrons. The Tavern will provide a vibrant and safe environment, where members of the community can watch live music.

On nights when the venue has live music, the performance will be completed no later than 60 minutes prior to the closure of the premises. Noise levels during the performances will be kept to the recommended levels, separate Acoustic Assessment report will be conducted with fit out design, and submission for Tavern. A complaints register will be kept at the venue at all times, enabling neighbouring residents, if required, to notify the premises of a noise complaint.

3.4 DRESS CODE

Chisholm tavern seeks to implement a dress code to ensure patrons are neat, clean and in appropriate attire always. The below attire will not be permitted.

+ Football shorts or stubbies.

+ Bare feet

+ Training apparel

+ Swimwear/beachwear

+ Soiled or dirty clothing

+ Offensive wear

+ Untidiness or frayed clothing

+ Singlets

Any clothing with obscene or offensive will not be tolerated.

3.5 LITTER PATROL

An adequate number of bins will be location through-out the premises to help mitigate the potential litter impact upon the surrounding environment. A litter patrol area will be determined and staff will perform litter patrols once a day prior to trade opening for the day. This will cover footpath, gutter, building entry, driveway and surrounds.

4 MANAGEMENT

4.1 GENERAL OPERATION AND MONITORING PATRON BEHAVIOUR

+ The Licensee and Management will consider the amenity of the surrounding area and will ensure the operations are managed in such a way as to reasonably minimise any adverse impacts to neighbours (business and residential) through noise, waste and behaviour of patrons.

+ Patron behaviour, if deemed unreasonable, may be refused service, asked to leave and be barred for a period of time warranted by the Licensee.

+ Management will comply with any noise conditions that may be in place relating to the operations of the premises.

+ The mechanical plant will be maintained appropriately to reduce noise and odours.

+ The venue operations will be conducted in such a manner as not to unreasonably interfere with, or materially affect the amenity of the neighbourhood by reason of noise, vibration, smell, fumes, vapor, steam, soot, ash, dust, waste water, waste products, grit, oil or otherwise.

+ The Licensee and staff shall take all reasonable steps to control the behaviour of patrons whilst on the premises and as they arrive and depart the venue. To ensure this, the Licensee shall:

    - Take all reasonable steps to ensure that venue operations are compliant with Section 125 of the Liquor Act 1982 – Conduct on Licensed Premises, by monitoring and managing patron behaviour;

    - Ensure that prospective patron behaviour is monitored upon approach to the venue and those persons observed consuming alcohol external to the venue, behaving in an anti-social manner or causing excessive noise are not permitted entry into the venue;

    - Ensure that persons who have been refused entry or a patron(s) who has been ejected from the venue does not loiter;

    - Erect signs at the entry/exits of the premises requesting that patrons be considerate of the neighbours by leaving the venue quickly and in a quiet and orderly manner without causing disturbances;

    - At the cessation of any bar trade make an announcement advising patrons of the approach of closing time and then making a request for patrons to depart the premises and vicinity quickly and quietly so as to avoid disturbance of the neighbourhood; and

    - The Licensee and staff shall take all reasonable steps to ensure that there is no loitering in the vicinity

of the venue.

Patrons that fail to comply with the venues behavioural requirements and have been provided correct advice and management and proceed to involve themselves in anti-social conduct causing ejection from the premises will be excluded from attending the venue for a period of time.

- Any such action will require Management to record such action in an appropriate ledger, acquiring patron details and nature of the incident.

- Management will establish a schedule of penalties as to maintain consistency appropriate to the level of misconduct.

4.2 NOISE

Patrons and employees will be encouraged to keep noise to a minimum when entering and leaving the premises. Intoxicated and/or loud patrons will not be allowed entry into the venue and will be ejected if they are already in the venue. All amplified sound will be reduced to background noise 60 minutes prior to closing. All noise complaints will be documented in a register and kept on site.

4.3 TRANSPORTATION

The use of public transportation, taxis and designated drivers as opposed to drink-driving will be encouraged under all circumstances in accordance with TfNSW, Independent Liquor and Gambling Authority (ILGA) and NSW Police guidelines. Staff can contact taxi service for the direct pickup of patrons if requested.

4.4 VENUE CLOSURE & DISPERSAL OF PATRONS

Patrons remaining at the venue during the later-night trade will be informed 30 minutes prior to the closure of evening trade. This provides the opportunity for patrons to organise their own appropriate transport home, or request a staff member to contact and arrange a taxi service. Upon closure staff will ask patrons to respectfully leave the venue, whilst considering local residents. Staff will disperse groups gathering and mingling around the building if they are not awaiting transport.

4.5 COMPLAINT REGISTER

+ Management will endeavour to address any reasonable concerns of people in the surrounding area or other third parties without the involvement of Maitland Council and/or NSW Police wherever possible.

+ Management will respond or meet with any complainants and attempt to address and resolve any reasonable concerns.

+ Management will be contactable by telephone during operating hours, or by email outside of hours.

Any complaints made to the venue are to be recorded, and such records are to include the complainant's details, nature of the complaint and action taken by the venue.

4.6 STAFF TRAINING

The Licensee will ensure that staff training sessions are held every 6 months which entail;

+ Crime Scene preservation guidelines;

+ RSA refresher;

+ Intoxication prevention measures;

+ License conditions and Plan of Management; and,

+ License authorisation and venue trading hours.

5 RESPONSIBLE SERVICE OF ALCOHOL

It is unlawful to sell or supply liquor to a person who is intoxicated on licensed premises and is unlawful to permit intoxication on licensed premises.

A person is considered to be intoxicated if:

+ The person's speech, balance, co-ordination or behaviour is noticeably affected, and

+ It is reasonable in the circumstances to believe that the affected speech, balance, co-ordination or behaviour is the result of the consumption of liquor.

The Liquor and Gaming NSW has issued Guidelines to assist in the identification of intoxicated persons.

Staff shall bring to the attention of Management any person considered to be in, or approaching a state of intoxication.

5.1 REQUIREMENTS

+ The Licensee will ensure that all staff involved in the sale and supply of liquor has completed an approved NSW Responsible Service of Alcohol Course and holds a valid NSW Competency Card and/or certificate.

+ The Licensee will maintain a register containing copies of RSA Competency Cards and/or certificates. This register is to be made available for inspection when requested by NSW Police or Inspectors of Liquor & Gaming NSW.

+ All staff and management involved with the sale and supply of liquor are accountable for the responsible service of alcohol on the premises.

+ Staff will provide patrons information about transport options and assist in contacting taxi companies to collect patrons at their request.

+ All takeaway sales will cease in accordance with the premises operating hours.

+ The venue will not serve liquor to any person who is intoxicated.

+ The venue will decline entry to any person who is intoxicated.

+ The venue will promote the service of non-alcoholic beverages.

+ A log of alcohol related incidents will be recorded by Management and will include:

    - Refusal of service/Asked to Leave

    - Minor/No ID

    - Violence

    - Intoxication

    - Any visit from NSW Police, Inspectors of Liquor & Gaming NSW or other relevant regulatory officers

+ The Licensee or Management will have adequate staff rostered to ensure the safety and compliance of the premises.

No person under the age of 18 years shall be served liquor at the venue. Production of a document of one of the following classes is, for the purposes of Section 117E of the Act, evidence that a person holding the document is at least 18 years of age, but only if the document bears a photograph of the person and indicates (by reference to the person's date of birth or otherwise) that the person is of or above that age (and only if the document has not expired and otherwise appears to be in force):

These are;

+ a motor vehicle driver's or rider's licence or permit issued by TfNSW or by the corresponding public authority of the Commonwealth, of some other State or Territory or of some other country;

+ a passport issued by the Commonwealth or under the law of some other country; or,

+ a Photo Card issued under the Photo Card Act 2005.

Note: All forms of identification used to establish proof of age MUST be current.

5.2 IDENTIFYING AND PREVENTING INTOXICATION

Management and staff will endeavour to prevent intoxication through the following methods:

+ Ensuring patrons already showing signs of intoxication or approaching intoxication will not be served.

+ Food commensurate to the responsible service of alcohol is available at all times that alcohol is served.

+ Ensuring that low alcohol, non-alcoholic drinks and free drinking water is available whenever alcohol is served.

Note: These symptoms or signs are not exhaustive and not necessarily conclusive of intoxication.

Table 1 - Symptoms of Intoxication

Speech	Balance	Co-ordination	Behaviour
+ Slurring words + Rambling or unintelligible conversation + Incoherent or muddled speech + Loss of train of thought + Not understanding normal conversation + Difficulty in paying attention	+ Unsteady on feet swaying uncontrollably + Staggering + Difficulty walking straight + Cannot stand or falling down + Stumbling + Bumping into or knocking over furniture and people	+ Lack of coordination + Spilling drinks + Dropping drinks + Fumbling change + Difficulty counting money or paying + Difficulty opening or closing doors + Inability to find one's mouth with a glass	+ Rudeness + Aggression + Belligerent + Argumentative/ + Quarrelsome + Offensive + Bad tempered + Physically violent + Loud/boisterous + Confused + Disorderly + Exuberance + Using offensive language + Annoying / pestering others + Overly friendly + Loss of inhibition + Inappropriate sexual advances + Drowsiness or sleeping at a bar or table + Vomiting + Drinking rapidly

5.3 PREVENTION OF SALE AND SUPPLY OF ALCOHOL TO MINORS

+ No alcoholic beverage shall be provided to a patron under the age of 18 by staff members or other patrons.
+ By law parents cannot supply alcohol to anyone under 18 years of age on licensed premises.
+ When alcohol is served at any function or event held in the premises, anyone under the age of 18 must be accompanied by a responsible adult.
+ Proof of age will be required if the patron looks under the age of 25.
+ Acceptable forms of ID:
    - Refer to Part 5.1

5.4 HARM MINIMISATION

Management and staff will take all reasonable steps to prohibit any liquor promotion or activities that are likely to promote irresponsible services of alcohol. Inclusive activities such as promotions and discounts that could:

+ Have a special appeal to minors;
+ May be considered indecent or offensive; or,
+ Encourage the rapid, excessive and/or irresponsible consumption of alcohol.

6 STAFF PROCEDURES

Refusal of Service

- Identify signs of intoxication. If you are unsure, ask for a second opinion.
- Refuse service to intoxicated patron and inform relevant management and staff.
- Respectfully and politely ask patron to leave.
- Tell them they are welcome to return another time.
- Stay with patron until they leave and walk them out the door.
- Offer assistance for transport.

Removal/Fail to Quit

- If a patron is continuously quarrelsome, unreasonable, or confrontational notify management. Police will be contacted if required.
- Any person that is asked to leave or refused entry to the premises are required by law to move 50m or more away from the premises and are not permitted to re-enter the vicinity for 6 hours (minimum).

Verifying Proof of Age

- If a patron looks under the age of 25, ask for a suitable form of ID to be provided prior to service.
- Check authenticity, date of birth, compare photograph.
- If no suitable ID can be produced, politely ask patron to leave and inform other staff members and management.

Dealing with Minors

- Minors are permitted to be on premises only with direct supervision of a responsible adult.
- Secondary supply of alcohol to minors will not be permitted.

Secondary Supply

- If a minor or patron that has been refused service gains access to alcohol while on premise confiscate the beverage.
- Inform other staff and management.
- Ask the relevant patrons to leave.

7 SECURITY MEASURES

7.1 SECURITY PERSONNEL

Should they be required, the premises will provide licensed security personnel who hold appropriate qualifications.

7.2 INCIDENT REPORTING

Immediately after the person in charge of the premises becomes aware of an incident involving an act of violence causing an injury to a person on the premises, the owner/Licensee/duty manager must:

- Take all practical steps to preserve and keep intact the area where the act of violence occurred;
- Retain all materials and implements associated with the act of violence in accordance with the crime scene preservation guidelines issued by the NSW Police;
- Make direct contact with local Police advise of the incident;
- Comply with any directions given by the Police to preserve or keep intact the area where the violence occurred; and,
- The Licensee will maintain a log of reportable incidents which will be made available at the request of NSW Police or other relevant regulatory officers.

7.3 VIDEO SURVEILLANCE (CCTV)

The Licensee will maintain a CCTV system that meets the following minimum requirements:

- A camera must be located at each entrance to the licensed premises and positioned to record any person entering through these entrances. The CCTV recordings of this camera must be sufficient to enable an individual to be identified, beyond reasonable doubt, when:
    - the person represents not less than 100% of screen height, and
    - there is an unobstructed view of the person's face.
- In addition, CCTV cameras must be maintained throughout the premises with camera coverage to specifically record images of the entire licensed premises.
- The CCTV recordings of the cameras referred to in sub condition (2) must be sufficient to enable the recognition of a person. A viewer must be able to say with a high degree of certainty whether or not an individual shown is the same as someone they have seen before, when:
    - the person represents not less than 50% of screen height, and
    - there is an unobstructed view of the person's face.
- Recordings must:
    - Be in digital format;
    - Record at a minimum of ten (10) frames per second, and,

- Commence one hour prior to opening and operate continuously until at least one hour after closure.

+ The correct time, date and camera identification must be automatically embedded on all recordings and be able to be read when the image is played back on a different system without interfering with the view of the target area.

+ Recordings should be retained for a period of 30 days before being reused or destroyed. The Licensee shall ensure that no person is able to delete or alter any recordings within the 30-day period.

+ Immediate access to the CCTV system and the ability to review recordings on the system is to be granted to NSW Police, OLGR Inspectors or other regulatory officers upon request.

+ The CCTV system shall be able to reproduce a copy of the recordings on Compact Disc, DVD or USB memory stick and must, upon request, be provided within one working day to NSW Police, Liquor & Gaming NSW Inspectors or other regulatory officers.

8 SITE MAINTENANCE

The premises and its immediate area will be kept clean and tidy. Its condition will be regularly maintained internally and externally to meet requirements of Council, any other relevant safety standard and community expectation.

8.1 CLEANING

Staff will ensure as far as practical that the premises is kept in a clean and tidy condition both internally and externally. Cleaning of both internal and external areas of the venue will be undertaken by professional cleaning staff in accordance with the site's liquor licence. Graffiti will be removed as soon as possible.

8.2 WASTE MANAGEMENT

Staff will separate general waste and recyclables where possible. Waste and recycling bins will be clearly labelled and identifiable. In accordance with relevant health guidelines, the bin area will be cleaned by staff with protective gloves.

9 HOUSE POLICY

A copy of the House Policy must be maintained in the RSA Register. The House Policy must be updated if there are changes to legislation. All staff must be briefed on the House Policy and be aware of their obligations.

10 AMENDMENTS TO THIS PLAN

This POM is designed as a dynamic document and therefore will be reviewed on an annual basis by the Licensee and Management. If it becomes evident that modification to the POM is required for operational and management improvement or compliance, the relevant changes will be made with approval and consultation with NSW Licensing Police and Council (if necessary). The most current version of this Plan of Management must be made available to NSW Police and Liquor & Gaming NSW Inspectors upon their request.

M^CLAREN TRAFFIC ENGINEERING

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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

15 June 2022 Reference: 210550.05FA

Revelop
Suite 506, Level 5
55 Phillip Street
Parramatta NSW 2150
Attention: Emily Han

LETTER OF RESPONSE TO COUNCIL COMMENTS FOR THE PROPOSED SHOPPING CENTRE DEVELOPMENT AT 20 HERITAGE DRIVE, CHISHOLM

Dear Emily,

Reference is made to your request to provide a Letter of Response to Council Comments within a letter dated 19 May 2022 for the proposed Shopping Centre Development at 20 Heritage Drive, Chisholm for DA2021/1702 as shown in **Annexure A**. The comments made by Council engineers are shown below italicised with a response provided by M^CLaren Traffic Engineering (MTE) thereafter.

> *14. Engineering*
>
> *Traffic Impact Assessment*
>
> *Address the issues identified by Transport for NSW regarding the SIDRA modelling*

MTE Response: The response to TfNSW comments is provided via a separate letter.

> *Pedestrian Linkages*
>
> *Having regard to comment elsewhere, concern is raised as to the walking distance from shops / facilities to bus stops. Consideration should be given to closer / direct access points for bus users (particularly for elderly and disabled bus users) adjacent to the building entrance doors.*

MTE Response: It is understood there are to be bus facilities along Tigerhawk Drive, which is roughly 130m from the nearest shop. Section 93 (Housing For Seniors) of the State Environmental Planning Policy (Housing) 2021 requires for the purposes of access to facilities that transport services are not to be located more than 400m. The location of bus facilities along Tigerhawk Drive is well within this distance and a relocation of bus facilities to the front door is not required.

Further, it is understood the location of bus facilities is consistent with that required by the DCP.

Road Design, Traffic & Transport

(i) Access to the site from the NE and Eastern Chisholm precincts, which is a large portion of the URA, does not have a dedicated main access. The applicant should consider providing access from Settlers Boulevard from a right turn median ramp for light vehicles.

MTE Response: Reference is made to Maitland Council DCP Part F – Urban Release Areas – Chisholm Neighbourhood Centre Section 1.3 which states the following:

Driveway entry points on Settlers Boulevarde and Tigerhawk Drive shall be left in / left out with concrete median separation on the centreline.

Providing a right turn facility into the site from Settlers Boulevarde is contrary to the DCP. Not only this, but access to the site from the north east will be facilitated by the vehicle access on Tigerhawk Drive, such that the provision of a right turning facility from Settlers Boulevard is not required.

(ii) It is noted that the application for subdivision of the land to the south includes with a 12m wide road which will provide legal and physical access to the shopping centre. It is recommended this road should be constructed as part of the shopping complex development.

MTE Response: For others to comment.

(iii) Concern is raised as to the ultimate use for the land at NE part of the site and its traffic and pedestrian integration impacts.

MTE Response: It is understood that this location will be subject to a separate development application. The traffic and pedestrian integration matters will be assessed as part of the additional development applications.

(iv) The suitability of the pedestrian crossing at the top of the driveway ramp off Heritage Drive is to be reviewed in terms of site distance and conflict, noting vehicles accelerating up the ramp will have limited vision of pedestrians entering the walkway due to the walls, balustrade and landscaping either side.

MTE Response: The location of the pedestrian crossing has been reviewed and relocated to connect to the central pedestrian crossing.

Parking & Vehicle Access

(i) Clarification is required of whether the angled parking on the through road is proposed as part of this DA for the Shopping Centre of the subdivision DA

MTE Response: For others to address

(ii) Turning movements for the largest service vehicles expected to enter and exit the site shall be provided showing the service bay entry at the rear of the commercial development.

MTE Response: Refer to **Annexure D** of the submitted Traffic & Parking Impact Assessment dated 23 December 2021 (MTE Report) for swept paths.

(iii) A 1 metre clearance from the back of the 30 degree angled parking to the dish drain is required. This should be shown on the typical section for Road 01.

MTE Response: For others to address

(iv) A review of the car parking is required, noting an assessment determined:

- *630 general spaces (claimed 653)*
- *14 accessible spaces*
- *10 parent spaces*
- *5 EV spaces*
- *Total – 659*

MTE Response: A review of the car parking numbers has been undertaken and the following is the number of spaces provided on the site:

- 126 spaces within the basement including:
  - Five (5) x EV spaces;
  - Four (4) disabled spaces
  - 117 standard car parking spaces.
- 535 spaces on the ground floor including:
  - 10 x parent spaces;
  - 10 x disabled car parking spaces;
  - One (1) x mini bus space;
  - 514 standard car parking spaces.

In addition to the above, there are six (6) direct to boot spaces. Based upon the above, there are 661 spaces available for the site (not including the six [6] direct to boot spaces). This is consistent with the MTE Report. The estimated parking demand of the site is some 644 spaces based upon Council's DCP and 617 spaces based upon TfNSW parking rates.

Furthermore, there are 18 on-street parking spaces provided along the New Link Road (previously 21 spaces) frontage.

(v) Please detail on the architectural and landscape plans the location of the bicycle parking spaces.

MTE Response: The amended plans detail the provision of 78 bicycle spaces, complying with Council requirements.

Please contact Mr Matthew M^{C}Carthy on 9521 7199 should you require further information or assistance.

Yours faithfully
M^{c}Laren Traffic Engineering

Matthew M^{C}Carthy
Senior Traffic Engineer
BE Civil Engineering
Masters of Engineering Science
RMS Accredited Level 2 Road Safety Auditor
RMS Accredited Work Zone Traffic Management Plan Designer and Inspector

ANNEXURE A: AMENDED PLANS

(2 SHEETS)

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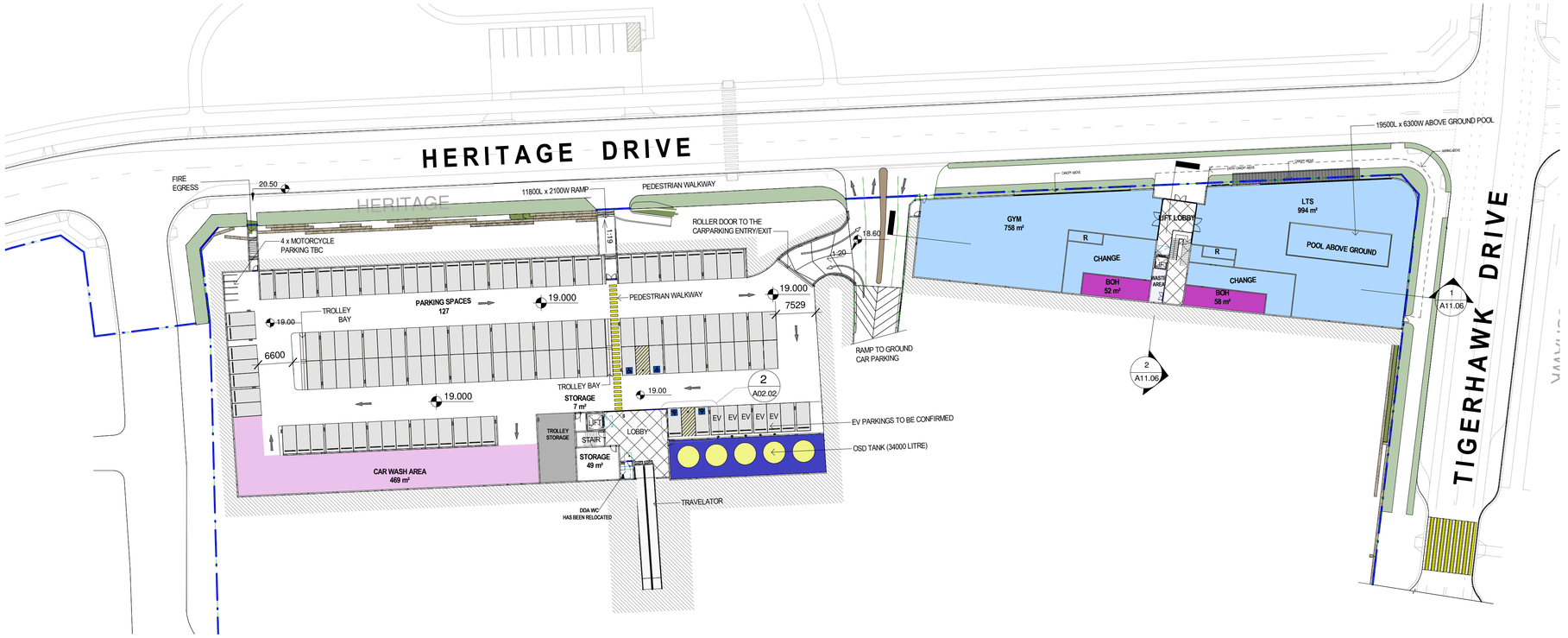
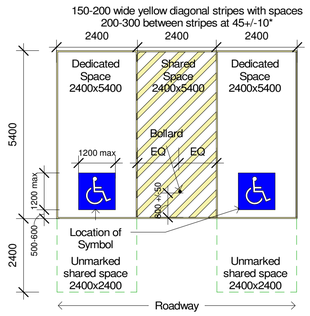
0 2 4 6 8
1 : 200



1 PROPOSED BASEMENT FLOOR PLAN
1 : 500



2 TYP. ACCESSIBLE PARKING BAY DETAIL
1 : 100

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
B	10.06.22	DA ISSUE
A	08.03.22	DA ISSUE

PROPOSED BASEMENT FLOOR PLAN AND MEZZANINE FLOOR PLAN

A02.02 DA - B
1:500 @ A1
1:1000 @ A3

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Urban Design
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1 : 500 (0 5 10 20 30)

HERITAGE DRIVE

SETTLERS BLVD.

TIGERHAWK DRIVE

ST ALOYSIUS CATHOLIC PRIMARY SCHOOL

PROPOSED RESIDENTIAL SITE
LOT 12

OUTLINE OF DROPDOWN CURTAINS AND FIRE COMPARTMENTS SHOWN RED TYP

PARKING SPACES

LOUVRE SCREEN

OUTLINE OF THE AWNING ABOVE LOADING DOCK AND WASTE AREA

TILT UP CONCRETE WALL WITH ALUMINIUM BATTENS ON TOP

OUTLINE OF DROPDOWN CURTAINS AND FIRE COMPARTMENTS SHOWN RED TYP

TILT UP CONCRETE WALL WITH ALUMINIUM BATTENS ON TOP

PARKING SPACES MODIFIED TO PARALLEL SPACES

6M AWNING ABOVE

RAMP GRADIENTS CONFIRM WITH LANDSCAPE DRAWINGS
ALL RAMPS ADJACENT TO MEDICAL CENTRE INCEASED TO 1.8M WIDTH

TAVERN

MINI MAJOR

LINE OF BASEMENT PARKING UNDER

PROPOSED ROLLER DOOR TO PROVIDE ACCESS TO LOADING DOCK

WASTE AREA

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13 T14 T15 T16 T17 T18 T19 T20 T21 T22 T23 T24 T25

K1&2 K3 K4

CAFE

KIDS WATER SPLASH / FOUNTAIN PLAYGROUND

PEDESTRIAN WALKWAY

OUTDOOR PLAY

PLAY ROOM 1 PLAY ROOM 2 PLAYROOM 3 PLAY ROOM 4 PLAY ROOM 5 PLAYROOM 6

BIKE RACK 15

DOUBLE BAY TROLLEY COLLECTION

OUTLINE OF THE EASTERN OSD TANK BELOW

SHADE SAIL ABOVE

MINI BUS

DOUBLE TROLLEY BAY COLLECTION

SINGLE TROLLEY BAY

ON-LINE DELIVERY PICK-UP SMALL VEHICLES

TAXI BAYS

PARKING SPACES 535

PICK-UP AREA

HOME DELIVERY

LOADING DOCK

SUPER MARKET

TRADING AREA = 2470 SQM
NON-TRADE AREA (INCL. LOADING DOCK) = 1050 SQM
PLANT/AC AT MEZZANINE = 180 SQM
DTB STAGING AREA = 130 SQM
BWS TRADING = 180 SQM
HOME DELIVERY = 200 SQM
TOTAL BUILDING AREA (EXCL. PLANT) = 4030 SQM

LIQUOR

DTB

CASTLE MEDICAL PATHOLOGY ALLIED HEATH DENTAL ALLIED HEATH

CANOPY ABOVE

BICYCLE RACK TO THE MEDICAL CENTRE ENTRY

SEATING REFER TO LANDSCAPE DRAWINGS

RAMP GRADIENTS CONFIRM WITH LANDSCAPE DRAWINGS

FUTURE PAD SITES

OUTLINE OF THE EASTERN OSD TANK BELOW

PEDESTRIAN ENTRY

BUS STOP AREA

RL 20.420 m

RL 22.510 m

LEGEND
- BUS STOP
- PEDESTRIAN ACCESS PATH
- BIKE RACK
  TOTAL BIKE RACKS 78

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
D	10.06.22	DA ISSUE
C	08.03.22	DA ISSUE
B	13.12.21	DA ISSUE
A	03.11.21	FOR REVIEW

PROPOSED GROUND FLOOR PLAN

A02.03 DA - D

1:500 @ A1
1:1000 @ A3

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URBIS

SOCIAL IMPACT ASSESSMENT

CHISHOLM SHOPPING VILLAGE

Prepared for

REVELOP

10 June 2022

This Social Impact Assessment was prepared and reviewed by:

Director	**Dr Rachel Trigg** Doctor of Philosophy (Built Environment) Bachelor of Arts (Social Geography) Member of Planning Institute of Australia

I confirm this SIA contains all relevant information and complies with legal and ethical obligations of social impact practitioners, including those set out in the Social Impact Assessment Guidelines for State Significant Project, 2021, prepared by the Department of Planning, Industry and Environment.

I further confirm that none of the information contained in the SIA is false or misleading.

This Social Impact Assessment was prepared by:

Senior Consultant	**Alyce Noney** Bachelor of Planning Master of Urban Management and Planning Member of Planning Institute of Australia
Consultant	**Gilbert Eliott** Bachelor of City Planning (Honours) Member of Planning Institute of Australia

Project Code	P0039102
Report Number	Final

Urbis acknowledges the important contribution that Aboriginal and Torres Strait Islander people make in creating a strong and vibrant Australian society.

We acknowledge, in each of our offices the Traditional Owners on whose land we stand.

All information supplied to Urbis in order to conduct this research has been treated in the strictest confidence. It shall only be used in this context and shall not be made available to third parties without client authorisation. Confidential information has been stored securely and data provided by respondents, as well as their identity, has been treated in the strictest confidence and all assurance given to respondents have been and shall be fulfilled.

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EXECUTIVE SUMMARY

Urbis Pty Ltd (Urbis) was engaged by Revelop (the proponent) to prepare a Social Impact Assessment (SIA) for the construction of a new neighbourhood shopping centre at 4 Heritage Drive, Chisholm. The proposed shopping centre is known as Chisolm Shopping Village (the proposal).

This SIA has been prepared in response to Council's request for information (RFI) item for a SIA and is limited to the potential social impacts which may be generated by the proposed liquor uses on site.

This SIA does not include an assessment of potential social impacts which may be associated with the entire development proposal. It should also be noted that this SIA has not been prepared to satisfy Liquor & Gaming NSW requirements for a Community Impact Statement or liquor licence application.

Assessing social impacts

A SIA is a specialist technical study which identifies and analyses the potential positive and negative social impacts associated with a proposal. Social impacts are the consequences that people experience when a new project brings change. Social impacts are those that impact on people's way of life, community, accessibility, decision making, culture, livelihoods, surroundings and health and wellbeing.

The potential impacts of the proposal are assessed by comparing the magnitude of impact (minimal to transformational) against the likelihood of the impact occurring (very unlikely to almost certain). This risk assessment methodology has been applied from the DPE SIA Guideline: Technical Supplement (2021) and is outlined below.

Table 1 Social impact significance matrix

		Magnitude level				
		1	2	3	4	5
Likelihood level		Minimal	Minor	Moderate	Major	Transformational
A	Almost certain	Low	Medium	High	Very high	Very high
B	Likely	Low	Medium	High	High	Very high
C	Possible	Low	Medium	Medium	High	High
D	Unlikely	Low	Low	Medium	Medium	High
E	Very unlikely	Low	Low	Low	Medium	Medium

Source: DPE, 2021, SIA Guideline for State Significant Projects: Technical Supplement, p. 13

Potential social impacts

Based on the assessment in this report, the key social impacts of this proposal are:

- **Potential increase in alcohol-related harm and anti-social behaviour:** The proposal will introduce two liquor-premises to Chisholm; a tavern and a packaged liquor outlet. As identified in Section 6.1, liquor licence density, socio-economic characteristics and venue characteristics can all influence rates of excessive alcohol consumption and, in turn, alcohol related offences. The proposal will not exceed the threshold of harm for the area and has implemented a range of management measures to help reduce the likelihood for excessive alcohol consumption and associated crime/harm.

  Based on this and the assessment in Section 6.1, the proposal is unlikely to contribute to increased rates of alcohol-related harm and anti-social behaviour and will have a low to neutral impact on the suburb community.

- **Potential for increased alcohol exposure to minors:** Research from the NSW Ministry of Health indicates there is limited evidence which shows a correlation between the availability of liquor outlets and underage drinking, with most studies lacking a robust research design. The proposal will situate the liquor outlets wholly within the shopping centre (as is common across NSW) and it appears likely that the licensed premises will not be able to be viewed by the surrounding education uses. If approved, the proposed licensed premises will also have to adhere to strict licencing regulations by the ILGA, including restricting the sale and advertisement of liquor to minors.

  Based on this and the assessment in Section 6.2, the proposal is unlikely to increase risky alcohol exposure or consumption opportunities to minors and will have a low negative impact on surrounding land users. Several recommendations have been made in this SIA which, if implemented, has potential to further reduce this impact.

- **Potential noise impact on neighbours:** The Noise Emission Assessment (NEA) prepared by Acoustic Logic considers that noise from the tavern will not exceed noise emission criteria and will comply with relevant industry guidelines, including those outlined by Liquor and Gaming NSW. As a result of this assessment, noise generation associated with the tavern is likely to have a low – neutral impact on the immediate residential community.

Recommendations

The following recommendations are provided to further manage the potential impacts from the proposal:

- Consult with NSW Police and community organisations to understand potential concerns relating to alcohol-related harm.
- Consider joining the Maitland Liquor Accord to regularly meet with other licences operators in the area and contribute to measures across the LGA to reduce rates of alcohol-related crime and anti-social behaviour.
- Ensure the tavern maintains a high level of amenity throughout its operation. This includes providing good lighting, ventilation, regular cleaning and employing an appropriate number of staff per patrons.
- Prepare a Plan of Management to include site-specific responsibilities for the packaged liquor outlet once the operator has been confirmed.
- Ensure the licenced premises cannot be seen or deciphered by the surrounding educational uses. This extends to any external signage or associated advertising material.
- Prohibit the consumption or sale of alcohol from the playground area.
- Consult with surrounding landholders, including all education uses, to inform them of the proposal and provide them with an opportunity to comment on the intended liquor uses, design and access.
- Implement all operational recommendations outlined for the tavern in the NEA.
- As requested in Council's RFI, consider preparing an additional noise assessment once fit out details of the tavern are confirmed to ensure noise levels are maintained.

Overall impact assessment

Based on this assessment and the above social impacts, the proposed liquor uses are likely to have a low – neutral impact on the community. This is influenced by the low likelihood of the proposal to contribute to increased rates of alcohol-related crime, harm or risky exposure within the suburb.

A number of recommendations have been provided within this SIA to help further manage and reduce the potential impacts of the proposal.

1. INTRODUCTION

Urbis Pty Ltd (Urbis) was engaged by Revelop (the proponent) to prepare a Social Impact Assessment (SIA) for the construction of a new neighbourhood shopping centre at 4 Heritage Drive, Chisholm (the site). The proposed shopping centre is known as Chisolm Shopping Village (the proposal).

Scope of this assessment

A development application (DA/2021/1702) for the proposal was lodged with Maitland City Council on 12 December 2021. In response to this application, Council issued a Request for Information (RFI) on 19 May 2022 to continue with the DA assessment.

Item 10 of the RFI includes a requirement for:

> A Social Impact Assessment is required for the proposed Tavern & Liquor Store to address the impact of a licensed premises in the locality and to consider the density of similar operations in the area

This SIA has been prepared in response to this item and is limited to the potential social impacts which may be generated by the proposed liquor uses on site.

This SIA does not include an assessment of potential social impacts which may be associated with the entire development proposal. It should also be noted that this SIA has not been prepared to satisfy Liquor & Gaming NSW requirements for a Community Impact Statement or liquor licence application.

1.1. PROJECT OVERVIEW

The proposed development is a one-to-two storey mixed use retail/commercial development with basement level parking. The development comprises a full-scale supermarket, retail premises, indoor recreation facilities, food and drink premises, childcare centre, car wash and a medical centre.

Specifically, the DA seeks consent for the following:

- Site preparation and early works including removal of all vegetation, retaining walls and bulk earth works.
- All land uses proposed within Chisholm Shopping Village including retail premises, food and drink premises, health services facility (medical centre), indoor recreation facility and a centre based child care facility.
- Fit out of the child care facility.
- Development of the shopping centre and ancillary uses including all external walls and structures. All detailed internal tenancy fit outs will be subject to separate approval (with the exception of the centre based child care facility).
- A total commercial / retail Gross Floor Area (GFA) of 8,060 sqm
- A total GFA of 3,320 sqm for a medical centre, centre based child care facility and indoor recreation facility.
- All internal driveways and hard stand areas to accommodate loading, 557 car parking spaces and a basement car park with ancillary car wash facility.
- An on site detention system, provided as a combination of below ground tanks and surface storage within the proposed carpark
- Landscaping and public domain works including tree planting, paving, construction of driveways and perimeter footpaths.

All other fitouts and signage for the shopping centre will be subject to future applications.

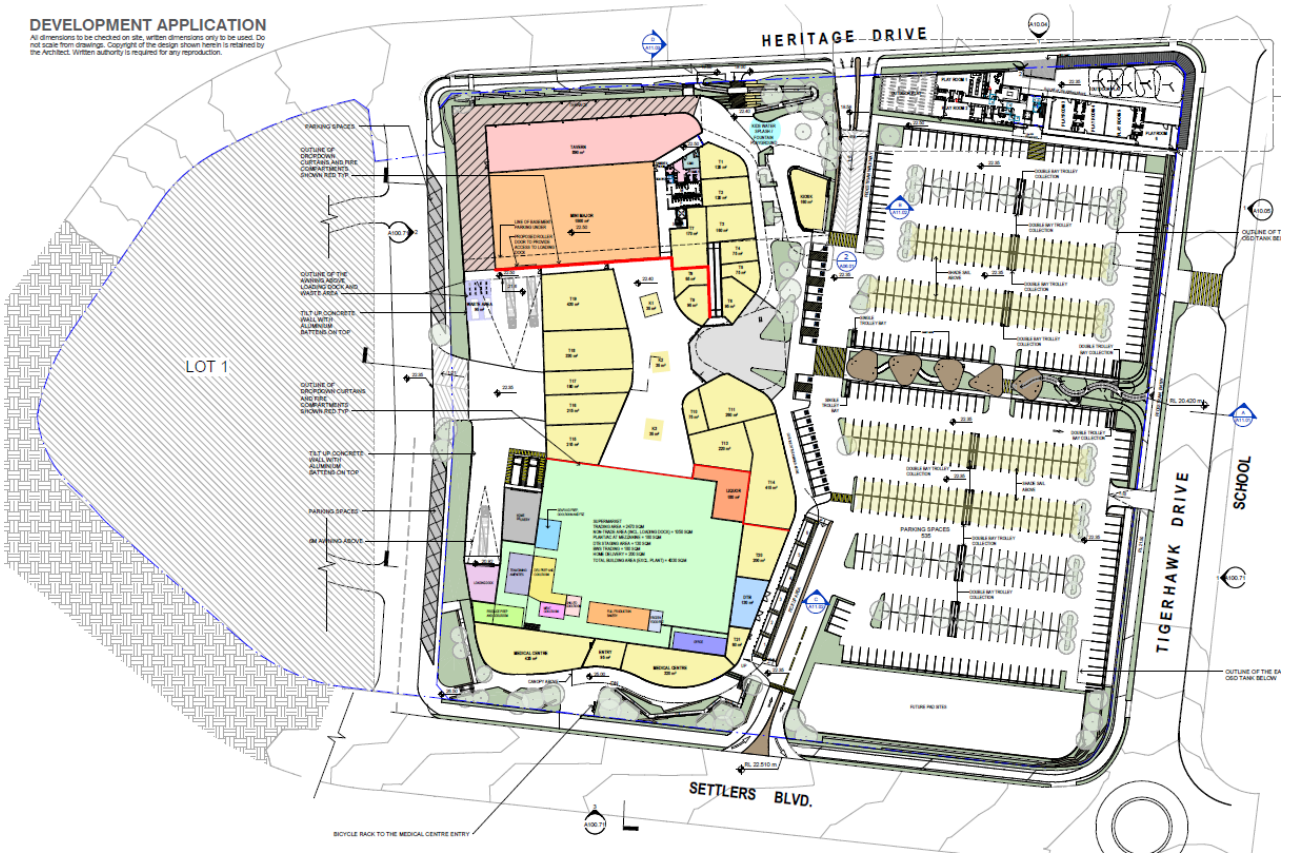
Operational hours

The proposed operational hours for the centre are outlined in Table 2 below.

Table 2 Proposed operational hours

Land use	Proposed hours
Tavern	9:00am to 12:00am, 7 days per week
Liquor	9:00am to 10:00pm, 7 days per week
Gym	24 hours, 7 days per week
Learn to swim	7:00am to 10:00pm, 7 days per week
Medical	7:00am to 10:00pm, 7 days per week
Child care centre	7:00am to 7:00pm, Monday to Friday
Car wash	7:00am to 7:00pm, 7 days per week
Supermarket and mini major	7:00am to 10:00pm, 7 days per week

Figure 1 Chisholm Shopping Village site plan



Source: BN Group

1.2. REPORT PURPOSE

A SIA is a specialist technical study which identifies and analyses the potential positive and negative social impacts associated with a proposal. It involves a detailed and independent study to scope potential social impacts, identify appropriate mitigation measures and provide recommendations aligned with professional standards and statutory obligations.

According to the Department of Planning and Environment's (DPE) SIA Guideline for State Significant Projects (2021), social impacts are the consequences that people experience when a new project brings change. For the purposes of an SIA, 'people' can be individuals, households, groups, communities, businesses or organisations. These impacts can be considered in eight categories, as shown in Figure 1 below.

Figure 2 Social impact categories

Source: DPE, 2021, SIA Guideline for State Significant Projects

1.3. STRUCTURE OF THIS REPORT

This report has seven sections as summarised below:

- **Section 1** (this section) introduces the proposal, purpose and scope of this report
- **Section 2** outlines the methodology applied to complete this SIA
- **Section 3** reviews the key findings and strategic directions from relevant state and local policies, as it relates to the proposal
- **Section 4:** provides key findings from a review of academic literature relating to the impacts of alcohol density and potential harm mitigation strategies
- **Section 5** provides a social baseline of the study area including the site's locality, social and demographic characteristics, and consultation outcomes
- **Section 6** assess the significant impacts of the proposal, including mitigation and management measures
- **Section 7** concludes the SIA by setting out a summary of the social impacts, recommendations and overall impact assessment.

2. METHODOLOGY

The methodology undertaken to prepare this SIA is outlined in Table 3. As Council currently does not have a policy to guide the preparation of an SIA, this methodology has been informed by the guidance contained within the DPE SIA Guidelines for State Significant Projects (2021).

Table 3 SIA methodology

Background review	Impact scoping	Assessment and reporting
▪ Desktop review and analysis of surrounding land uses ▪ Review of relevant state and local policies to understand potential implications of the proposal ▪ Targeted review of academic literature to understand alcohol harm and potential mitigation strategies ▪ Analysis of relevant data to understand the existing community.	▪ Review of site plans and technical assessments ▪ Consultation with Council to identify potential impacts ▪ Review of engagement outcomes ▪ Identification of impacted groups ▪ Targeted scoping of liquor-related impacts.	▪ Assessment of liquor-related impacts considering management measures ▪ Provision of recommendations to enhance positive impacts, reduce negative impacts and monitor ongoing impacts.

2.1. APPROACH TO ASSESSING SOCIAL IMPACTS

The assessment of social impacts can be approached in several ways. The International Association for Impact Assessment (IAIA) highlights a risk assessment methodology, whereby the significance of potential impacts is assessed by comparing the consequence of an impact against the likelihood of the impact occurring. This approach is used in the Technical Supplement which supported DPE's SIA Guideline.

The DPE's risk assessment methodology is outlined below and has been applied in this SIA.

Table 4 Social impact significance matrix

		Magnitude level				
		1	2	3	4	5
Likelihood level		Minimal	Minor	Moderate	Major	Transformational
A	Almost certain	Low	Medium	High	Very high	Very high
B	Likely	Low	Medium	High	High	Very high
C	Possible	Low	Medium	Medium	High	High
D	Unlikely	Low	Low	Medium	Medium	High
E	Very unlikely	Low	Low	Low	Medium	Medium

Source: DPE, 2021, SIA Guideline for State Significant Projects: Technical Supplement, p. 13

Likelihood and magnitude level characteristics

The likelihood and magnitude levels are determined by subjective and objective components. It considers both individual experiences, community perceptions and technical evaluations.

The likelihood level assesses the probability of the impact occurring impact. The level of magnitude assesses the likely significance of the impact and considers several characteristics including:

- **Extent**: the volume of people expected to be affected and their relative location to the proposal
- **Duration:** the timeframe and frequency of potential impacts
- **Severity or scale**: the degree of change from the existing condition as a result of the impact
- **Intensity or importance**: the extent to which people or an environment can adapt to or mitigate the impact, including the value they attach to the matter and their capacity to cope and/or adapt to change
- **Level of concern/interest**: the level of interest or concern among the people affected.

Management measures

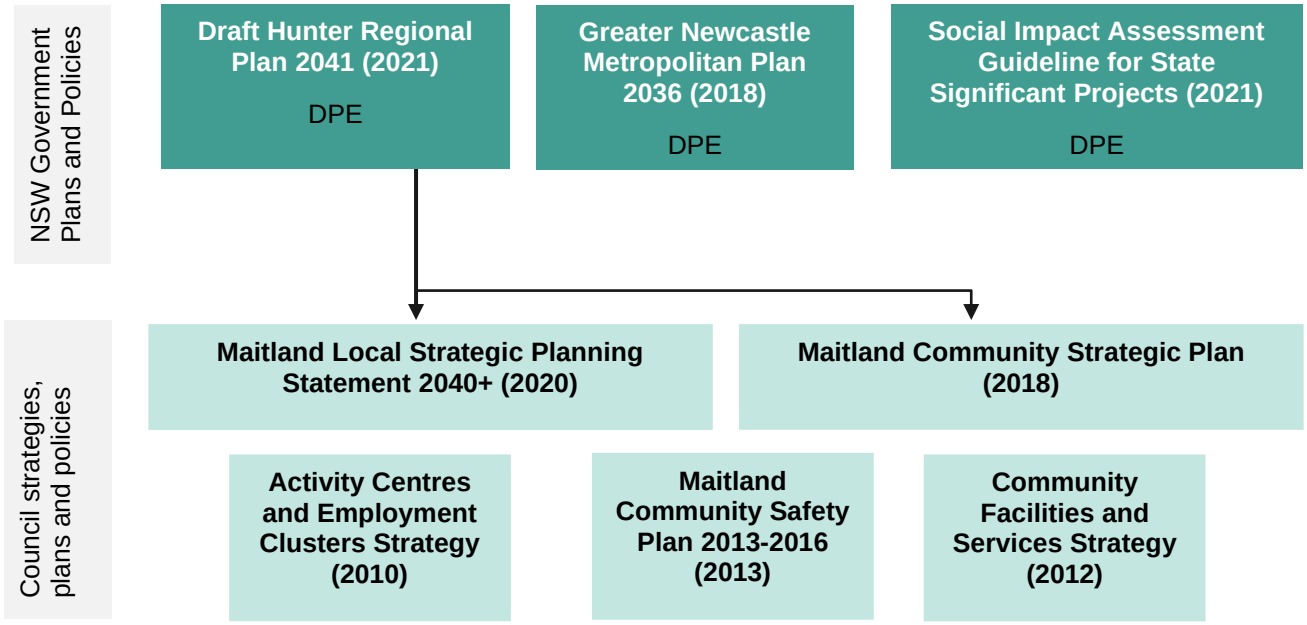
Social impacts are assessed before and after the implementation of management measures. Management measures are designed to reduce negative impacts and enhance positive impacts. These measures can take different forms and may be incorporated in the planning, construction, or operational stage of the proposal.

Section 6 of this report assesses the likely social impacts associated with the proposal with any planned mitigation measures. This is undertaken to determine the residual impact level.

3. POLICY CONTEXT

A review of relevant state and local policies was undertaken to understand the strategic context of the proposed development and any potential impacts. This included the following documents:

Figure 3 Documents reviewed



A summary of key findings relating to the potential social impacts of the proposal is provided below.

Table 5 Relevant social themes from policy review

Theme	Summary of findings
Providing retail services to support Chisholm's growing residential population and role as a local centre	▪ Chisholm (formerly known as Thornton North) was designated as an urban release area in 2003 in the Thornton North Structure Plan. The suburb has experienced residential growth over the last 10 years, with this growth expected to continue as more land within the urban release area is subdivided and developed. ▪ The Maitland Local Strategic Planning Statement (LSPS) identifies Chisholm as a 'local centre'. According to the Draft Hunter Regional Plan 2041 (2022), the role of a local centre is to provide shopping, dining, health and personal services to meet the daily and weekly needs of the local community. ▪ Council's Activity Centres and Employment Clusters Strategy (2010) notes that the development of a retail centre would provide for convenience shopping and some community activities for Chisholm residents, and for people living in the rural areas in the north east of the LGA.
Reducing alcohol-related crime and antisocial behaviour	▪ The Maitland Community Safety Plan (the Safety Plan) identifies reducing alcohol-related crime and antisocial behaviour as a key focus area for improving safety within the Maitland LGA.

Theme	Summary of findings
	▪ Community consultation undertaken as part of the Safety Plan identified misuse of alcohol, underage drinking, drunk and disorderly behaviour and noise as key issues in the LGA. The consultation also indicated that some people did not feel safe at night-time venues. This suggests that the venues or activities involving alcohol may be perceived as a safety risk. ▪ During consultation, the community identified a range of settings and features which made them feel safe in the built environment. This included places which had good lighting, were vibrant and well looked after, and where there was presence of police and security guards. ▪ The Safety Plan notes that Council has been working with licensed venue operators, the Maitland Liquor Accord and Liquor and Gaming NSW to embed footpath markers to indicate the 50 metre distance from a venue's licenced area boundary. These markers help security personnel direct intoxicated patrons away from the premises and minimises opportunities for alcohol-related violence and anti-social behaviour.
Delivering social infrastructure in accessible locations 	▪ The Maitland Community Facilities and Services Strategy acknowledges that social infrastructure (such as community facilities, childcare centres, health services) have historically been provided as standalone facilities or in isolated locations. ▪ The Strategy notes that best practice social infrastructure provision is now moving towards locating facilities in areas that have good public transport connections and where people already congregate, such as shopping centres or schools. This approach maximises convenience as multiple activities can be undertaken within the one trip. ▪ This approach helps support the development of a 15-minute neighbourhood, which is a key objective in the Draft Hunter Regional Plan 2041.

4. LITERATURE REVIEW

A review of relevant literature relating to alcohol use and associated harm was undertaken to understand the potential impact of the proposal and any potential mitigation measures. A summary of the key findings is provided in Table 6 below, with a list of all reviewed literature contained in the Reference List.

Table 6 Summary of key findings relating to alcohol use and harm characteristics

Theme	Summary of findings
Excessive consumption of alcohol and associated impacts	The consumption of alcohol is not an inherently harmful or negative experience. As outlined by NSW Health (2016), most people consume alcohol responsibly as part of a positive social experience, whether this be drinking for enjoyment at events or for relaxation. The most predominate risk in alcohol use lies in excessive consumption. The excessive consumption of alcohol can create a range of adverse social, economic and health impacts which extend beyond the individual (NSW Police Force 2019). It is known to increase the occurrence of violent crimes (i.e. domestic violence, assault and road trauma) and rates of antisocial behaviour, including a reduction in public amenity. Excessive drinkers also have a higher likelihood of developing long term physical and mental health problems including cancer, liver disease and cognitive impairment (NSW Health 2016).
Risk characteristics of excessive alcohol consumption	Findings from the 2019 National Drug Strategy Household Survey indicates that rates of excessive alcohol consumption are declining across Australia, with the proportion of people drinking at risking levels down by 5% over the last ten years. There are a range of factors which can influence a person's likelihood or decision to engage in excessive drinking. While multifaceted, research indicates there are some common demographic characteristics amongst individuals who drink at risky levels. Data from NSW Health (2016) indicates that people who are born in English speaking countries, who live outside of major cities, who are male or who identify as Aboriginal are more likely to drink at levels that put them at long term risk. Research concentrated in Melbourne also found that frequent alcohol consumption is more common amongst low-income households, older people and people employed in non-professional jobs (Kavanagh et.al 2011). More young people (18 – 25 years) are also choosing not to drink. However, those that do are more likely than any other age group to drink to become intoxicated (NSW Police Force 2016). These characteristics indicate that some communities are more likely to be vulnerable to the impacts of risky or excessive alcohol consumption compared to other areas (NSW Police 2016).
Influence of venue characteristics on alcohol harm	There are various studies which outline a relationship between alcohol outlet density and associated harm. In 2015, the Bureau of Crime Statistics and Research (BOCSAR) published research into the effect of liquor licence concentrations on rates of assault in NSW. This research found that the rate of domestic and non-domestic assault increases when the number of packed liquor licenses exceed 0.75 outlets per 1,000 residents in an LGA. This relationship was stronger with hotel licences, with the rates of violence increasing markedly when there are more than two hotels per 1,000 LGA residents. Proximity to alcohol outlets is not seen to increase rates of consumption or related violence (Kavanagh et al. 2011).

Theme	Summary of findings
	Aside from density, there are several other venue characteristics which influence rates of alcohol related harm. Venue amenity is a leading factor, with places that had low levels of ventilation, cleanliness and lighting more likely to attract higher rates of alcohol-related harm (Hughes et.al. 2010). Overcrowding and noise were also regarded as contributing factors. Venues which focussed solely on alcohol consumption were also more likely to increase rates of alcohol related harm, with rates of boredom linked to increased aggression. Venues which provided alternative activities such as quizzes or stage shows were found to alleviate rates of violence, as were those that provided an availability of food and a high staff to patron ratio (Hughes et al. 2010). Strong staff and venue management are therefore considered as key mitigation measures to help reduce high rates of alcohol consumption and associated rates of harm.

5. SOCIAL BASELINE

This section provides a social baseline of the study area including the site's locality, social context, demographic characteristics, engagement outcomes and areas of social influence.

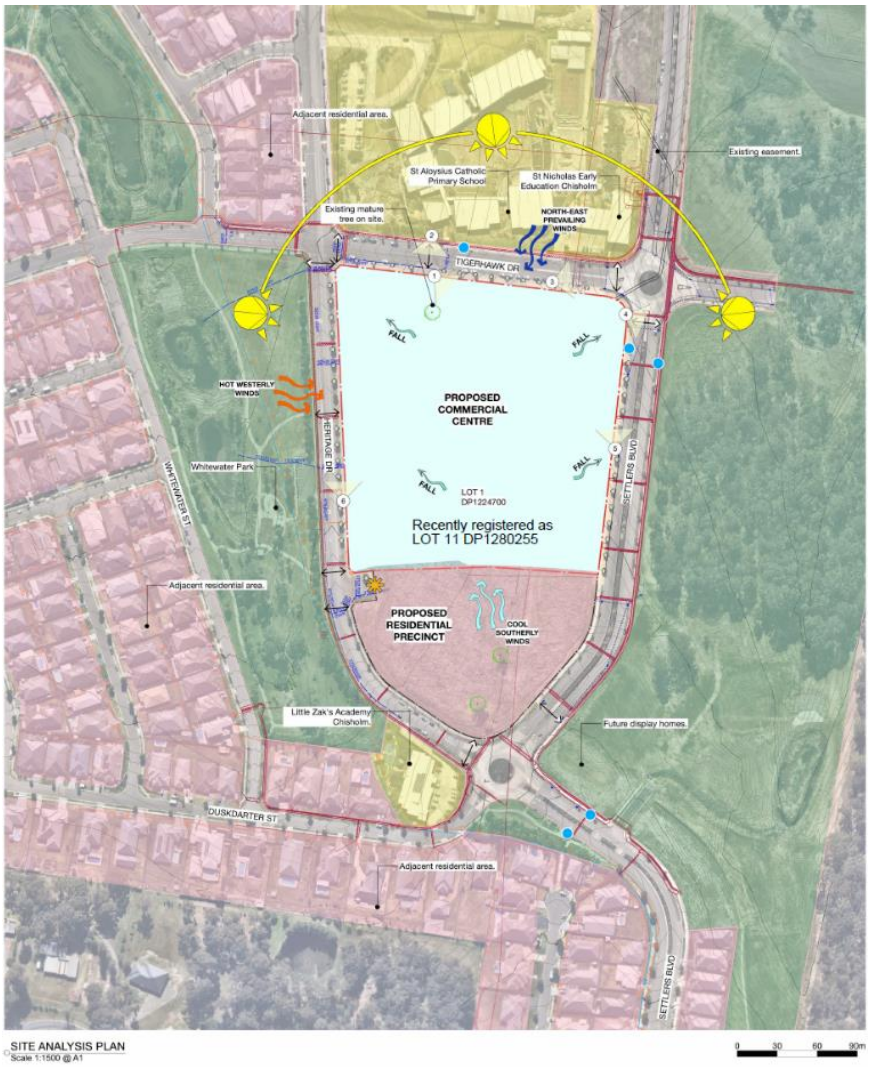
5.1. SOCIAL LOCALITY

The site is located on Wonnarua land in the suburb of Chisholm and the Maitland LGA. The site comprises 4.2ha and is bound by Tigerhawk Drive to the north, Settlers Boulevard to the east, Heritage Drive to the west and a section of undeveloped land to the south. The site is currently vacant and contains cleared grassland with some existing trees.

The site is currently surrounded by a mix of residential, recreational and educational land uses as outlined in Figure 4. Most of these uses cater to the needs of children, with two schools and two child care centres located semi-adjacent to the site. Whitewater Park, located east of the site, also contains a children's playground.

As an urban release area, residential development in Chisholm has steadily progressed over the last 10 years. While the suburb contains a range of social infrastructure, it currently does not have a local retail centre. Most residents are required to travel to Thornton Shopping Centre (3.5km from the site) or Stockland Green Hills Shopping Centre in East Maitland (6.6km from the site) to access general retail services.

Figure 4 Social context



Source: Moir Landscape Architecture 2021

Figure 5 Site photos

Picture 1 North eastern view of the site from Heritage Drive

Picture 2 View of Whitewater Park located to the west of the site

Picture 3 Eastern view of the site from Heritage Drive

Picture 4 South eastern view of the site from Heritage Drive

Picture 5 View of the site looking north

Picture 6 View of St Aloysius School located to the north of the site

Source: BN Architects

5.2. COMMUNITY PROFILE

A community profile identifies the demographic and social characteristics of a proposal's likely area of social influence. This is an important tool in understanding how a community currently lives and that community's potential capacity to adapt to changes arising from a proposal.

A community profile has been developed for Chisholm based on demographic data from the Australian Bureau of Statistics (ABS) 2016 Census and DPE population projections. The demographic characteristics of Maitland LGA and Greater Sydney have been used where relevant to provide a comparison. While population data from the 2016 Census now dates to five years ago, it remains the most recent population data source until the release of 2021 Census data in June 2022.

In 2016, there were approximately 1,461 people living in Chisholm. Key characteristics of this community include:

Young population

Chisholm has a median age of 31 years, which is lower compared to Maitland LGA (36 years). The suburb also has a higher proportion young children aged 0-9 years (20%) and adults aged 30-39 years (18%) compared to the LGA (15% and 13% respectively).

Family-oriented suburb

There are a higher proportion of family households in Chisholm (92%) compared to the Maitland LGA (76%). Of the family households in Chisholm, approximately 62% have children.

Low cultural diversity

Chisholm has a lower proportion of residents who identify as Aboriginal and/or Torres Strait Islander (3%) compared to the Maitland LGA (5%). Most Chisholm residents were born in Australia (88%), which is similar in the Maitland LGA (87%).

Mix of occupations

The most common occupations of Chisholm residents include professionals (20%), technicians and trade workers (19%) and clerical and administrative workers (18%). The most recent data from the National Skills Commission (December 2021) indicates that unemployment in the Maitland LGA (3.6%) is slightly lower compared to the NSW average (4.0%).

High presence of advantage

Chisholm has a higher weekly median household income ($2,295) compared to the Maitland LGA ($1,415). Based on the index of relative socio-economic advantage and disadvantage, Chisholm is ranked in the top 20% of NSW suburbs.

Strong population growth across the LGA

Over the next 20 years to 2041, Maitland LGA is expected to increase by 32% to 104,700 people. The largest growth is expected to occur in people aged 75 years and over, which will increase by 7,500 people.

5.3. TARGETED ALCOHOL-RELATED HEALTH PROFILE

As outlined in Section 4, the health impacts of alcohol consumption are well documented. Data from HealthStats NSW was analysed to understand the current level of risk in the local community and how the proposal may influence this. The data was accessed on 17 May 2022. Key findings of relevance to this assessment include:

- Maitland LGA has lower rates of alcohol attributable hospitalisations (386 per 100,000 people) compared to the NSW average (513 per 100,000 people).
- The LGA has a slightly higher rate of alcohol attributable deaths[1] (22 deaths per 100,00 people) compared to the NSW average (20 per 100,000 people). This was recorded in the most recent reporting period, from 2018 – 2019. This rate has remained relatively stable over the past ten years, with the LGA recording a rate of 21 alcohol attributable deaths per 100,000 people in 2008 – 2009.

5.4. CRIME AND SAFETY

Alcohol-related crime rate data from the NSW Bureau of Crime Statistics and Research (BOCSAR) was analysed to understand the existing context and potential risk factors of the local area. This data was accessed on 6 April 2022 and covers the reporting period from January 2021 to December 2021.

Key findings of relevance to this assessment include:

- Chisholm has no incidences of liquor offences[2], which reflects the lack of any liquor outlets or licensed premises in the suburb. The suburb also had no incidences of alcohol-related non-domestic assault.
- While there are no licensed outlets in Chisholm, the suburb does have a higher rate (152) of alcohol-related domestic assault compared to the LGA (127) and NSW (112). However, it's important to note that this rate is based on four counts of alcohol-related domestic assault across a 12 month reporting period and therefore represents a relatively low number of incidents.
- More broadly, the LGA has a significantly lower rate of liquor offences (37 per 100,000 people) compared to NSW (102). It also has a lower rate of alcohol-related non-domestic assault (77) compared to NSW (85).
- Crime trends for the LGA also indicates that rates have liquor offences, alcohol-related domestic assault and alcohol-related non-domestic assault have remained stable between December 2020 and December 2021. Two year crime trends were not available for Chisholm.

5.5. LIQUOR LICENCE CONTEXT

Liquor & Gaming NSW (L&GNSW) provides data on the distribution of liquor licences to help understand potential alcohol-related risk in communities. The data below was accessed on 17 May 2022 and relates to the most recent published data from March 2022. As there are currently no liquor licences in Chisholm, data for Maitland LGA has been analysed.

Liquor licences

There are 105 liquor licences in the Maitland LGA. This consists of 25 packaged liquor store licences, 24 hotel licences and one general bar licence.

The number of liquor licences in Maitland LGA has increased marginally over the past two years, from 99 liquor licences in March 2020 to 105 in March 2022.

[1] Alcohol attributable deaths is a measure of the amount by which deaths would be reduced if exposure to alcohol had been avoided.

[2] BOCSAR defines liquor offences as: Production, sale, purchase and/or consumption of alcohol in breach of licensing conditions/regulations/laws (ANZSOC, 2011). It includes the police incident categories of consume alcohol in public by minor, consume alcohol in an alcohol free zone, Licensing Legislation Offences (e.g. offence by licensee/ employee/ secretary/ minor/ customer (not minor), supply liquor to juvenile, offence against registered clubs.

Licence distribution

L&GNSW uses two key measures to understand the potential risk of licenced premises within the community: **outlet saturation** and **outlet clustering**.

Outlet saturation is a measure of the number of liquor licences compared to the population and is calculated per 100,000 residents in an area. Outlet clustering is a measure of the proximity of liquor licences to each other. Outlet clustering is calculated by drawing a 1km radius around each authorised liquor licence and then dividing the number of liquor licences within this radius by the total number of liquor licences within a defined geography (i.e. suburb or LGA).

Key findings from these measures include:

- Maitland LGA has a lower rate of outlet saturation (134.5 liquor licences per 100,000 residents) compared to the NSW (199.2). However, the rate of outlet saturation has increased over the past two years in the LGA, up from 128.1 in March 2020.
- The Maitland LGA also has a significantly lower rate of outlet clustering (14.8) compared to the NSW average (87.0). This is reflective of the sub-regional nature of the LGA and the likely distances between established retail areas. As with saturation, outlet clustering has also increased slightly over the past two years, up from 13.3 March 2020.

Threshold of harm

BOCSAR undertook research which assessed the effect of liquor licence concentrations in local areas on rates of assault in LGAs across NSW[3]. This study found that incidence rates for both domestic violence and non-domestic violence assaults accelerated when the packaged liquor licence concentration exceeded 0.75 outlets per 1,000 people and hotel licence concentration exceeded 2.0 per 1,000 people. This is known as the threshold of harm.

An assessment of the threshold of harm is provided below:

- The inclusion of the proposed liquor licences with the proposal would result in Chisholm having a packaged liquor licence concentration of 0.68 per 1,000 people and a hotel liquor licence concentration of 0.68 per 1,000 people. This does not exceed the threshold of harm for either liquor licence type.
- At the LGA level, the inclusion of the proposed liquor licences would result in packaged liquor licence concentration of 0.32 per 1,000 people and a hotel liquor licence of 0.32 per 1,000 people. Again, this does not exceed the threshold for harm for either liquor licence type.

Table 7 Liquor licence density in Chisholm

	Packaged liquor licences		Hotel licences	
	Chisholm	Maitland LGA	Chisholm	Maitland LGA
Existing number of liquor licences	0	25	0	24
2016 population	1,461	77,305	1,461	77,305
Existing concentration per 1,000 people	0	0.32	0	0.31

[3] Donnelly, Menendez and Mahoney, 2014, 'The effect of liquor licence concentrations in local areas on rates of assault in New South Wales', Contemporary Issues in crime and Justice, Number 181, NSW Bureau of Crime Statistics and Research, https://www.bocsar.nsw.gov.au/Publications/CJB/CJB181.pdf.

	Packaged liquor licences		Hotel licences	
	Chisholm	Maitland LGA	Chisholm	Maitland LGA
Number of liquor licences including those associated with the proposal	1	26	1	25
Concentration per 1,000 people including the proposed liquor licences	**0.68**	**0.32**	**0.68**	**0.32**

5.6. RELEVANT ENGAGEMENT OUTCOMES

The proposal was placed on public exhibition in 2022. No community submissions were received during this period. The NSW Police has been contacted to provide feedback on the tavern and packaged liquor outlet components of the proposal.

Formal community engagement activities were not undertaken during the preparation of the DA.

Consultation with Maitland City Council

As part of this SIA, a videoconference was held with representatives from Council's Culture, Community and Recreation team to help understand the characteristics of the local community and any potential positive or negative social impacts associated with the proposal. The videoconference took place on 13 May 2022.

Key feedback from this interview includes:

- As a recently developed urban release area, Chisholm has a small but growing population. The suburb is characterised by families with school-aged children.
- As the site is currently vacant, the proposed shopping centre is likely to increase activation around the site. Council noted there are a mix of residential, recreational and educational uses surrounding the proposal, which need to be carefully considered given the proposed liquor uses within the shopping centre. This may include consideration of access and potential alcohol exposure to minors.
- Council representatives noted that, based on their previous experience in other parts of the LGA, shopping centres are often used by young people as places to congregate and socialise. There have been some incidents of anti-social behaviour among this cohort at shopping centres which will need to be managed as the LGA grows.
- Council has introduced alcohol-free zones in the Maitland CBD and other parts of the LGA where there are a concentration of liquor licences to help reduce the risk of alcohol-related violence and/or antisocial behaviour.
- Council noted that a family-friendly Tavern, with a focus on serving food, would deliver a more positive social outcome to the area compared to a premises which focused solely on alcohol consumption.
- Council is developing a new community facility immediately west of the site along Heritage Drive (next to Whitewater Park). Consultation undertaken as part the planning for this facility indicated that the community wanted an accessible facility which had spaces for young people. There was also feedback for the facility to have minimal noise impacts on surrounding residents.

5.7. AREAS OF SOCIAL INFLUENCE

Considering the outcomes from the social baseline, the area of social influence is mostly confined to the immediate suburb context. Within the areas of social influence, the following individuals and communities are likely to be impacted by the proposal:

- Chisholm residents

- Residents on streets immediately surrounding the proposal
- Students, children and users at education uses immediately surrounding the site
- Users of Whitewater park.

6. ASSESSMENT OF LIKELY SOCIAL IMPACTS

A proposal may cause a range of direct and indirect social impacts which can have a positive, negative or neutral impact on people. A SIA should assess the expected and perceived impacts which are considered to have the most significant impacts on the community and identified stakeholder groups.

The following sections outline the key social impacts of the proposal. These impacts have been informed by Sections 1 to 5 of this SIA and the supporting technical assessments. All identified impacts have been assessed against the SIA criteria described in Section 2.

6.1. POTENTIAL INCREASE IN ALCOHOL-RELATED HARM AND ANTI-SOCIAL BEHAVIOUR

Description of Impact	Impacted groups	Social impact category
Potential increase in alcohol-related harm and anti-social behaviour in the suburb	▪ Chisholm residents	▪ Health and wellbeing ▪ Surroundings

Current environment

As outlined in Section 5.5, there are currently no licensed premises or existing liquor licences in Chisholm. Due to this, the suburb has low levels of alcohol-related harm, with no incidences of liquor offences or alcohol-related non-domestic assault in the past year (January 2021 – December 2021). More broadly, the number of licenced premises in Maitland LGA has increased slightly over the past two years, however rates of alcohol-related crime have generally remained stable and below the NSW average.

There is a current focus within the LGA to help further reduce rates of alcohol-related crime and anti-social behaviour, as outlined in the Maitland Community Safety Plan (2013). Community consultation undertaken as part of this plan identified the misuse of alcohol and drunk and disorderly behaviour as key issues in the LGA.

Research undertaken by the BOCSAR indicates that rates of assault increase markedly when the concentration of packaged liquor licences exceed 0.75 licences per 1,000 people and hotel licences exceed 2.0 licences per 1,000 people. This is known as the ‘threshold of harm’. As outlined in Section 5.5, both Chisholm and Maitland LGA currently sit below the threshold of harm for packaged liquor licences and hotel licences.

Impact of the proposal

The proposal will introduce two liquor-premises to Chisholm; a tavern and a packaged liquor outlet. The premises will apply for separate liquor licences through the Independent Liquor and Gaming Authority (ILGA), with the tavern expected to operate under a hotel licence. If approved, the proposal will introduce the first licensed premises into the suburb.

The introduction of two licensed premises in the suburb has potential to increase alcohol availability to the immediate residential community, and to some visitors from within the LGA. While the presence of alcohol is not an inherently harmful or negative experience, the excessive availability and consumption of alcohol is known to increase incidents of crime and anti-social behaviour, which can impact on the health and wellbeing of individuals and on community wellbeing more generally.

In regards to availability, research undertaken in Melbourne (Kavanagh et al. 2011) indicates that a person’s proximity to alcohol outlets does not increase rates of consumption or alcohol-related violence. There is, however, an established link between the density of liquor licences and rates of assault, as

shown through the BOCSAR threshold of harm. As shown in Section 5.5, the introduction of the packaged liquor outlet and tavern will not exceed the threshold harm for either licence type in Chisholm or the Maitland LGA. The proposal is therefore unlikely to change the rate of assault crimes in the area.

In regards to consumption, there are a range of socio-economic and venue characteristics that can influence an individual's likelihood to engage in excessive alcohol consumption (and in turn rates of alcohol-related crime). Data from NSW Health (2016) indicates that people who are born in English speaking countries, who live outside major cities, who identify as male or who identify as Aboriginal are more likely to drink at risky levels. Venues which focussed solely on alcohol consumption, had poor amenity or limited staff management were also more likely to increase rates of excessive drinking and alcohol related harm in an area.

Based on this profile, the population in Chisholm has some risk factors for excessive alcohol consumption, being in a regional area and having a high proportion of residents born in Australia (88% of the total population). To help minimise this risk, the proposal has implemented a range of management practices at the tavern including:

- Emphasising the tavern as a place to eat, rather than to drink. While the tenant is not yet confirmed, the proponent has indicated the tavern will be a family friendly premise with a focus on dining. Research indicates that venues which provide a high availability of food are shown to alleviate rates of alcohol-related violence.
- Providing dedicated liquor staff who are certified and have completed responsible service of alcohol (RSA) training. These staff will be trained to encourage patrons to drink within appropriate limits, assess alcohol affected patrons and refuse service to intoxicated patrons, in line with certification regulations.
- Development and implementation of a Plan of Management (PoM) outlining clear requirements and responsibilities of staff around the sale of liquor and management of patrons within the tavern. This includes measures such as:
    - Refusing entry and service to intoxicated patrons.
    - Removing patrons who are intoxicated or display unreasonable or anti-social behaviour. This includes ensuring these patrons move at least 50m away from the premises in accordance with the Liquor Act 2007.
    - Maintaining an incident register and contacting NSW Police.
    - Undertaking regular cleaning of internal and external areas.

Management measures	SIA recommendations
▪ Operation and management of liquor premises in accordance with ILGA regulatory requirements and guidelines. This includes a requirement for all liquor serving staff to undertake the RSA training. ▪ Preparation and implementation of a PoM to outline the responsibilities of staff and relevant measures to support safe liquor practices. The PoM also includes measures to support a high	▪ Consult with NSW Police and community organisations to understand potential concerns relating to alcohol-related harm. ▪ Encourage the future tenant of the tavern to join the Maitland Liquor Accord to regularly meet with other licences operators in the area and contribute to measures across the LGA to reduce rates of alcohol-related crime and anti-social behaviour.

level of venue amenity, including maintenance practices. ▪ Operation of the tavern as a family friendly venue, with a focus on dining and entertainment activities over liquor sales and consumption. ▪ Preparation of a CPTED report to assess the design of the tavern against key CPTED principles including surveillance, lighting, territorial reinforcement, maintenance, space management and access control.	

Residual impact summary (considering mitigation measures)		
Likelihood: Unlikely	**Magnitude:** Minor	**Resultant impact:** Low negative to neutral

The proposal will introduce two liquor-premises to Chisholm; a tavern and a packaged liquor outlet. As identified above, liquor licence density, socio-economic characteristics and venue characteristics can all influence rates of excessive alcohol consumption and, in turn, alcohol related offences. The proposal will not exceed the threshold of harm for the area and has implemented a range of management measures to help reduce the likelihood of excessive alcohol consumption and associated crime/harm.

Based on this and the above assessment, the proposal is unlikely to contribute to increased rates of alcohol-related harm and anti-social behaviour and will have a low to neutral impact on the local community.

6.2. POTENTIAL FOR INCREASED ALCOHOL EXPOSURE TO MINORS

Description of Impact	Impacted groups	Social impact category
Potential for increased, risky alcohol exposure and consumption opportunities to minors	▪ Students and children at education uses immediately surrounding site ▪ Users of Whitewater Park	▪ Health and wellbeing

Current environment

As outlined in Section 5.1, the site is surrounded by a range of uses that cater to the needs of children. This includes St Bede's Catholic College, St Aloysius Primary School and St Nicholas Early Education Centre to the north of the site, Whitewater Park playground to the west and Little Zak's Child Care Centre to the south.

Community consultation undertaken as part of the Maitland Community Safety Plan (2013) identified underage drinking as one of the key safety issues within the LGA. Council representatives consultant as part of this SIA noted there were concerns with the proximity of the licensed premises to the surrounding education uses.

Impact of the proposal

The proposal will introduce a tavern and packaged liquor outlet to the area as part of a new shopping centre development. The shopping centre will be located next to a range of educational and childcare uses and is expected to be visited by the users of these facilities. Given the proximity of these uses, there is concern the proposed liquor premises will increase minors' exposure and access to alcohol, creating potential impacts to the health and wellbeing of these children and young people.

The impacts of alcohol consumption on young people are well documented. Data from NSW Health shows that young people (0 – 25 years) are at higher risk of alcohol related harm, due to a greater risk of accident, injury and adverse brain development. Trends indicate that the number of young people who drink are declining, with the number of high school students who had consumed alcohol decreasing from 64% in 2014 to 44% in 2015 (NSW Health 2016).

A 2015 study undertaken by the Sax Institute for the NSW Ministry of Health highlighted that there isn't a robust, evidence base which shows a correlation between liquor outlets and underage drinking. The study found that while there are a handful of Australian studies around this topic, there are "none with particularly strong research designs" (18: 2015). The study also found that there are inconclusive results as to whether outlet density is associated with increased parental supply of alcohol to minors or underage purchasing.

Based on this, there is limited evidence which establishes a risk between the presence of liquor outlets and underage drinking or risky exposure. Nonetheless, given the harm of underage drinking, all licenced premises must adhere to strict licencing guidelines as outlined by the ILGA. This includes measures such as prohibiting the sale of alcohol to minors by staff and patrons, restricting any advertising materials or promotions which have special appeal to minors and ensuring all staff serving liquor have responsible service of alcohol training. The proposal will adhere to these measures and has also prepared a Plan of Management to clearly outline and the roles and responsibilities all staff.

The ILGA is responsible for assessing and approving liquor licences, including considering the suitability of the premises with regard to local context and surrounding stakeholders.

The proposal will situate the proposed liquor premises within a shopping centre, as is common across retail centres across NSW. The proposal has sought to reduce the visibility of the licenced premises from surrounding sensitive uses, with the tavern located on Heritage Drive and the packaged liquor outlet contained wholly within the shopping centre. This will prevent clear sight lines between the surrounding education uses to the licences premises, helping to reduce potential alcohol exposure to minors.

Management measures	SIA recommendations
▪ Assessment of the proposed liquor licences by the ILGA, with consideration to the locational context and surrounding receivers. ▪ Preparation of a Plan of Management for the tavern and shopping centre with clear roles and responsibilities to enforce responsible sales practices, including restricting the sale and supply of alcohol to minors. ▪ Intended operation of the licenced premises in accordance with ILGA regulatory requirements and guidelines. ▪ Location of the proposed tavern on Heritage Drive, away from surrounding educational uses.	▪ Prepare a Plan of Management to include site-specific responsibilities for the packaged liquor outlet once the operator has been confirmed. ▪ Ensure the licenced premises cannot be seen or deciphered by the surrounding educational uses. This extends to any external signage or associated advertising material. ▪ Prohibit the consumption or sale of alcohol from the playground area. ▪ Consult with surrounding landholders, including education uses, to inform them of the proposal and provide them with an opportunity to comment on the intended liquor uses, design and access.

Residual impact summary (considering mitigation measures)		
Likelihood: Unlikely	**Magnitude:** Minor	**Resultant impact:** Low negative

Research from the NSW Ministry of Health indicates there is limited evidence which shows a correlation between the availability of liquor outlets and underage drinking, with most studies lacking a robust research design. The proposal will situate the liquor outlets wholly within the shopping centre (as is common across NSW) and it appears likely that the licensed premises will not be able to be viewed by the surrounding education uses. If approved, the proposed licensed premises will also have to adhere to strict licencing regulations by the ILGA, including restricting the sale and advertisement of liquor to minors.

Based on this and the above assessment, the proposal is unlikely to increase risky alcohol exposure or consumption opportunities to minors and will have a low negative impact on the users of surrounding educational facilities. Several recommendations have been made in this SIA which, if implemented, have potential to further reduce this impact.

6.3. POTENTIAL NOISE IMPACT ON NEIGHBOURS

Description of Impact	Impacted groups	Social impact category
Potential noise impact of the tavern on surrounding residents and educational facilities.	▪ Residents on streets immediately surrounding the proposal ▪ Students and users of the surrounding educational facilities	▪ Health and wellbeing ▪ Surroundings

Current environment

Chisholm is an urban release area and is experiencing a high rate of urban development. Most of the suburb consists of new homes. There is currently no significant retail or commercial centre in the suburb.

The site is located on undeveloped land and is zoned B1 Neighbourhood Centre. As identified in Section 5.1, the site is surrounded by a mix of existing residential, recreational and educational uses. The closest land uses to the proposed tavern location include:

- Residences on Whitewater Street and Duskdarter Street, located approximately 120m west of the tavern and separated by Whitewater Park
- St Bede's Catholic College, St Aloysius Primary School and St Nicholas Early Education Centre, located approximately 250m north of the tavern
- Little Zak's Child Care Centre, located approximately 180m south of the tavern.

A large section of undeveloped land is also located immediate south of the site. This site is zoned R1 General Residential. At the time of this report, it is not known if development has been planned for this location.

According to the Maitland Community Safety Plan, noise from venues was identified as a key safety issue by the community.

Impact of the proposal

The proposal will introduce a new tavern as part of the shopping centre development. While the tenant has not been confirmed at this stage, the tavern is proposed to operate from 9am – 12 am, seven days a week.

Food and beverage venues are often the source of ambient noise emissions, ranging from the noise of customers leaving/entering the venue through to noise from associated live music or entertainment activities. While common, noise from these venues can impact on an individual's way of life and wellbeing through disturbance of sleep. This impact can generally be minimised by ensuring venues are situated in appropriate locations, enacting patron management plans and maintaining communication with surrounding landholders.

In relation to location, the proposal will situate the tavern in an area zoned for small scale retail, business and community users. The tavern is a permitted use and is part of a larger shopping centre which will house various retail and food services. The centre has been planned since the initial release of the suburb, with the location known in the community for the past 20 years.

The location of the tavern directly adjacent to Whitewater Park and an undeveloped land parcel provides some current separation between the venue and adjoining residential areas on Heritage Drive, acting as a natural buffer. The tavern has two entry points for customers: one via the planned carpark area and the other from a pedestrian entry along Heritage Drive. Due to the proximity of the pedestrian entry along Heritage Drive to the residential area to the west, there may be some noise impact on residents when patrons access the premises through this entry/exit. The tavern also includes an outdoor dining area along Heritage Drive which may also cause some noise impact on residents in the immediate area.

A Noise Emission Assessment (NEA) was undertaken by Acoustic Logic to assess the potential noise impacts from the proposal on surrounding neighbours. This also included an assessment of likely noise impacts from the tavern, in accordance with the NSW Liquor and Gaming requirements for patron and music noise. The predicted noise levels from the tavern were determined based on the assumption that the capacity of the tavern would be 500 patrons within the internal area and 25 patrons within the outdoor terrace.

The NEA considers that noise associated with the operation of the tavern will not exceed noise emission criteria and will comply with the relevant industry guidelines.

The NEA contains several measures to help further reduce and manage potential noise impacts from the tavern on residents. These measures are detailed in full within the NEA and include recommendations such as:

- Limiting outdoor capacity of the tavern to 20 patrons unless noise barriers are installed to reduce noise emissions to the west
- Restricting music in the outdoor area
- Providing signage to remind patrons to leave the venue in a quiet manner.

A Plan of Management (PoM) has also been prepared for the tavern to help manage the operation of the venue and patron behaviour. The PoM includes a number of measures to help reduce noise on site which the tenant must adhere to. These are detailed in full within the PoM and include measures such as:

- Ensuring patrons do not loiter outside the tavern
- Encouraging patrons to minimise noise when entering/leaving the premises
- Maintaining a register to document noise complaints made by neighbours and meeting with neighbours to address their concerns.

Management measures	SIA recommendations
▪ Inclusion of measures in the PoM to minimise noise associated with the tavern. This includes ensuring patrons do not loiter outside the tavern, encouraging patrons to minimise noise when entering/leaving, documenting noise complaints, and discussing concerns with neighbours. ▪ Location of the proposal in an area approved for retail uses, with those uses trading into the evening.	▪ Implement all operational recommendations outlined for the tavern in the NEA. ▪ As requested in Council's RFI, consider preparing an additional noise assessment once fit out details of the tavern are confirmed to ensure noise levels are maintained.

Residual impact summary (considering mitigation measures)		
Likelihood: Unlikely	**Magnitude:** Minor	**Resultant impact:** Low negative to neutral
The Noise Emission Assessment (NEA) prepared by Acoustic Logic considers that noise from the tavern will not exceed noise emission criteria and will comply with relevant industry guidelines, including those outlined by Liquor and Gaming NSW. As a result of this assessment, noise generated by the tavern is likely to have a low negative to neutral impact on the residential community immediately surrounding the site.		

7. CONCLUSION

This SIA has been undertaken to assess the potential social impacts arising from the proposed liquor uses within the Chisholm Shopping Village at 4 Heritage Drive, Chisholm.

Based on the assessment in this report, the key social impacts of this proposal are:

- **Potential increase in alcohol-related harm and anti-social behaviour:** The proposal will introduce two liquor-premises to Chisholm; a tavern and a packaged liquor outlet. As identified in Section 6.1, liquor licence density, socio-economic characteristics and venue characteristics can all influence rates of excessive alcohol consumption and, in turn, alcohol related offences. The proposal will not exceed the threshold of harm for the area and has implemented a range of management measures to help reduce the likelihood for excessive alcohol consumption and associated crime/harm.

  Based on this and the assessment in Section 6.1, the proposal is unlikely to contribute to increased rates of alcohol-related harm and anti-social behaviour and will have a low to neutral impact on the suburb community.

- **Potential for increased alcohol exposure to minors:** Research from the NSW Ministry of Health indicates there is limited evidence which shows a correlation between the availability of liquor outlets and underage drinking, with most studies lacking a robust research design. The proposal will situate the liquor outlets wholly within the shopping centre (as is common across NSW) and it appears likely that the licensed premises will not be able to be viewed by the surrounding education uses. If approved, the proposed licensed premises will also have to adhere to strict licencing regulations by the ILGA, including restricting the sale and advertisement of liquor to minors.

  Based on this and the assessment in Section 6.2, the proposal is unlikely to increase risky alcohol exposure or consumption opportunities to minors and will have a low negative impact on surrounding land users. Several recommendations have been made in this SIA which, if implemented, has potential to further reduce this impact.

- **Potential noise impact on neighbours:** The Noise Emission Assessment (NEA) prepared by Acoustic Logic considers that noise from the tavern will not exceed noise emission criteria and will comply with relevant industry guidelines, including those outlined by Liquor and Gaming NSW. As a result of this assessment, noise generation associated with the tavern is likely to have a low – neutral impact on the immediate residential community.

7.1. RECOMMENDATIONS

The following recommendations are provided to further manage the potential impacts from the proposal:

- Consult with NSW Police and community organisations to understand potential concerns relating to alcohol-related harm.
- Consider joining the Maitland Liquor Accord to regularly meet with other licences operators in the area and contribute to measures across the LGA to reduce rates of alcohol-related crime and anti-social behaviour.
- Ensure the tavern maintains a high level of amenity throughout its operation. This includes providing good lighting, ventilation, regular cleaning and employing an appropriate number of staff per patrons.
- Prepare a Plan of Management to include site-specific responsibilities for the packaged liquor outlet once the operator has been confirmed.
- Ensure the licenced premises cannot be seen or deciphered by the surrounding educational uses. This extends to any external signage or associated advertising material.
- Prohibit the consumption or sale of alcohol from the playground area.
- Consult with surrounding landholders, including all education uses, to inform them of the proposal and provide them with an opportunity to comment on the intended liquor uses, design and access.
- Implement all operational recommendations outlined for the tavern in the NEA.

- As requested in Council's RFI, consider preparing an additional noise assessment once fit out details of the tavern are confirmed to ensure noise levels are maintained.

7.2. OVERALL IMPACT ASSESSMENT

Based on this assessment and the above social impacts, the proposed liquor uses are likely to have a low – neutral impact on the community. This is influenced by the low likelihood of the proposal to contribute to increased rates of alcohol-related crime, harm or risky exposure within the suburb.

A number of recommendations have been provided within this SIA to help further manage and reduce the potential impacts of the proposal.

REFERENCES

This SIA has been informed by a range of data sources, information and technical studies. The following data sources have been used:

Demographic, crime and health data

Australian Bureau of Statistics, 2016, Census of Population and Housing, Greater Sydney, Maitland (LGA), and Chisholm (suburb) data.

Bureau of Crime Statistics and Research, Chisholm (suburb), Maitland (LGA) and NSW hotspot maps and crime rates.

Department of Planning and Environment, 2019, NSW population projections.

Liquor and Gaming NSW, 2022, Chisholm (suburb) and Maitland (LGA) liquor licence dashboard/map.

Policy documents

International Association for Impact Assessment, 2015, Social Impact Assessment: Guidance for assessing and managing the social impacts of projects.

Maitland City Council, 2010, Activity Centres and Employment Clusters Strategy.

Maitland City Council, 2013, Community Facilities and Services Strategy.

Maitland City Council, 2013, Maitland Community Safety Plan 2013-2016.

Maitland City Council, 2020, Maitland Local Strategic Planning Statement 2040+.

NSW Department of Planning and Environment, 2018, Greater Newcastle Metropolitan Plan 2036.

NSW Department of Planning and Environment, 2021, Draft Hunter Regional Plan 2041.

NSW Department of Planning, Industry and Environment, 2021, Social Impact Assessment Guideline: State significant projects.

Literature review

Australian Institute of Health and Welfare, 2019, National drug strategy household survey.

NSW Health, 2016, Trends in alcohol use and health-related harms in NSW.

NSW Police Force, 2019, Alcohol strategy 2019 – 2026.

Hughes & Bellis, 2012, Drinking environments.

Hughes et.al., 2011, Environmental factors in drinking venues and alcohol-related harm: the evidence base for European intervention.

Kavanagh et al., 2011, Access to alcohol outlets and harmful alcohol consumption: a multi-level study in Melbourne, Australia.

Sax Institute, 2015, Evidence check: community impact of liquor licences for the NSW Ministry of Health

Donnelly, Menendez and Mahoney, 2014 (BOSCAR), 'The effect of liquor licence concentrations in local areas on rates of assault in New South Wales', Contemporary Issues in crime and Justice, Number 181, NSW Bureau of Crime Statistics and Research, http://www.bocsar.nsw.gov.au/Documents/cjb181.pdf.

Technical studies

Acoustic Logic, 2021, Noise Emission Assessment.

BN Group, 2021, Architectural Plans.

Ethos Urban, 2021, Economic Impact Assessment.

McLaren Traffic Engineering, 2021, Traffic and Parking Impact Assessment.

Moir Landscape Architecture, 2021, Landscape Plans.

The Design Partnership, 2021, Crime Prevention Through Environmental Design Report.

Urbis, 2022, Statement of Environmental Effects.

DISCLAIMER

This report is dated 10 June 2022 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd **(Urbis)** opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of REVELOP **(Instructing Party)** for the purpose of Social Impact Assessment **(Purpose)** and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

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All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

REVELOP

22 August 2022

Maitland City Council
285–287 High Street
PO Box 220
Maitland NSW 2320

Attention: Brian Gibson- Principal Planner

Re: **Response to additional information request**

Address: **4 HERITAGE DRIVE CHISHOLM NSW 2905**

Application No: **DA/2021/1702**

Dear Brian

We refer to the Social Impact Assessment comment via email on 12/08/2022 regarding subject application, we hereby would like to submit the documents and detailed response as per table attached.

The above and attached satisfies the issues raised by Council.

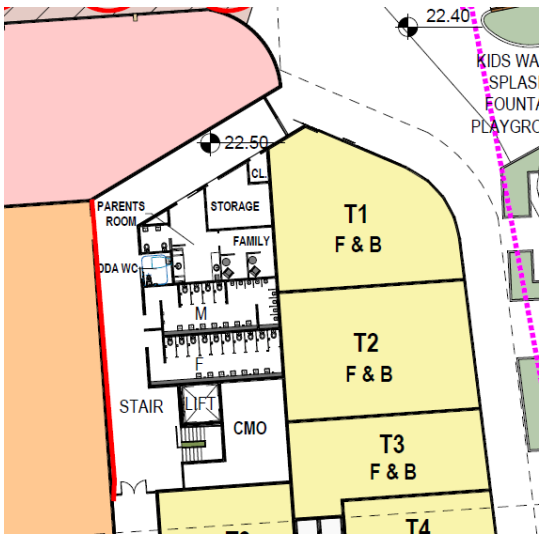
<table>
<tr><th>No.</th><th>Council's comment</th><th>Applicant's response</th></tr>
<tr>
<td></td>
<td>
<u>Hours of Operation</u>
The proposed hours of operation are:
Table 5 Proposed operational hours
<table>
<tr><th>Land Use</th><th>Proposed Hours</th></tr>
<tr><td>Supermarket and Mini Major</td><td>7:00am to 10:00pm, 7 days per week</td></tr>
<tr><td>Liquor</td><td>9:00am to 10:00pm, 7 days per week</td></tr>
<tr><td>Gym</td><td>24 hours, 7 days per week</td></tr>
<tr><td>Learn to Swim</td><td>7:00am to 10:00pm, 7 days per week</td></tr>
<tr><td>Medical</td><td>7:00am to 10:00pm, 7 days per week</td></tr>
<tr><td>Child care centre</td><td>7:00am to 7:00pm, Monday to Friday</td></tr>
<tr><td>Car wash</td><td>7:00am to 7:00pm, 7 days per week</td></tr>
<tr><td>Tavern</td><td>9:00am to 12:00am, 7 days per week</td></tr>
</table>
It was also advised the:
• Food & Beverage tenancies T1 to T6 are to be 9am to 12am.
• Basement Carpark will be opened from 7am to 12am.

Comment: -
1. Should the food & beverage tenancies have an earlier opening time to cover coffee shops/cafes?
2. Should the swim school have an earlier opening time? For example will squad training occur at the facility?
</td>
<td>
1. Food and Beverages tenancies T1 to T6 opening hour will be from 6am to 12am

2. Swimming school opening hour will be from 5am to start training.

Summary of Opening Hours
<table>
<tr><td>Supermarket</td><td>7am to 10pm - 7days/ week</td></tr>
<tr><td>Mini major</td><td>7am to 10pm - 7days/ week</td></tr>
<tr><td>Liquor</td><td>9am to 10pm – 7days/week</td></tr>
<tr><td>Gym</td><td>24 hours – 7days/week</td></tr>
<tr><td>Learn to Swim</td><td>5am to 10pm - 7days/ week</td></tr>
<tr><td>Medical</td><td>7am to 10pm - 7days/ week</td></tr>
<tr><td>Childcare Centre</td><td>7am to 7pm (Monday to Friday)</td></tr>
<tr><td>Car wash</td><td>7am to 7pm-7days/week</td></tr>
<tr><td>Tavern</td><td>9am to 12am - 7days/ week</td></tr>
<tr><td>Outdoor F&B</td><td>6am-12am – 7 days/week</td></tr>
<tr><td>Outdoor Retail</td><td>6am-12am – 7 days/week</td></tr>
<tr><td>Loading Dock</td><td>7am-10pm – 7 days/week</td></tr>
<tr><td>Lift Lobby-Mall</td><td>6am-12am – 7 days/week</td></tr>
<tr><td>Lift Lobby-Gym</td><td>24 hours – 7days/week CARD ACCESS</td></tr>
<tr><td>Car Park-Basement</td><td>7am-10:30pm – 7 days/week</td></tr>
<tr><td>Car Park-at grade</td><td>24 hours – 7days/week NO. PLATE RECOGINTION</td></tr>
</table>
Refer to access control plan submitted with this response letter prepared by BN Architect
</td>
</tr>
</table>

506 / 55 Phillip Street, Parramatta NSW 2150 PO BOX 313, Baulkham Hills NSW 1755
p 8203 0362 **f** 9635 8288 **www.revelop.com.au**

	Social Impact Assessment In relation to the SIA for Chisholm Shopping Centre, the following comments are made: • The DA proposal for the Tavern hours of operation are 9:00am to 12:00am, 7 days per week. Comment - It is considered the hours be restricted to 9.00am to 10.00pm, 7 days per week to gauge the operation and community impact. These hours can then be subject to an application to modify after a reasonable 'trial' period. This will also address acoustic concerns with the proposed Tavern not providing a detailed acoustic assessment of its fitout and operations.	We request to keep Tavern operating hour to be 9:00am to 12:00am, 7 days. Condition to be included as after 6 months from operation of Tavern with proposed hour from 9am to 12am, acoustic assessment to be conducted and submitted to council to assess the amenity impact if reduced hour is required. Fit out DA for Tavern will be submitted as separate DA application with full acoustic assessment including equipment data and no. of occupants based on full internal and external layout. Above condition should be part of the fit out DA approval.
	• Travelator & Elevator Comment - There are concerns regarding late hours access and visibility thereof in relation to the travelator and the elevator. The lift at the basement carpark receives good visibility however it opens into an enclosed corridor, which after 10pm has only one entry/exit. It is considered the lift foyer at the Ground Floor be redesigned to provide improved safety through casual surveillance and (particularly with the elevator opening into an empty/hidden space as opposed to a high visibility/passive surveillance space).	As per previous response, improved surveillance has been added by winded lobby, full length mirror will be added as shown below. Provisions such as Security patrol, CCTV within amenities corridor and basement, well-lit lighting, time limit senor DDA WC and safety convex mirror at blind corner to be imposed to improve crime prevention. 

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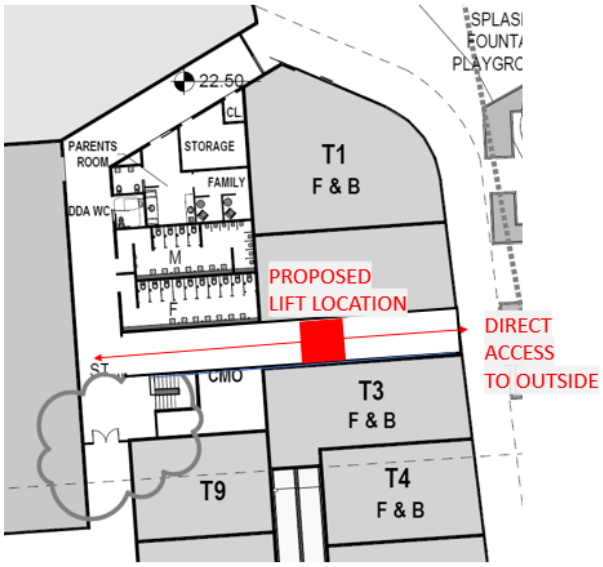
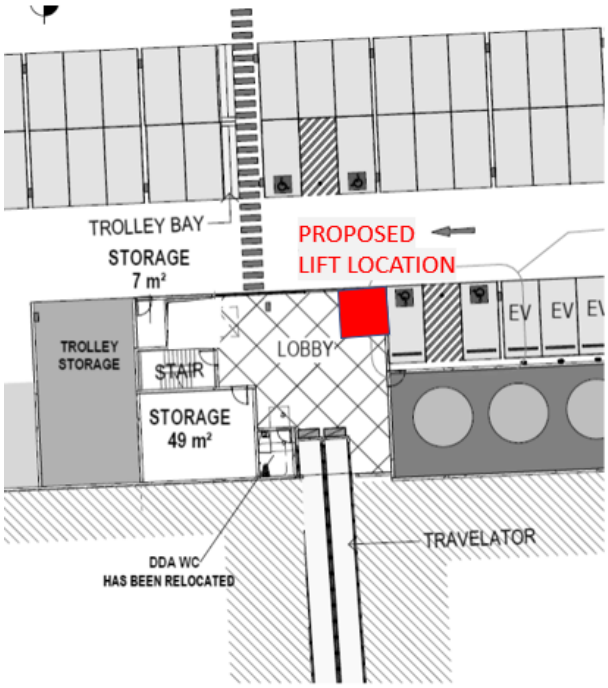
		If council is still of a concern on the above, r elocation of lift can be considered as per proposal below. There will direct access to outside, patrons have a choice of exiting the lift in the mall or outside dining precinct.  
	• Basement Carpark Comment - The underground/basement carpark is proposed to operate from the opening of the centre at 7am to the closing of	Plan of Management has been submitted as part of previous RFI response for management of carpark safety.

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	the Tavern and Food & Beverage Tenancies at 12am. The car wash will operate between 7am and 7pm. Noting the limited casual surveillance of the basement carpark, combined with 4 points of egress, it is recommended the basement carpark have its opening hours limited during late hours evening hours, to correspond more with peak trips and parking demand, ie. from 8pm when demand is likely to have dropped significantly.	Basement should be opened until Major supermarket opening hour plus allowance of travel and loading time for customer. Basement is the only parking with weather proof, for consideration of elderly people and parents with kids, this parking will be highly utilised during wet weather days. We proposed basement carpark to be closed at 10:30pm.
	<u>Waste Collection</u> Clarification/Confirmation is required of the operation aspects of waste collection: • Gym & Swim School Comment - Waste collection is proposed via the waste bins being transferred from the waste storage room on the Basement Floor Plan level to the kerb for collection by a private contractor. Please confirm the Gym and Swim school will operate in this manner, superseding the Waste Collection Report.	Yes confirmed that Gym and Swim school will operate as same manner as childcare superseding Waste Management report. Waste rooms are indicated in this building.
	• Medical Centre Comment - General waste and recycling from the medical centre will be disposed of into the compactors and bins located in the central loading dock for collection at a later point. Medical waste is to be collected by an appointed contactor directly from the operation locations. Please confirm the medical waste will be managed during typical business hours (ie. 8am to 6pm) and the vehicle type to be used.	Yes confirmed that the medical waste will be managed during typical business hours (ie. 8am to 6pm), vehicle type will be B99 SRV.
	• Waste Collection (Loading Dock) Comment - A condition will be imposed restricting truck movements including deliveries to the loading dock and the collection of waste is to occur between 7am and 10pm (the hours may be reduced for Saturday and Sunday).	Hour to be as per acoustic report 7am to 10pm 7 days/week. Refer to access control plan submitted with this response letter prepared by BN Architect.

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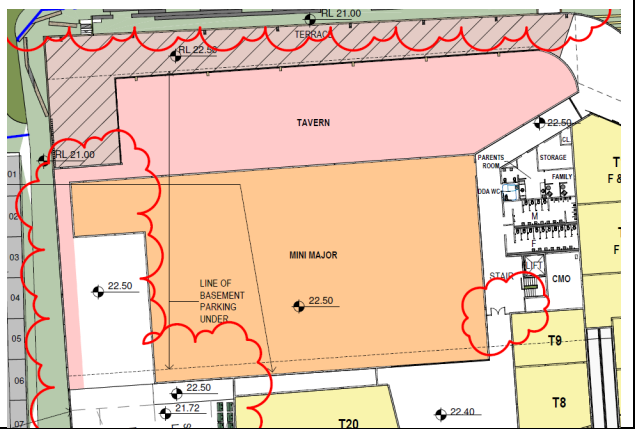
	Others	Revised Ground Gloor Plan with mini major layout to allow loading is submitted as part of this response letter. There will be no change in Gross Floor area of Mini Major and overall Gross Floor area. The changes is to accommodate the tenancy's operational requirement. 

We look forward council to expedite the process of assessment and development approval at your earliest.
I can be contacted on 8203 0362 should you require anything further or to discuss this matter.

Kind Regards,

Anthony El-Hazouri

Director
Revelop Building and Developments Pty Ltd

Attachments:

1. Access Control Plan Ground Floor and Basement Plan-prepared by BN
2. Updated Ground Floor Plan (Rev-F)-Prepared by BN

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ENVIRONMENTAL CONSULTING SERVICES

PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT

2 & 4 Heritage Drive
Chisholm NSW 2322

ENVIRONMENTAL CONSULTING SERVICES PTY LTD
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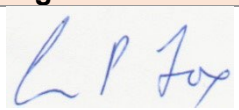
Register of Amendments		
Revision	**Date**	**Description**
1	02.06.2022	Issued to Client
2	30.08.2022	Reviewed by CSAM

Document Approval		
Prepared by	**Date**	**Signed**
Lisa Danzey	02.06.2022	
Approved by	**Date**	**Signed**
Simon Caples **Principal Consultant**	04.06.2022	
Certified by	**Date**	**Signed**
Laurie Fox 	29.08.2022	

Executive Summary

Environmental Consulting Services Pty Ltd (ECS) was engaged to review the previous environmental investigations that encompasses the property known as 2 and 4 Heritage Drive in Chisholm (the Site) and complete a current preliminary site investigation. The purpose of this Preliminary Site Investigation was to evaluate the potential for contamination resulting from past site activities and to draw conclusions regarding the suitability of the Site for mixed residential and commercial development, and for a childcare facility.

The scope of work undertaken during this investigation included a site inspection, a review of background information including past investigation reports and targeted soil sampling.

The site is currently vacant and aerial photographs show the land has been predominantly vacant since 1954 although a small shed was located near the south east corner from sometime after 1977 until around 2007.

The certificates of title indicate some owners were poultry farmers. However, the associated buildings and storage facilities were located on the land surrounding the Site, other than the small shed near the south east corner.

The Preliminary Site Investigation (PSI) completed in 2003 encompassed the Site and surrounding land. At the time of this investigation there was a turkey farm located adjacent to the Site to the west and three other turkey farms located more remotely to the north and west. The PSI 2003 did not identify any potential sources of contamination on the Site or in close proximity to the Site.

The second PSI conducted in 2020 considered the development on the Site through a review of the historical aerial photographs. This showed that the Site had not been significantly developed although there was a small shed (for a period of between 20-30 years) near the south east corner and an unpaved road running north south across the Site. This investigation did not identify a potential for significant contamination including the presence of fill material.

This current investigation has considered the previous two Preliminary Site Investigations and the proposed development. Based on the past use of the Site there is no indication of the potential for significant Site contamination. However, to further consider the past use of the land and the proposed development, targeted soil sampling was undertaken at the former location of the small shed on the Site and at the proposed location of the childcare facility.

During the Site inspection no potential ACM was observed on the Site including at the former shed location. The targeted soil sampling did not identify levels of potential contaminants above Site Assessment Criteria.

The Site is considered suitable for the proposed development (DA/2021/1702) for a mixed use on the area known as 4 Heritage Drive (Lot 11) and the proposed residential subdivision on 2 Heritage Drive (Lot 12) provided the following recommendations are implemented:

- Preparation of a Construction Environmental Management Plan (CEMP) including an Unexpected Finds Procedure (UFP) prior to earthworks commencing;
- Excavated and surplus material should be waste classified in accordance with the NSW EPA Waste Classification Guidelines. Based on the preliminary results the site soils below the topsoil would likely classify as either Virgin Excavated Natural Material (VENM) or Excavated Natural material (ENM). Further assessment will be required to confirm this preliminary classification

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1.0 INTRODUCTION

Environmental Consulting Services Pty Ltd (ECS) was engaged to undertake a preliminary environmental site assessment (PESA) of the property known as 2 and 4 Heritage Drive in Chisholm NSW (the Site). The purpose of this PESA was to support a Development Application (DA) to Maitland City Council for a shopping centre and childcare facility on the northern allotment of the Site and a 12 lot residential development with an open space area on the southern allotment.

A development application has been submitted to Maitland City Council (DA/2021/1702) for a mixed use development for the area known as 4 Heritage Drive that includes:

- Commercial Premises with retail premises, supermarket, mini major and liquor shop;
- Recreational Facility (Indoor) with gym and swimming pool;
- Food and Drink premises with Pub;
- Centre based Child Care Facility (112 children);
- Health Services Facility with Medical Centre; and
- Car Wash and Signage.

Plans of the proposed development are included in Appendix 1 of this report.

Following the submission of the Development Application Maitland City Council have acknowledged receipt of a Preliminary Site Contamination Investigation (2003) report and a Preliminary Environmental Site Assessment (2020). However, Council has stated that it is not satisfied, having regard to potential contamination and possible remediation of the Site, for the purposes of granting consent. Council has requested that:

"a revised PSI addressing the above, which provides direct analysis of the site's suitability for the proposed development having regard to historic land uses and remediation or validation works"

This investigation has been undertaken in accordance with:

- Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA, 2020);
- State Environmental Planning Policy (Resilience and Hazards) 2021; and
- National Environment Protection Measure (NEPM) for the Assessment of the Site Contamination (NEPM 2013).

Site inspections, soil sampling, and laboratory analyses were performed as part of this study. Best professional judgement was used to interpret and extrapolate between sampling points, however, even under ideal circumstances actual conditions may vary from those inferred to exist. The actual interface between materials and variation of soil quality may be more abrupt or gradual than the report indicates.

1.1 Objective and Scope of Work

The objective of the environmental assessment was to review the previous environmental investigations that encompasses the property known as 2 and 4 Heritage Drive in Chisholm NSW (the Site) and draw conclusion about the suitability of the Site for residential use.

The scope of work undertaken to meet this objective included the following:

- Undertake a Site walkover;

- The review of selected background information including past investigation reports, historical air photographs and relevant published information;
- The identification of past and present potentially contaminating activities, modes of contamination, assess chemicals of potential concern;
- Field investigation including sampling and laboratory analysis;
- The assessment of the need for further investigation or remediation; and
- The preparation of an investigation report.

2.0 BACKGROUND

The Site has been the subject of a previous Preliminary Site Investigation (PSI) in 2020 and also part of a larger investigation area investigated in 2003. The findings of these previous investigations are presented in the reports entitled:

- Beechwood Homes, Thornton North Preliminary Site Contamination Investigation (Reference No 22/11222/53856. GHD November 2003); and
- Preliminary Environmental Site Assessment 20 Heritage Drive, Chisholm NSW 2322 (ECS December 2020).

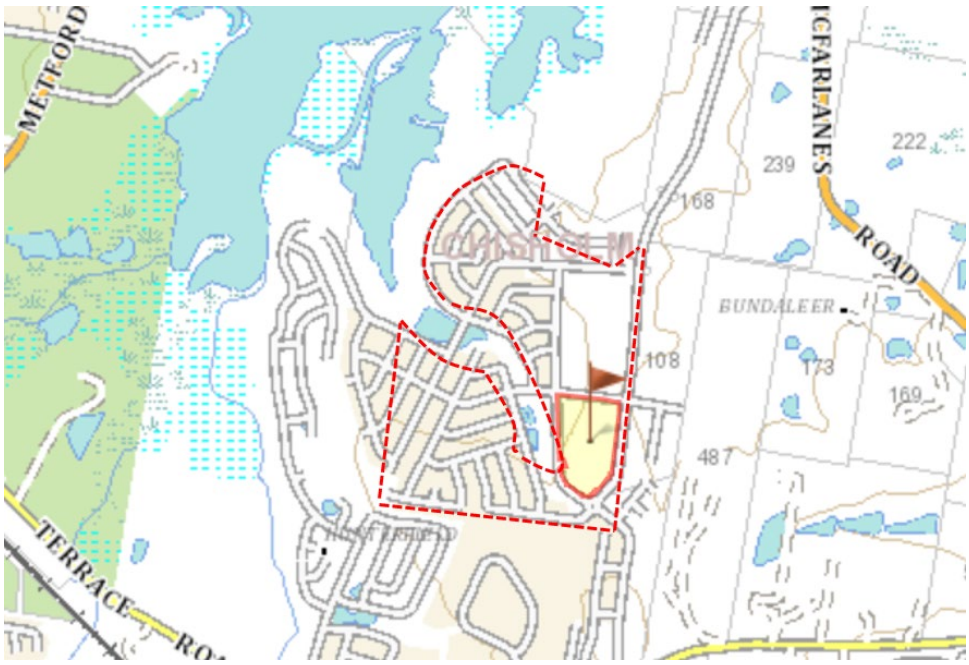
The findings of these reports are summarised in the following sections.

2.1 GHD PSI (2003)

This PSI was undertaken to assess conditions of the land to the north of Raymond Terrace Road North Thornton (described as Lot 12 DP 603613) and encompassed an area of approximately 53Ha. The area of investigation for the GHD PSI (2003) encompassed the Site (2 & 4 Heritage Drive).

The approximate location of the investigation area for this PSI is outlined with a dashed red line. The current Site is outlined in red and shaded yellow on Figure 2.1 – Investigation Area Comparison.

Figure 2.1 – Investigation Area Comparison



The objectives of the GHD PSI (2003) were to:

- Identify past and present contaminating activities on Lot 12 DP 603613);
- Report on site conditions;
- To assess whether potential contamination was likely to be an issue for the proposed residential redevelopment of the site; and
- To recommend any further investigations that may be required.

This investigation included a review of background information and included the collection of soil samples from targeted locations.

This PSI presented the following conclusions:

- Four turkey farms were located on the Lot 12 DP 603613);
- Potential contamination activities were limited to the existing turkey farm;
- There was likely to be little potential for sources of contamination other than those associated with the farms, machinery storage sheds, and areas of waste disposal;
- Soil sampling identified concentrations of petroleum hydrocarbon contamination at levels above sensitive site landuse guidelines adjacent to above ground diesel storage tanks to the east of Turkey Farm 1 (which is to the east of the Site) and Turkey Farm 4 (which is to the north of the Site);
- There was a former dam which had been backfilled with uncontrolled waste in the northern area of this investigation (to the north of the Site); and
- Two turkey burial pits were located within the investigation area to the east and west of Turkey Farm 3 (which is to the north west of the Site).

This PSI recommended that the impacts associated with the above diesel storage tanks, former dam and turkey burial pits should be remediated.

This investigation did not identify contamination within the vicinity of Turkey Farm 2 which was located directly west of the Site.

2.2 ECS PSI (2020)

The purpose of this assessment was to assess the potential for contamination resulting from past site activities and to draw conclusions regarding the suitability of the Site for mixed residential and commercial development. The Site was defined as 2 & 4 Heritage Drive Chisholm NSW.

The scope of work undertaken during th ECS PSI (2020) included the following:

- Undertake a Site walkover;
- The review of selected background information including historical air photographs and relevant published information;
- The identification of past and present potentially contaminating activities and potential contamination types; and
- The assessment of the need for further investigation and/or remediation.

Aerial photographs dating back to 1954 were reviewed to assess the historical development on the Site. These photographs indicated that the Site was predominately bushland which was cleared sometime prior to the 1965. The Site remained vacant and grassed since 1965.

Notable development features on the surrounding land shown on the historical aerial photographs include:

- 1984 – 1993. Elongated factory-type buildings are located towards the south east (30m away) and south-west (120m away) of the Site that were likely to be used for poultry farming;
- 2007 – The elongated sheds have been demolished and the areas have been left vacant;
- 2010 – Significant road infrastructure has been developed with a round-a-bout adjacent to the southern tip of the Site;
- 2015 – Significant residential development has occurred to the west of the Site and the school has been developed directly north of the Site and the existing road system has been complete.

The certificates of title show that the Site has historically been owned by various individuals and corporations. Occupations of proprietors indicate the Site may have been used for various farming activities until 2003/2004.

Both properties that form the Site were purchase by Steggles Poultry Pty Ltd in 1970 and 1973 and then sold to Blue Rock Developments Pty Limited and Thornton Developments Pty Limited in 2003. Steggles Poultry Pty Ltd is a poultry farming company and this period of ownership coincides with the large, elongated buildings observed on the 1984 and 1993 aerial photographs.

This PSI concluded that:

- The land was cleared of native vegetation prior to 1965 and has remained cleared since this time;
- There is no evidence of filling on the Site or that significant earthworks have been undertaken;
- The past use of the Site was not associated with any potential sources of contamination that may preclude residential or commercial land use.

The Site was considered suitable for redevelopment for proposed residential and commercial use.

3.0 SITE INFORMATION

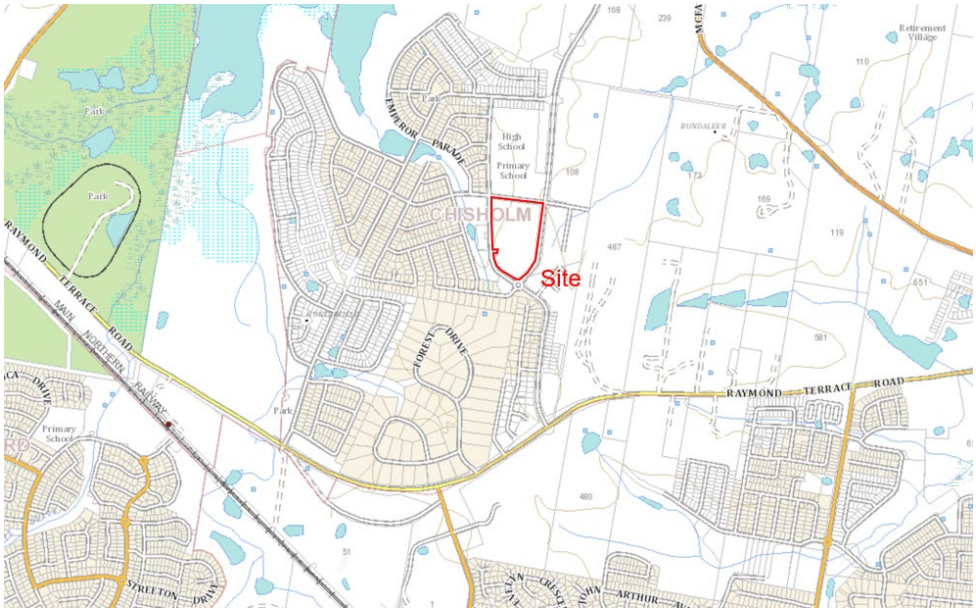
3.1 Site Identification

The Site identification details are summaries in Table 3.1 – Site Identification and the location of the Site is presented in Figure 3.1 – Site Location Plan.

Table 3.1 – Site Identification

Attribute	Detail
Site Address	2 and 4 Heritage Drive, Chisholm 2322
Lot & Deposited Plan	Lots 11 and 12 in DP 1280255
Current Land Use	Vacant
Proposed Land Use	Lot 11 - Commercial – Shopping centre and childcare facility Lot 12 – Residential – 12 residential lots and an open space area
Local Government	Maitland City Council
ApproximateSite Area (m^2)	Lot 11 - 44000 Lot 12 – 15000
Geographical Location (approximate centre)	Latitude: -32.757373969 Longitude: 151.634406709

Figure 3.1 – Site Location Plan (Six Maps)



3.2 Land Zoning

The Land Zoning Map within the Maitland Local Environmental Plan 2011 (LEP) prepared by the Maitland City Council shows the southern third of the Site (Lot 12 DP 1280255) is zoned as General Residential (R1) and the northern portion of the Site (Lot 11 DP 1280255) is zoned as Neighbourhood Centre (B1).

3.3 Site Location and Regional Setting

The Site is situated within an existing residential area of the Hunter Region of NSW. The Site is surrounded by open space and recent residential developments to the west and south, a school to the north and residual bushland to the east.

The Site is currently vacant and grassed with occasional residual trees. The Site is irregular in shape with an area of approximately 6 hectares. The Site is outlined in red and surrounding properties are shown on Figure 3.2 – Site Layout.

Figure 3.2 – Site Layout

3.4 Topography and Drainage

The Site is located across a shallow ridge that slopes down from the south to the north. The western two thirds of the Site slopes downwards to the north west and the eastern third slopes downward to the north east. The Site is at an elevation of approximately 20m AHD (Australian Height Datum).

Rain falling on the site is expected to infiltrate into the site soils with excess water directed to stormwater system on Heritage Drive. The nearest surface water body to the Site is Four Mile Creek located approximately 50m to the west of the Site. This stream drains into wetlands to the north west of the Site which drain into the Hunter River, located about 3.5 north east of the site.

Wastewater treatment ponds associated with Morpeth Wastewater Treatment Works are located approximately 2 km north of the Site. This wastewater treatment facility is relatively remote to the Site and are not expected to impact the Site.

4.0 GEOLOGY AND HYDROGEOLOGY

4.1 Regional Geology

Regional Geology of the area is shown on the Newcastle 1:100 000 Geological Map Sheet 9232 (Geological Survey of NSW, 1976). The Site is underlain by Permian aged sediments described as shale, mudstone, sandstone, coal, tuff, and clay. These rocks typically weather to clays and sandy clays.

4.2 Acid Sulfate Soil (ASS) Risk Planning

The Acid Sulfate Soils (ASS) risk map within the Maitland Local Environmental Plan 2011 (LEP) shows the area as having Class 5 classification of ASS which indicates there is a low probability for ASS at the Site.

4.3 Hydrogeology

Groundwater beneath the Site is expected to occur within a semi confined aquifer at depths greater than 10m, within the weathered rock. Groundwater flow is likely to be towards the north and east discharging to the Hunter River located about 3.5km to the north east.

5.0 DATA QUALITY OBJECTIVES

The Data Quality Objective (DQO) process is a systematic, seven-step process that defines the criteria an investigation should satisfy including; the type, quantity and quality of data required to support decisions relating to the investigation. DQOs for this investigation have been developed based on the seven-step approach in accordance with the NSW DEC Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017. The DQOs incorporate field quality control and laboratory analysis, methods and information on laboratory quality control data and validate the field and analytical data for this investigation. The DQOs are presented in detail in the following sections.

Step 1 - State the Problem

The assessment for potential contamination should be undertaken in general accordance with the NSW EPA Guidelines for Consultants Reporting on Contaminated Sites 2020. This requires a review of historical Site usage to evaluate the potential for the former uses of the Site to result in contamination. Where there is the potential for contamination, an intrusive investigation should be undertaken, and appropriate management strategies implemented.

The Site was previously surrounded by poultry farms, though there is no evidence that poultry farming was carried out on site. There is a potential for contamination to exist from past practices that could preclude the use of the site for commercial and residential development

Step 2 - Identify the Decisions

The assessment for contamination is based on the known historic uses of the land. The decisions associated with this assessment include:

- Does past land use indicate the presence of potential contamination that may preclude commercial and residential land use of the Site?
- Is the Site suitable for proposed residential and commercial use?

Step 3 - Identify Inputs to the Decision

The inputs required to make the identified decisions include:

- Site walkover;
- Review of previous investigation results:
- Data regarding the regional and local conditions; and
- Historical records including aerial photographs, certificates of title and previous investigations.
- Laboratory results

Step 4 - Define the Study Boundary

The boundaries for this assessment have been identified as follows:

- Spatial boundaries – the Site area (Lot 11 and Lot 12).
- Surface conditions observed at the Site to about 0.5m depth.

Step 5 - Develop a Decision Rule

The decision rule for this investigation are:

- If the Site history indicate the potential for Site contamination, then further assessment or management must be implemented. Preliminary sampling undertaken was to allow for targeted consideration to supplement the history records only.

Step 6 - Specify Limits on Decision Errors

The acceptable limits on decision errors to be applied in this assessment and the manner of addressing possible decision errors are limited to the Site setting and sample analysis results.

The incorrect consideration of background information and analytical results has the potential to conclude that the Site is contaminated when it is not or alternatively, conclude the Site is not contaminated when it actually is. To provide more certainty to the conclusion regarding the contamination status of the Site, both the background information and the analytical results will be jointly evaluated.

The continuity and understanding of past Site activities provides the basis for the Site sampling plan. Where there is uncertainty or indications of the potential for contamination, sampling needs to be undertaken.

The sampling at the Site needs to address the findings of the background data review and needs to include sufficient sampling locations and depths, utilise appropriate field sampling methodologies, review suitable data quality indicators (DQIs) and quality assessment procedures and incorporate appropriate data evaluation procedures such as the use of 95 percent upper confidence limit (95% UCL) calculations.

Step 7 - Optimise the Design for Obtaining Data

The data sources for this assessment are historic records that have been maintained and that are readily available, soil samples that are from targeted sampling locations established as the preliminary sampling plan.

The sampling plan prepared for this investigation considered the Site history and the Site setting. A sampling plan was established to assess near surface soil conditions with locations targeting areas of environmental concern, including fill material, if present.

The density of sampling considered the Schedule B2 of the NEPM Guideline on Site Characterisation (2011) and the sampling depth intervals set to assess surface soil. The sampling density this is considered suitable for the Preliminary Site Investigation.

6.0 HISTORY REVIEW

Chisholm is a relatively new suburb located 7 km south-east of Maitland. Development of this suburb appears to have commenced at some time following the GHD PSI in 2003.

6.1 Aerial photographs

A summary of the aerial photographs reviewed during the PSI 2020 dating back to 1954 is presented in Table 6.1 – Aerial Photograph Summary. Copies of the aerial photographs are included in Appendix 2.

Table 6.1 – Aerial Photograph Summary

Year	Site Features	Surrounding Area
1954	The Site is undeveloped and has remnant bush vegetation	The surrounding areas are undeveloped and have remnant bush vegetation although the land to the south east has been cleared
1965	The Site has predominantly been cleared of vegetation although trees remain on the eastern side. There is an un-made vehicle track running north south through the Site	The land to the south and west has been cleared of vegetation and a dam constructed on the creek to the west. There is also a large dam to the south east
1977	The Site remains unchanged from the 1965 aerial photograph	The surrounding area remains unchanged from the 1965 aerial photograph
1984	The Site remains relatively unchanged from the 1965 aerial photograph although there is now a defined but unsurfaced road running close to north/south near the eastern boundary. There is also a small shed at the eastern corner of Lot 12 of the Site	There is a poultry farm consisting of two sheds directly to the south east of the Site with three dams for waste water to the east of these sheds. There is a poultry farm approximately 100m to the south west of the Site consisting of two sheds (Turkey Farm 2) and a house. There is also a poultry farm to the north east of the Site
1993	The Site remains unchanged from the 1984 aerial photograph	The surrounding area remains unchanged from the 1984 aerial photograph
2007	The Site remains relatively unchanged from the 1993 aerial photograph although the small shed at the eastern corner of Lot 12 of the Site has been demolished	The poultry farms on the surrounding land have been demolished and the dams to the south east backfilled
2010	The Site remains unchanged from the 2007 aerial photograph	Sealed roadways have been constructed at the southern tip of the Site and to the west of the Site
2015	The Site remains unchanged from the 2010 aerial photograph	Sealed roadways have been constructed along the western and northern boundaries of the Site and there are houses to the south and west of the house. There is a school to the north of the Site
2020	The Site remains unchanged from the 2010 aerial photograph however, the gravel road	Sealed roadway has been constructed along the eastern boundary of the Site.

Year	Site Features	Surrounding Area
	that former crossed the Site from north/south has been removed and the trees along the eastern boundary	There are additional houses to the north west of the Site

The aerial photographs show that the Site has not been significantly developed although there has been an unsealed road running north south across the land and there was a small shed located near the eastern corner of Lot 12. There was no apparent indication of filling or earthworks on the land.

The 2021 aerial photograph of the Site is presented in Figure 6.1 – 2021 Aerial Photograph (Near Maps). This photograph shows the Site conditions have not changed since the PSI in 2020.

Figure 6.1 – 2021 Aerial Photograph

6.2 Certificate of Title

The historical land title records indicating ownership of the land were reviewed during the previous PSI in 2020. The Site formerly comprised of two lots with the layout shown in Figure 6.2 – Former Lot Identification. The title records associated with the Site are presented in Table 6.2 – Title History. A copy of the title search for the Site is included in Appendix 3.

Figure 6.2 – Former Lot Identification (Cadastral Records)

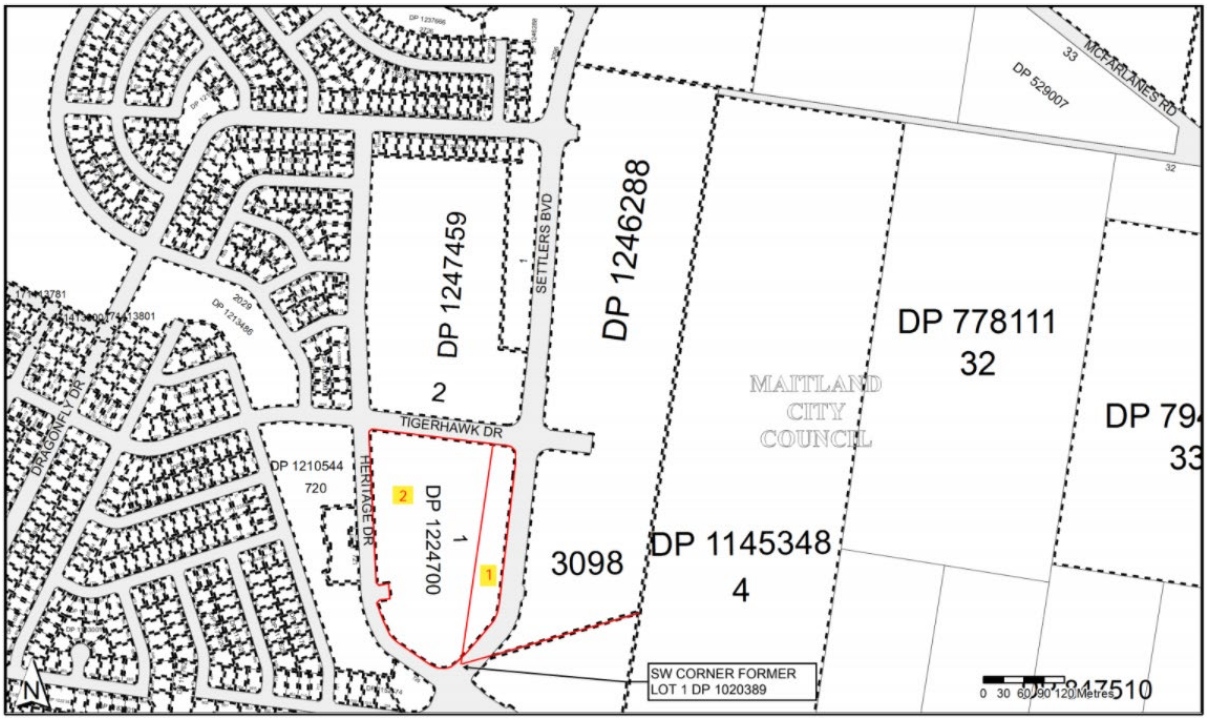


Table 6.2 – Title History

Section of Property	Years owned	Proprietor(s)
1	1938 – 1967	James Patrick O'Hearn (Farmer)
	1967 – 1973	John Anthony O'Hearn (Farmer)
	1973 – 2004	Steggles Poultry Pty Limited
	2004 – 2006	Blue Rock Developments Pty Limited Thornton Developments Pty Limited
2	1921 – 1944	William Edstein (Farmer)
	1944 – 1950	Herbert Edstein (Farmer) Cecil Edstein (Farmer) Arthur Edstein (Farmer)
	1950 – 1950	Herbert Edstein (Farmer) Cecil Edstein (Farmer)
	1950 – 1952	Cecil Edstein (Farmer)
	1952 – 1953	William Henry Campbell (Retired Police Officer)
	1953 – 1961	Francis Herbert Hill (Dealer)
	1961 – 1961	Roy Leslie Pegler (Accountant)
	1961 – 1970	Percy Clifford Bird (Skin and Hide Merchant)
	1970 – 2003	Steggles Poultry Pty Limited
	2003 – 2006	Blue Rock Developments Pty Limited Thornton Developments Pty Limited
1 & 2	2006 – 2007	TRD Thornton North Pty Limited
	2007 – 2017	Maitland Nominee Holdings Pty Limited

The certificates of title show that the Site prior to the 1970s was owned mainly by farmers and various individuals. The properties that form the Site were purchased by Steggles Poultry Pty Ltd in 1970 and 1973 and then sold to Blue Rock Developments Pty Limited and Thornton Developments Pty Limited in 2003.

Steggles Poultry Pty Ltd is a poultry farming company and this period of ownership coincides with the large factory style buildings observed on the 1984 and 1993 aerial photographs.

6.3 NSW EPA Records

A review of the NSW Environment Protection Authority (EPA) databases was conducted including the following:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified to the EPA in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015);
- Licensed activities under the Protection of the Environment Operations Act (1997).

This review did not indicate any properties in Chisholm that have been notified to the EPA.

6.4 Summary of Site History

The Site has been used for agricultural purposes from at least the 1940s. The type of agricultural use prior to the 1970s is unknown but based on experience with other similar sites in the Lower Hunter region, would likely have been used for stock grazing. Steggles purchased the land in the early 1970s and poultry farms and sheds existed within the surrounding land until sometime before 2007.

There is no evidence in the historic aerial photos suggesting that poultry sheds existed on the Site and it has remained vacant, apart from one shed in the eastern corner and an unpaved access track, since at least the mid 1960s. The location of former poultry sheds are considered to have been located at a sufficient distance from the Site boundaries and contamination, if it existed within the former building footprints would unlikely impact the Site soils.

6.5 Site History Gaps

The Site history review has used information from historical aerial photos, land titles published information and data from previous reports. The aerial photo gap is 14 years (1993 to 2007) and this is considered acceptable. Land use prior to 1960s is unknown but likely to be stock grazing.

The use of the Site from 1970s by Steggles is unknown but based on aerial photo evidence unlikely to have been used for poultry farming and this is not considered a significant data gap.

7.0 CONCEPTUAL SITE MODEL

The potential for Site contamination is reflective of past use of the land. The conceptual site model (CSM) is based on the findings of the desktop study including regional and local conditions and historical records. The history review indicated the Site has been open space around former poultry farms that is unlikely to result in significant contamination. It is noted

that the PSI 2003 inspected the poultry farms around the Site and did not identify any potential Areas of Environmental Concern (AEC) on the Site.

The CSM is the framework for identifying activities with the potential to contaminate the site and how potential receptors may be exposed to contamination (if present) either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Potential Sources

Based on the previous investigation results, no significant sources of contamination were identified on the Site. There was formerly a shed located near the eastern corner of Lot 12 that was demolished at some time. The Site walkover did not identify fill on the Site and there was no evidence of earthworks or filling within the aerial photo review since 1954.

The following potential AEC and associated CoPC that have been identified as including;

S1 – Demolition of the former shed may have resulted in surface impacts from hazardous building materials including asbestos and lead.

Potential Receptors

Human health receptors
R1 – Construction and maintenance workers;
R2 – End users (commercial, residential and a child care facility); and
R3 – Adjacent users (residential).

Environmental receptors
R4 – Surface Water bodies (creek to the west of the Site);
R5 – Ecology (vegetation, soil biota and transitory wildlife); and
R6 – Groundwater and Groundwater Dependent Ecosystems.

Potential Pathways
P1 – Ingestion and dermal contact;
P2 – Inhalation of dust;
P3 – Surface water run-off;
P4 – Leaching of contaminants and vertical migration into groundwater;
P5 – Lateral migration of groundwater providing base flow to water bodies and GDEs; and
P6 – Direct contact and ingestion by ecological receptors (including accidental and/or via irrigation).

A ‘source–pathway–receptor’ approach has been used to assess the potential risks of harm being caused to human, water or environmental receptors from potential contamination sources on or in the vicinity of the Site, via exposure pathways (complete pathways). The possible pathways between the above potential sources (S1) and receptors (R1 to R6) are provided in Table 7.1 – Source Pathway Analysis.

Table 7.1 – Source Pathway Analysis

Source	Pathway	Receptor	Risk Evaluation
S1	P1 – Ingestion and dermal contact	R1 – Workers	Possible during development works
		R2 – Occupants	Unlikely following development works
		R3 – Neighbours	Possible during earthworks (dusts). Unlikely following development works
	P2 – Inhalation of dust and/or vapours	R1 – Workers	Possible during development works
		R2 – Occupants	Unlikely following development works
		R3 – Neighbours	Unlikely the potential source is limited
	P3 – Surface water run-off	R4 – Water bodies	Unlikely potential source is limited
		R6 – Groundwater	Unlikely potential source is limited
	P4 – Leaching of contaminants	R4 – Water bodies	Unlikely potential source is limited and distance to water bodies is 50m or greater
		R6 – Groundwater	Unlikely potential source is limited and likely depth to groundwater is >10m
	P5 – Migration of groundwater	R4 – Water bodies	Unlikely the Site is relatively isolated
		R6 – Groundwater	Unlikely as potential source is limited and depth to groundwater would preclude impact and migration
	P6 – Contact with ecological receptors	R5 – Ecology	Unlikely, potential source is limited

Notes: Risk ranking assessed as low and acceptable are shaded in green
Risk ranking assessed to be more than low shaded in yellow
Risk ranking assessed to be high and unacceptable would be shaded in red.

One AEC has been identified at the Site associated with the former shed. This AEC is considered minor and unlikely to result in significant human health risk for current of future occupants/residents.

The Site surface generally follows the topography of the surrounding area with no undulations indicative of potential disturbance and/or uncontrolled filling.

8.0 SITE ASSESSMENT

One potential area of environmental concern was identified associated with historical Site usage. To assess for contamination and for the presence and quality of fill, the following scope of work was undertaken:

- A walkover Site inspection;
- The excavation of three test pits in targeted locations across the Site with consideration of the proposed development;
- The collection of selected surface soil samples from the test pits; and
- The analysis of the soil samples considering the contaminants of potential concern (CoPC).

The rationale for environmental sampling locations was based on the probability that surface soils (to about 0.5m depth) are most likely impacted from the demolition of a former shed near the eastern corner of Lot 12. It is also noted that this is the location of the proposed childcare facility.

The sampling density was established considering Schedule B2 of the ASC NEPM Guideline on Site Characterisation (2013). The sampling density is below the recommended sampling density defined by the Schedule B2 of the NEPM Guideline on Site Characterisation (2011) however, this density is considered suitable for the preliminary Site investigation.

8.1 Site Walkover

The Site is undeveloped vacant land with several trees and thick grass cover. There is no indication of significant filling across the Site with no questionable stockpile, mounds or undulations.

There was no indication of the location of the former shed near the eastern corner of Lot 12 and no residual demolition waste was observed.

8.2 Assessment Method

The sampling plan prepared for this investigation considered the Site history and the Site setting. Locations were established targeting the AEC and the proposed location of the childcare facility.

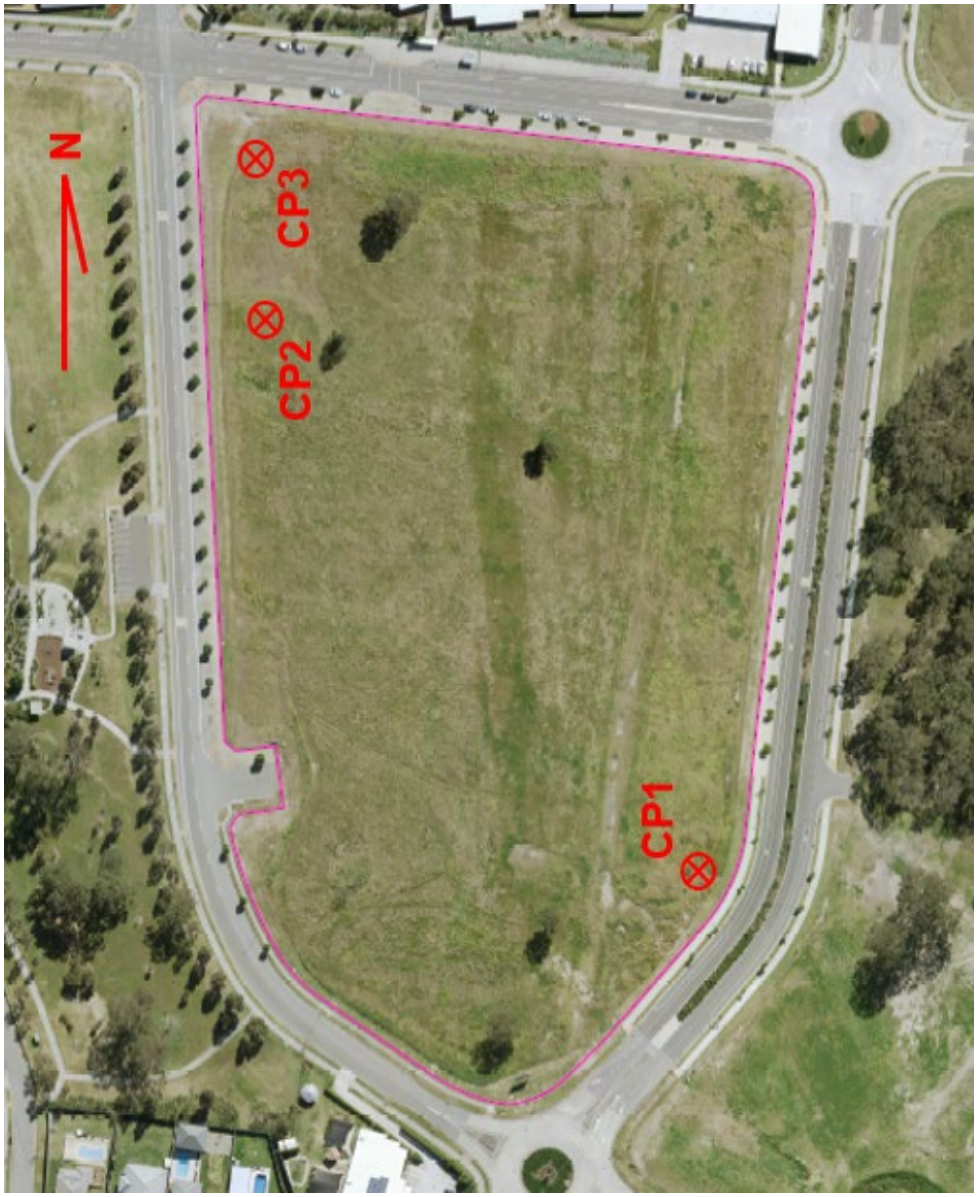
To provide a preliminary indication of the soil contamination status of the surface material, three test pits were excavated. Soil samples were collected from each test pit targeting the surface material. All sample locations were recorded in the field.

Test pits were numbered sequentially CP1 to CP3 with samples labelled with the test pit number. The locations of the test pits are presented on Figure 8.1 – Sample Location Plan.

Test pit CP1 was at the former shed location and test pits CP2 and CP3 are at the proposed childcare facility location.

The subsurface conditions encountered at each location are summarised in Table 8.1 – Sample Schedule.

Figure 8.1 – Sample Location Plan



The surface soil conditions encountered generally consisted of shallow organic topsoil material over natural clays.

Table 8.1 – Sample Schedule

Location Number	Sample Depth (m)	Description
CP1	0 - 0.2	Dark brown topsoil with roots over brown clay
CP2	0 - 0.2	Dark brown topsoil with roots over brown clay
CP3	0 - 0.2	Dark brown topsoil with roots over brown clay

Soil samples were collected directly from test pits at the nominated sample depths interval of 0 – 0.2m. Care was taken whilst sampling to avoid cross contamination. Samples were collected by hand directly into laboratory prepared sample jars wearing a new pair of disposable gloves to collect each sample.

8.3 Quality Plan

The field quality assurance / quality control (QA/QC) procedures adopted during this assessment included: field decontamination protocols, sample labelling storage and handling methodologies.

Field decontamination involved rinsing of sampling equipment with potable water. All samples were labelled in the field with the sample location recorded. A duplicate sample was not considered necessary for the preliminary sampling investigation.

The analytical laboratory also conducted a QA/QC program. This program included; the analysis of one blank sample and one spiked sample with every batch of samples tested; the repeat analysis of approximately 10% of the samples. The results of this laboratory QA/QC program are included within the laboratory reports.

9.0 ASSESSMENT GUIDELINES

The NSW Environment Protection Authority (EPA) has issued a number of guidelines relevant to the concentration of contaminants in soil. These are used in conjunction with the National Environment Protection Council (NEPC) – National Environment Protection (Assessment of Site Contamination) Measure 2013.

The Site Assessment Criteria (SAC) that have been used to evaluate surface soils are based on the National Environment Protection Measure (NEPM) for the Assessment of Site Contamination (ASC NEPM 2013). These criteria are not derived as acceptance criteria for contamination at a site, but as levels above which specific consideration of risk, based on the site use and potential exposure, is required. If a risk is determined present, then remediation and/or management must be undertaken.

The ASCNEPM 2013 provides Health Investigation Levels (HILs) that are concentration levels, which have been tiered (provided in sets based on risk) for various exposure settings pertaining to land uses. The site criteria within the ASC NEPM are based on potential impact to human health and are intentionally conservative.

The HILs have been derived for four (4) generic land use settings. The HILs for the land use type considered in ASC NEPM include:

- HIL A – residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools
- HIL B – residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats
- HIL C – public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate.
- HIL D – commercial/industrial such as shops, offices, factories and industrial sites.

Health Screening Levels (HSLs) for various petroleum hydrocarbon compounds have also been developed. The HSLs also relate to the land use (consistent with the HILs) and are dependent on soil type and depth.

The land use at this Site will predominantly be for commercial use however it is proposed to use the southern part of the Site for residential use and the north west corner for a childcare

facility. The guidelines used for the proposed more sensitive land use are the residential (HIL A levels). Consistent with the HILs, HSLs for residential land use (HSL A) with clayey soils have been adopted for the relevant SAC. These criteria are summarised on Table 9.1 – Soil Assessment Criteria.

Table 9.1 – Soil Assessment Criteria

Contaminant	Site Assessment Criteria (mg/kg)
Heavy Metals	
Arsenic	100[1]
Cadmium	20[1]
Chromium (VI)	100[1]
Copper	6000[1]
Lead	300[1]
Mercury	40[1]
Nickel	400[1]
Zinc	7400[1]
Total Recoverable Hydrocarbons (TRH)	
Naphthalene	5[2]
TRH C6-C10 (F1)	50[2]
TRH C10-C16 (F2)	280[2]
Monocyclic Aromatic Hydrocarbons (BTEX)	
Benzene	0.7[2]
Toluene	480[2]
Ethylbenzene	NL[2]
Xylene (Total)	110[2]
Polycyclic Aromatic Hydrocarbons (PAH)	
Benzo(a)pyrene	3[3]
Total PAH	300[3]
Asbestos	
Bonded ACM	0.01%
Friable Asbestos	0.001%
All forms of asbestos	No visible asbestos for surface soil

Notes: NL – Not Limiting
1. HIL D levels of commercial/industrial land use.
2. Health screening levels for clayey soils over the depth interval 0-1m.
3. Carcinogenic PAHs based on the 8 carcinogenic PAHs.

10.0 DISCUSSION

10.1 Site Conditions

The surface soil conditions encountered consisted of shallow residual topsoil over natural clays. Significant anthropogenic material or potential Asbestos Containing Material (ACM) was not observed during fieldwork.

10.2 Analytical Results

The soil samples collected were tested for the following contaminants:

- Heavy metals including lead from paint potentially associated with the former shed structure;
- TRH, BTEX and PAH potentially associated with oil/diesel potentially from fuels stored the shed; and
- Asbestos potentially associated with the former shed structure.

The results of analysis soil samples are summarised in Table 10.1 and the laboratory reports are included in Appendix 4.

The results of the soil analysis indicate concentrations of Contaminants of Potential Concern (CoPC) below the SAC for residential land use and generally below the laboratory level of reporting. Concentrations of heavy metals detected in soil samples are considered to represent natural background levels at the Site. Asbestos was not detected in any of the soil samples.

Table 10.1 – Summary of Results

Sample Number	CP1	CP2	CP3	SAC
Heavy Metals				
Arsenic	5.7	5.1	6	100
Cadmium	< 0.4	< 0.4	< 0.4	20
Chromium	15	13	14	100
Copper	37	23	19	6000
Lead	14	13	14	300
Mercury	< 0.1	< 0.1	< 0.1	40
Nickel	12	17	10	400
Zinc	55	85	52	7400
Total Recoverable Hydrocarbons (TRH)				
Naphthalene	< 0.5	< 0.5	< 0.5	5
TRH F1	< 20	< 20	< 20	50
TRH F2	< 50	< 50	< 50	280
Monocyclic Aromatic Hydrocarbons				
Benzene	< 0.1	< 0.1	< 0.1	0.7
Toluene	< 0.1	< 0.1	< 0.1	480
Ethylbenzene	< 0.1	< 0.1	< 0.1	NL
Xylene (Total)	< 0.3	< 0.3	< 0.3	110
Polycyclic Aromatic Hydrocarbons (PAH)				
Benzo(a)pyrene	< 0.5	< 0.5	< 0.5	3
Total PAH	< 0.5	< 0.5	< 0.5	300
Asbestos				
Asbestos %	ND	ND	ND	0.01

Notes: All measurements in mg/kg except for asbestos
ND: No asbestos detected at the reporting limit of 0.01% w/w

Comprehensive consideration of Environmental Investigation Levels (EIL) has not been incorporated into this PSI. However, reference to the ASCNEPM indicates that the levels of heavy metals detected at this Site are below generic guideline values.

11.0 CONCLUSIONS

The Site is currently vacant and aerial photographs show the land has been predominantly undeveloped since 1954 although a small shed was located near the south east corner from sometime after 1977 until around 2007.

The certificates of title indicate some site owners were poultry farmers. However, the associated buildings and storage facilities were located on the land surrounding the Site, other than the small shed near the south east corner.

The GHD PSI 2003 encompassed the Site and surrounding land. At the time of this investigation there was a turkey farm located adjacent to the Site to the west and three other turkey farms located more remotely to the north and west. The GHD PSI (2003) did not identify any potential sources of contamination on the Site or in close proximity to the Site.

The ECS PSI (2020) considered the development on the Site through a review of the historical aerial photographs. This showed that the Site had not been significantly developed although there was a small shed (for a period of between 20-30 years) near the south east corner and an unpaved road running north south across the Site. This investigation did not identify a potential for significant contamination including the presence of fill material.

This current investigation has considered the previous two Preliminary Site Investigations and the proposed development. Based on the past use of the Site there is no indication of the potential for significant Site contamination to exist. In order to further consider the past use of the land and the proposed development, targeted soil sampling was undertaken at the former location of the small shed on the Site and at the proposed location of the childcare facility.

During the Site walkover no potential ACM was observed on the Site including at the former shed location. The targeted soil sampling did not identify levels of potential contaminants above Site Assessment Criteria.

The Site is considered suitable for the proposed development (DA/2021/1702) for a mixed use on the area known as 4 Heritage Drive (Lot 11) and the proposed residential subdivision on the area known as 2 Heritage Drive (Lot 12) provided the following recommendations are implemented:

- Preparation of a Construction Environmental Management Plan (CEMP) including an Unexpected Finds Procedure (UFP) prior to earthworks commencing;
- Excavated and surplus material should be waste classified in accordance with the NSW EPA Waste Classification Guidelines. Based on the preliminary results the site soils below the topsoil would likely classify as either Virgin Excavated Natural Material (VENM) or Excavated Natural material (ENM). Further assessment will be required to confirm this preliminary classification

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APPENDIX 1

DEVELOPMENT APPLICATION

All dimensions to be checked on site, written dimensions only to be used. Do not scale from drawings. Copyright of the design shown herein is retained by the Architect. Written authority is required for any reproduction.

HERITAGE DRIVE

SETTLERS BLVD.

TIGERHAWK DRIVE

SCHOOL

PEDESTRIAN ENTRY

PEDESTRIAN WALKWAY

LOT 1

PARKING SPACES

OUTLINE OF DROPDOWN CURTAINS AND FIRE COMPARTMENTS SHOWN RED TYP

OUTLINE OF THE AWNING ABOVE LOADING DOCK AND WASTE AREA

TILT UP CONCRETE WALL WITH ALUMINIUM BATTENS ON TOP

OUTLINE OF DROPDOWN CURTAINS AND FIRE COMPARTMENTS SHOWN RED TYP

TILT UP CONCRETE WALL WITH ALUMINIUM BATTENS ON TOP

PARKING SPACES

6M AWNING ABOVE

BICYCLE RACK TO THE MEDICAL CENTRE ENTRY

OUTLINE OF THE EASTERN OSD TANK BELOW

OUTLINE OF THE EASTERN OSD TANK BELOW

TERRACE

TAVERN 890 m²

MINI MAJOR 1500 m²

LINE OF BASEMENT PARKING UNDER

PROPOSED ROLLER DOOR TO PROVIDE ACCESS TO LOADING DOCK

WASTE AREA 95 m²

T1 125 m²
T2 120 m²
T3 160 m²
T4 75 m²
T5 75 m²
T6 95 m²
T7 170 m²
T8 65 m²
T9 95 m²
T10 75 m²
T11 260 m²
T13 220 m²
T14 415 m²
T15 215 m²
T16 215 m²
T17 190 m²
T18 330 m²
T19 430 m²
T20 200 m²
T21 60 m²
DTB 130 m²
LIQUOR 180 m²
K1 35 m²
K2 35 m²
K3 35 m²

KIDS WATER SPLASH / FOUNTAIN PLAYGROUND

CMO
PARENTS ROOM
FAMILY
DDA WC
WC

SUPERMARKET
TRADING AREA = 2470 SQM
NON-TRADE AREA (INCL. LOADING DOCK) = 1050 SQM
PLANT/AC AT MEZZANINE = 180 SQM
DTB STAGING AREA = 130 SQM
BWS TRADING = 180 SQM
HOME DELIVERY = 200 SQM
TOTAL BUILDING AREA (EXCL. PLANT) = 4030 SQM

HOME DELIVERY
SEAFOOD PREP, COOLROOM AND FRZ
LOADING DOCK
TEAM DINING AMENITIES
DELI PREP AND COOLROOM
CHILLED COOLROOM
MEAT COOLROOM
FULL PRODUCTION BAKERY
FROZEN FOOD FRZ
PRODUCE PREP AND COOLROOM
OFFICE

MEDICAL CENTRE 425 m²
ENTRY 95 m²
MEDICAL CENTRE 320 m²

CANOPY ABOVE

PLAY ROOM 1
PLAY ROOM 2
OUTDOOR PLAY
PLAYROOM 3
PLAY ROOM 4
PLAY ROOM 5
PLAYROOM 6
OUTLINE OF THE AWNING ABOVE

DOUBLE BAY TROLLEY COLLECTION
SINGLE TROLLEY BAY
DOUBLE TROLLEY BAY COLLECTION
SHADE SAIL ABOVE

PARKING SPACES 535

PICK UP AREA

FUTURE PAD SITES

RL 20.420 m
RL 22.510 m
RL 21.50

A100.71 2
A10.04 1
D A11.03
1 A06.04
B A11.02
1 A10.05
2 A06.01
A A11.01
C A11.02
1 A100.71
3 A100.71

REVELOP	CHISHOLM SHOPPING CENTRE HERITAGE DRIVE CHISHOLM, NSW 2322 , AUSTRALIA	PROPOSED GROUND FLOOR PLAN

ISSUE	DATE	DESCRIPTION
A	03-11-21	FOR REVIEW
B	13.12.21	DA ISSUE

A06.02 DA - B

1:500 @ A1
1:1000 @ A3

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APPENDIX 2

LOTSEARCH

LOTSEARCH AERIALS

Date: 11 Dec 2020

Reference: LS016735 EA

Address: 20 Heritage Drive, Chisholm, NSW 2322

Aerial Imagery 2020

20 Heritage Drive, Chisholm, NSW 2322

Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 11 December 2020

Aerial Imagery 2015

20 Heritage Drive, Chisholm, NSW 2322

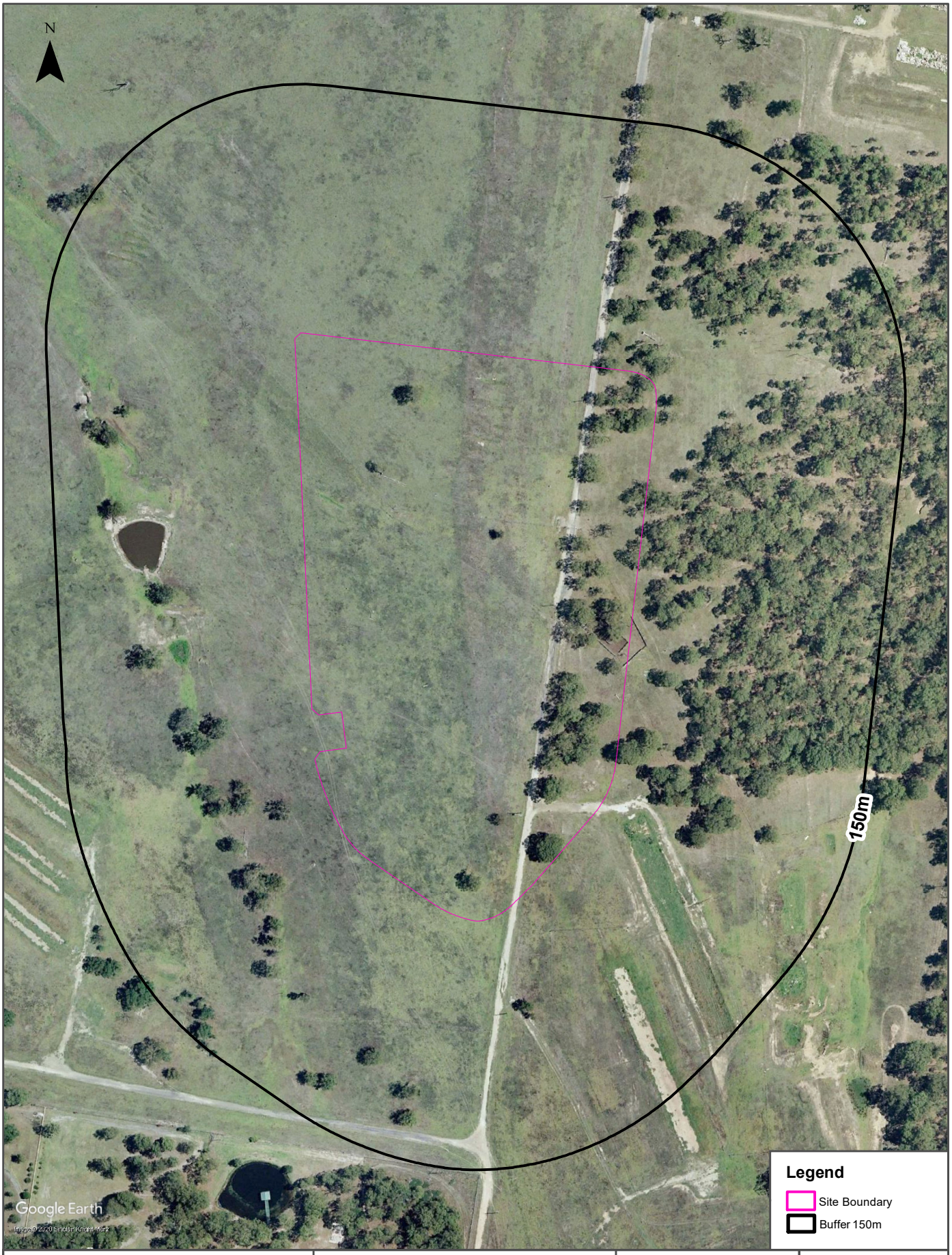
Scale: 0 30 60 90 120 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 11 December 2020

Aerial Imagery 2010

20 Heritage Drive, Chisholm, NSW 2322

Aerial Imagery 2007

20 Heritage Drive, Chisholm, NSW 2322



Scale: 0 30 60 90 120 Meters	Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 10 December 2020

Aerial Imagery 1993

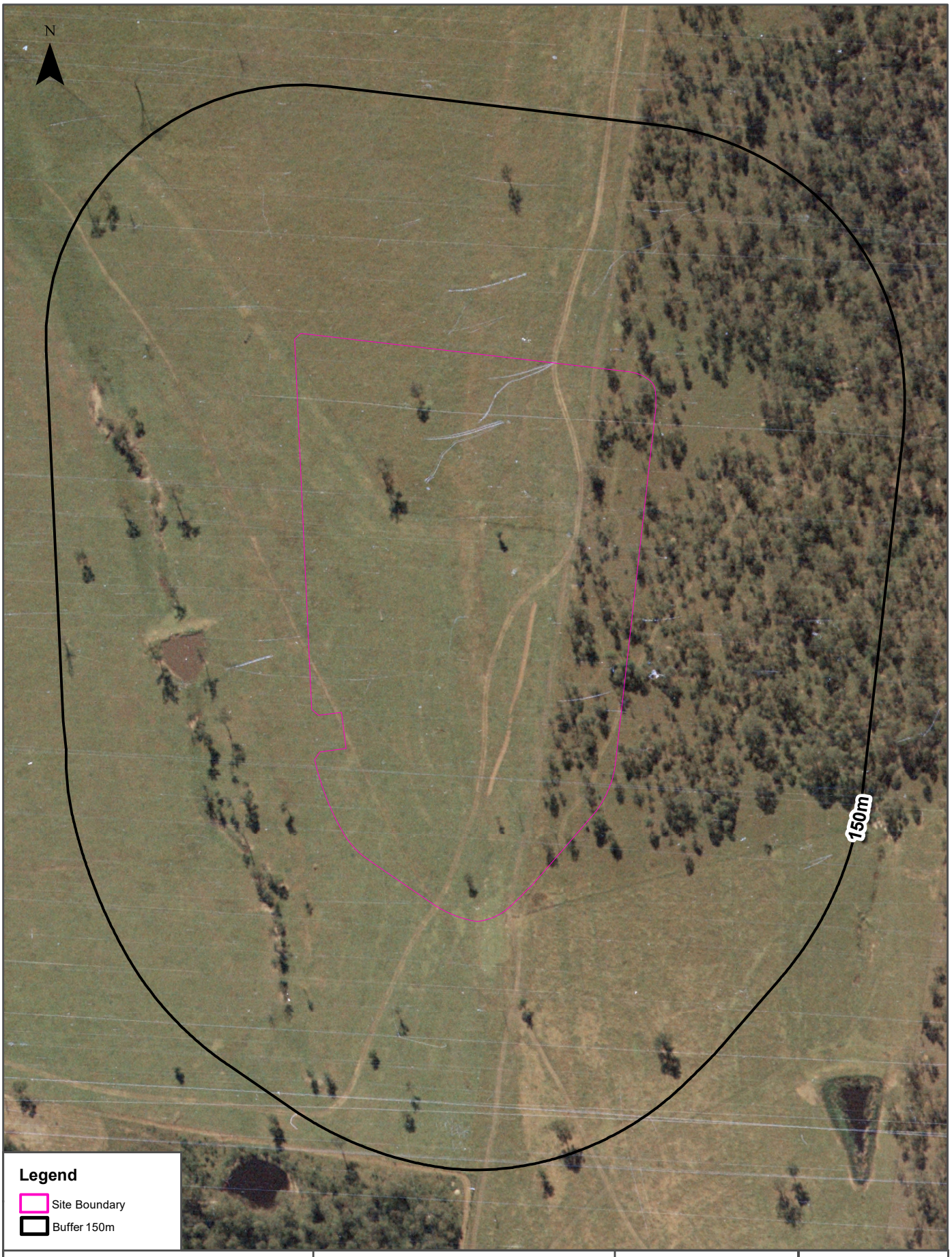
20 Heritage Drive, Chisholm, NSW 2322

Aerial Imagery 1984

20 Heritage Drive, Chisholm, NSW 2322

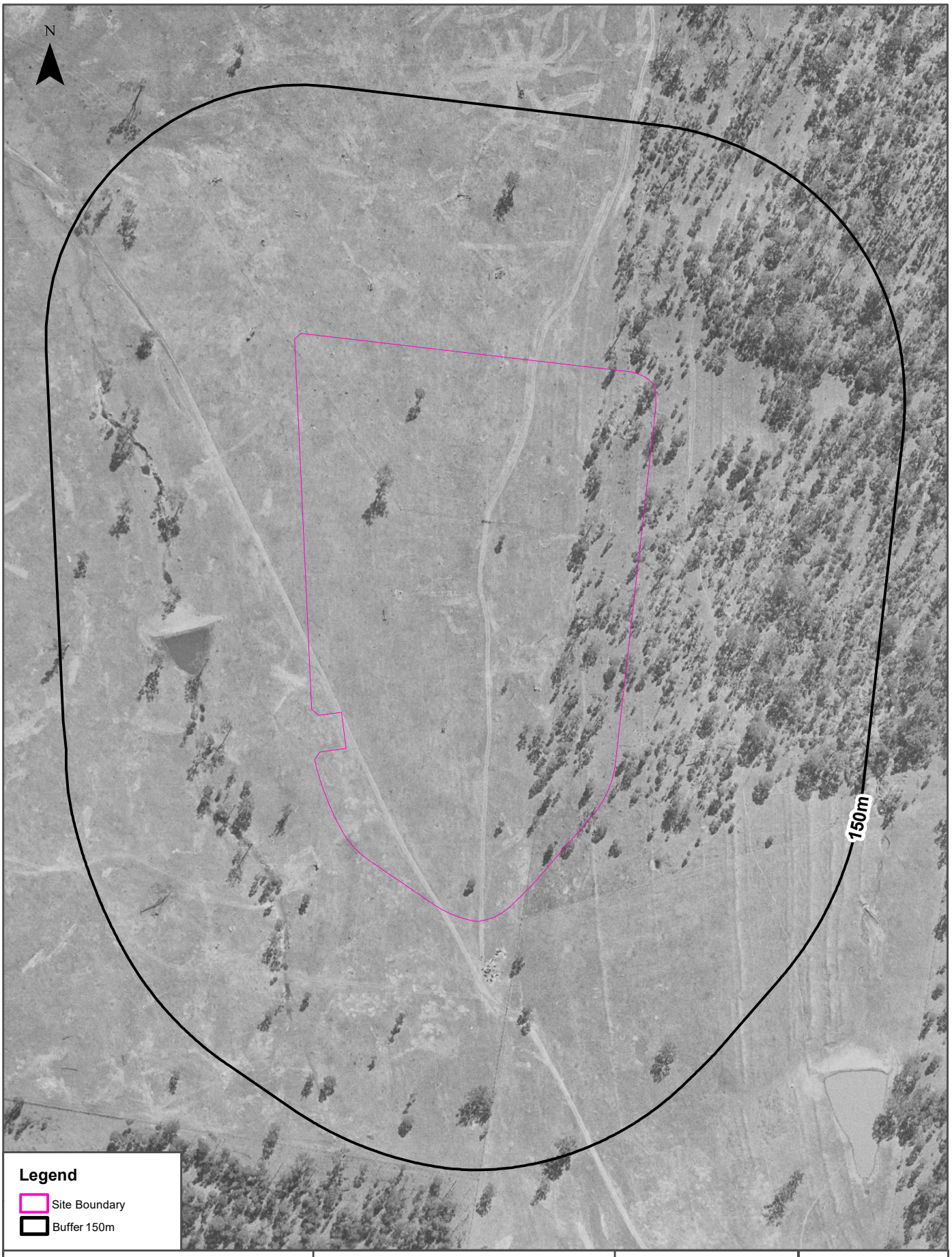
Aerial Imagery 1977

20 Heritage Drive, Chisholm, NSW 2322



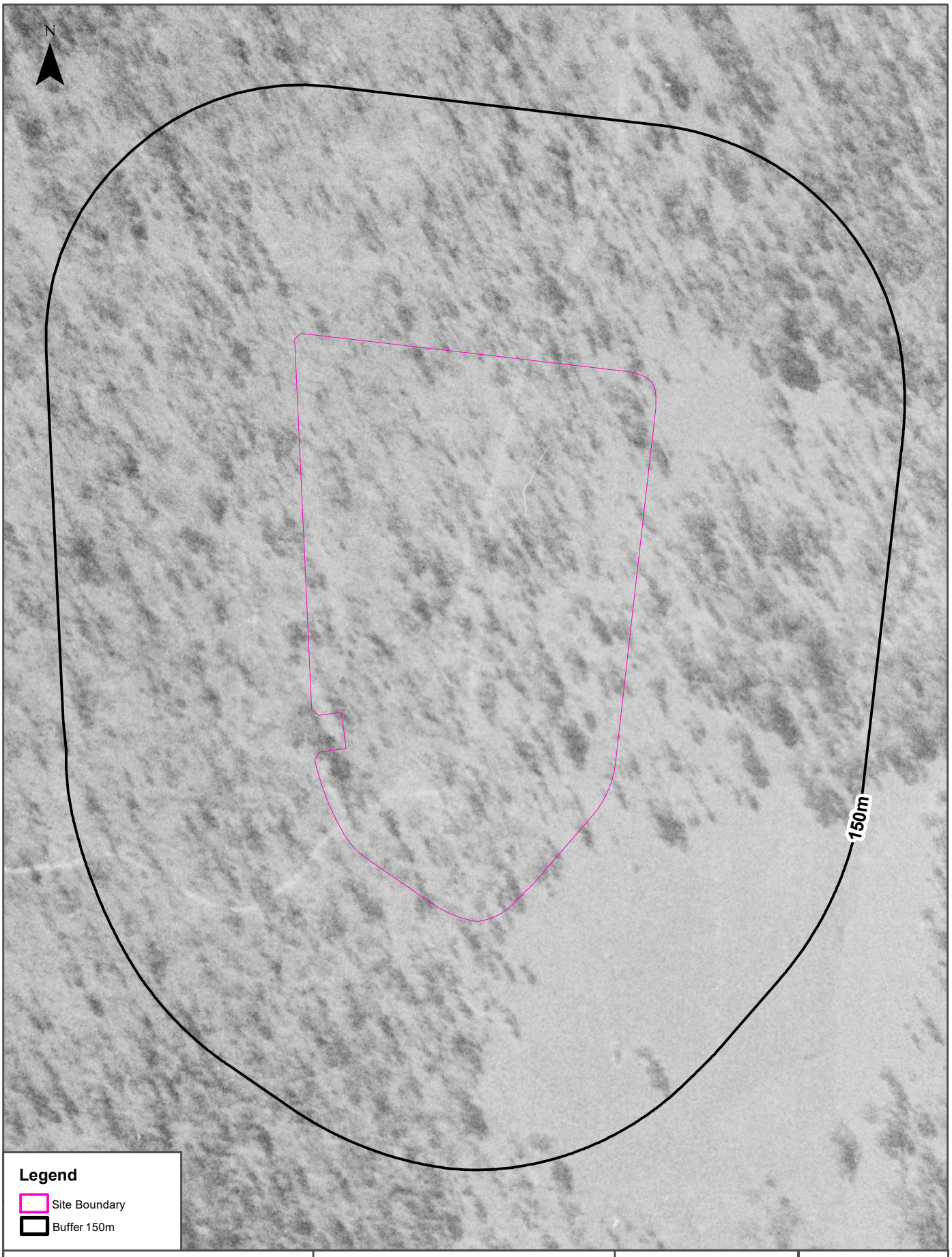
Aerial Imagery 1965

20 Heritage Drive, Chisholm, NSW 2322



Aerial Imagery 1954

20 Heritage Drive, Chisholm, NSW 2322



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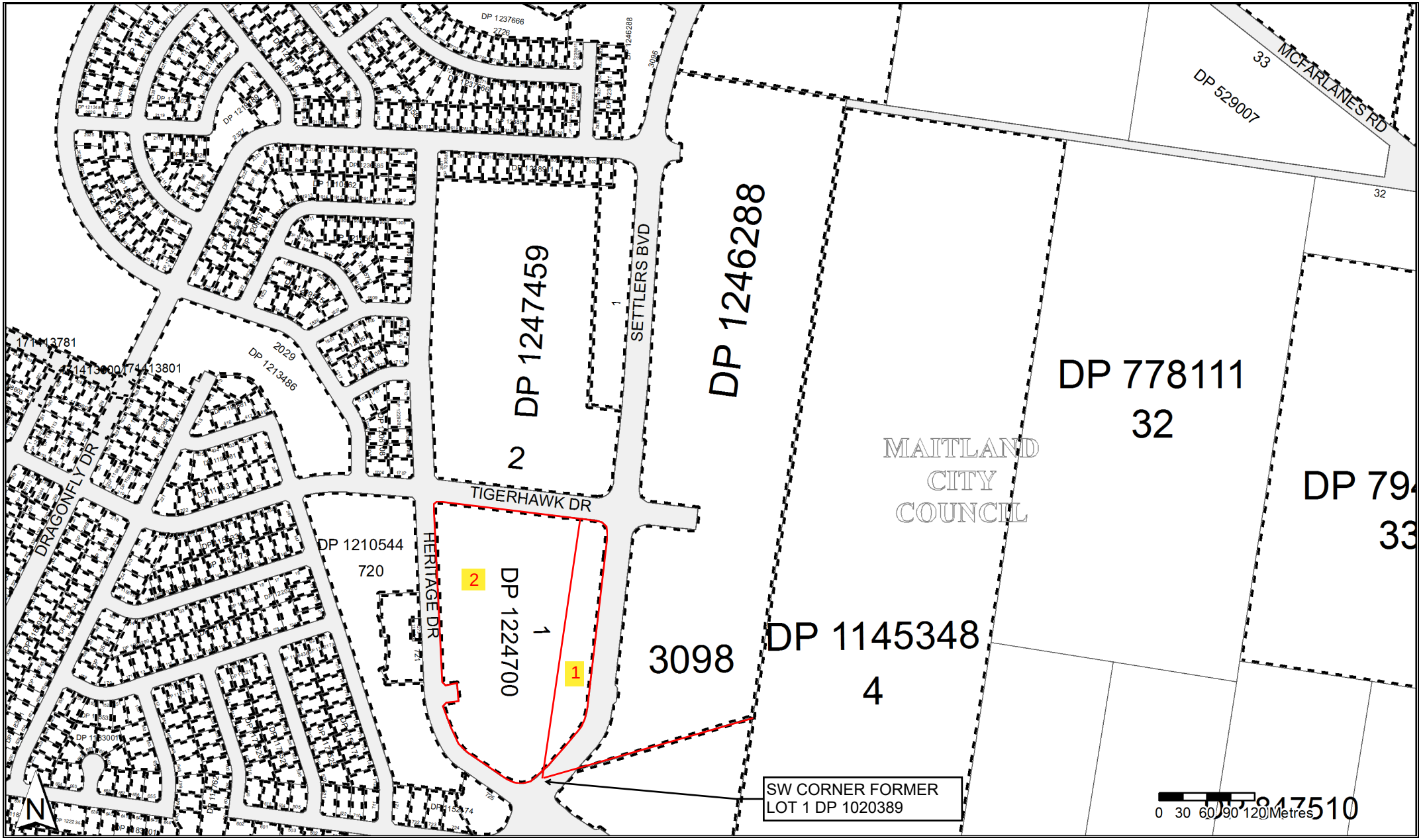
APPENDIX 3

Cadastral Records Enquiry Report : Lot 3098 DP 1246288

Locality : CHISHOLM
Parish : ALNWICK
LGA : MAITLAND
County : NORTHUMBERLAND



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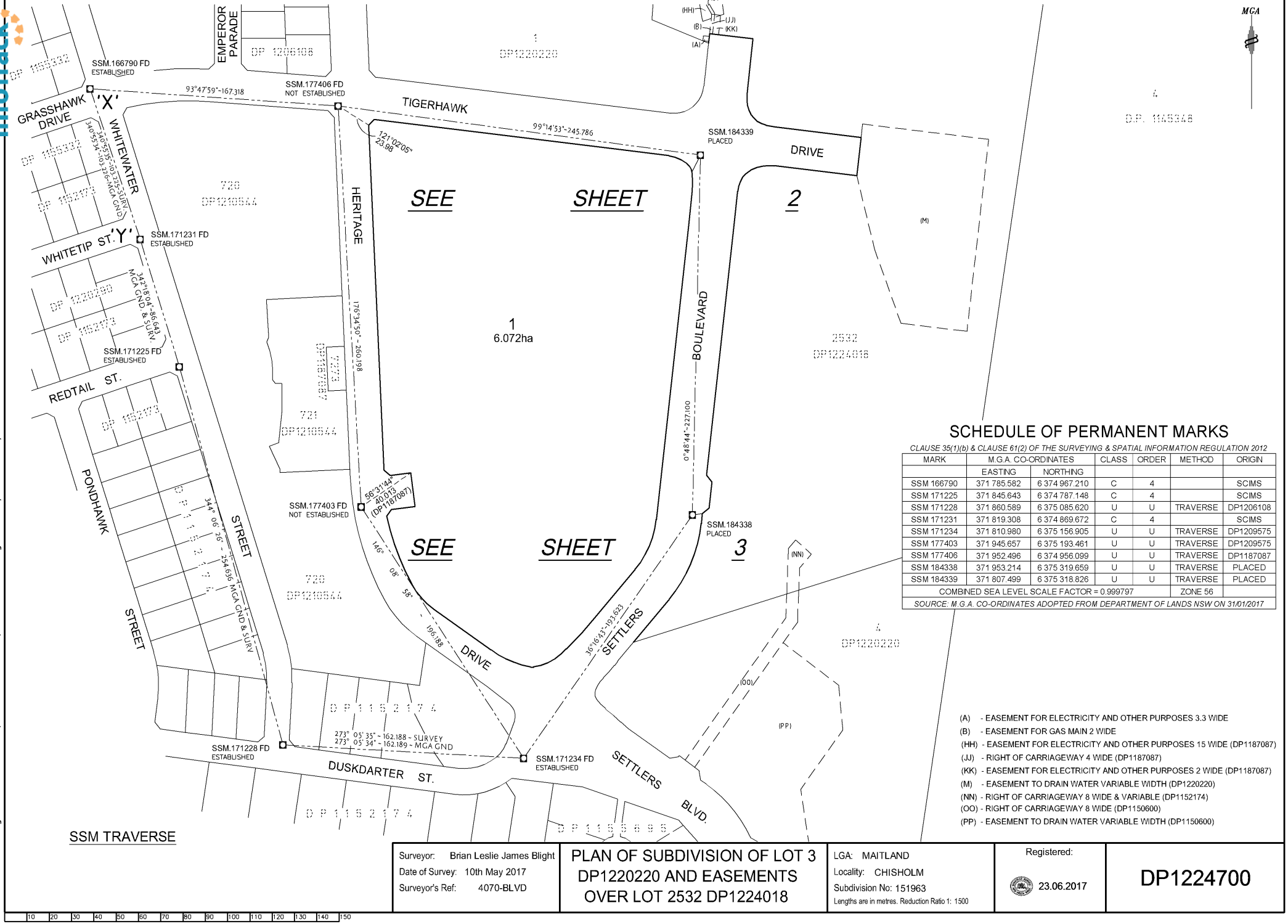
This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

InfoTrack
Req:R126509 /Doc:DP 1224700 P /Rev:23-Jun-2017 /NSW LRS /Pgs:ALL /Prt:17-Dec-2020 17:41 /Seq:1 of 6
Office of the Registrar-General /Src:INFOTRACK /Ref:20 Heritage Drive, Chisholm, NSW 2322



Surveyor: Brian Leslie James Blight
Date of Survey: 10th May 2017
Surveyor's Ref: 4070-BLVD

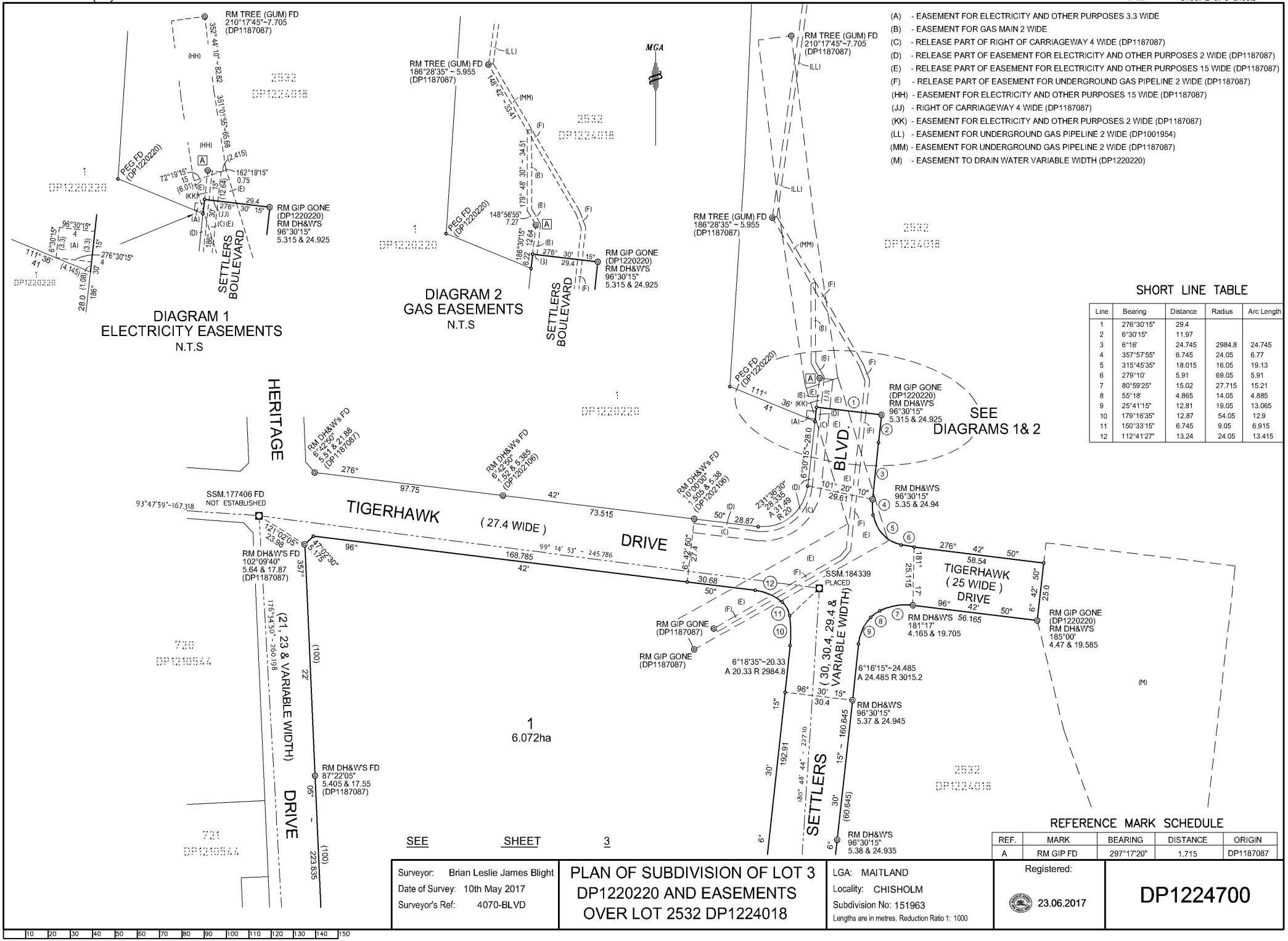
PLAN OF SUBDIVISION OF LOT 3 DP1220220 AND EASEMENTS OVER LOT 2532 DP1224018

LGA: MAITLAND
Locality: CHISHOLM
Subdivision No: 151963
Lengths are in metres. Reduction Ratio 1: 1500

Registered: 23.06.2017

DP1224700

PLAN FORM 2 (A2) WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION ePlan Sheet 2 of 3 sheets



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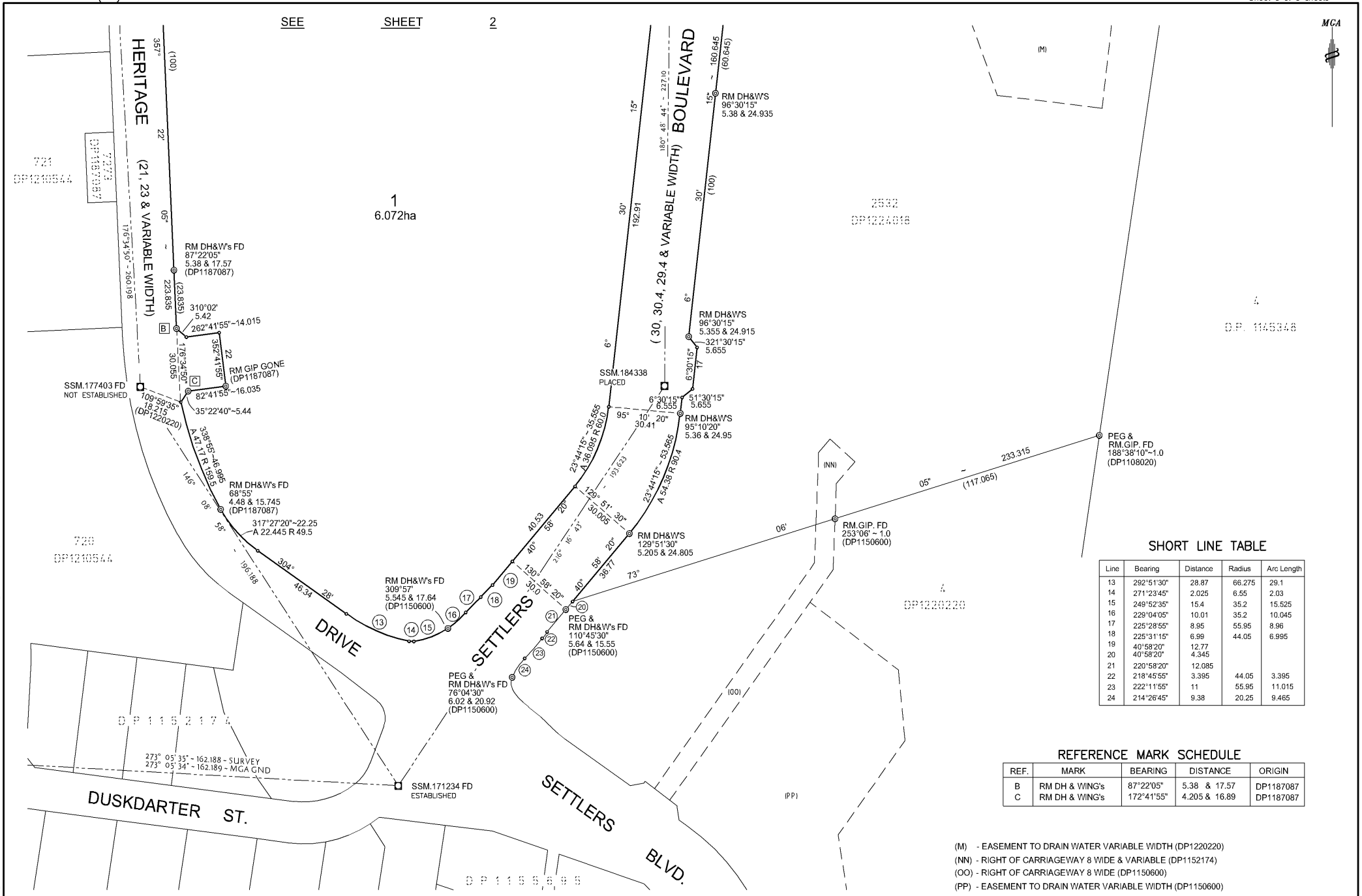
© Office of the Registrar-General /Src:INFOTRACK /Ref:20 Heritage Drive, Chisholm, NSW 2322



SHORT LINE TABLE

Line	Bearing	Distance	Radius	Arc Length
13	292°51'30"	28.87	66.275	29.1
14	271°23'45"	2.025	6.55	2.03
15	249°52'35"	15.4	35.2	15.525
16	229°04'05"	10.01	35.2	10.045
17	225°28'55"	8.95	55.95	8.96
18	225°31'15"	6.99	44.05	6.995
19	40°58'20"	12.77		
20	40°58'20"	4.345		
21	220°58'20"	12.085		
22	218°45'55"	3.395	44.05	3.395
23	222°11'55"	11	55.95	11.015
24	214°26'45"	9.38	20.25	9.465

REFERENCE MARK SCHEDULE

REF.	MARK	BEARING	DISTANCE	ORIGIN
B	RM DH & WING's	87°22'05"	5.38 & 17.57	DP1187087
C	RM DH & WING's	172°41'55"	4.205 & 16.89	DP1187087

(M) - EASEMENT TO DRAIN WATER VARIABLE WIDTH (DP1220220)
(NN) - RIGHT OF CARRIAGEWAY 8 WIDE & VARIABLE (DP1152174)
(OO) - RIGHT OF CARRIAGEWAY 8 WIDE (DP1150600)
(PP) - EASEMENT TO DRAIN WATER VARIABLE WIDTH (DP1150600)

Surveyor: Brian Leslie James Blight
Date of Survey: 10th May 2017
Surveyor's Ref: 4070-BLVD

PLAN OF SUBDIVISION OF LOT 3 DP1220220 AND EASEMENTS OVER LOT 2532 DP1224018

LGA: MAITLAND
Locality: CHISHOLM
Subdivision No: 151963
Lengths are in metres. Reduction Ratio 1: 1000

Registered: 23.06.2017

DP1224700

Req:R126509 /Doc:DP 1224700 P /Rev:23-Jun-2017 /NSW LRS /Pgs:ALL /Prt:17-Dec-2020 17:41 /Seq:3 of 6
© Office of the Registrar-General /Src:INFOTRACK /Ref:20 Heritage Drive, Chisholm, NSW 2322

Req:R126509 /Doc:DP 1224700 P /Rev:23-Jun-2017 /NSW LRS /Pgs:ALL /Prt:17-Dec-2020 17:41 /Seq:4 of 6
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PLAN FORM 6 (2012) **WARNING: Creasing or folding will lead to rejection** ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Office Use Only

Registered: 23.06.2017

Title System: TORRENS

Purpose: SUBDIVISION

Office Use Only

DP1224700

PLAN OF SUBDIVISION OF LOT 3 DP1220220 AND EASEMENTS OVER LOT 2532 DP1224018

LGA: MAITLAND

Locality: CHISHOLM

Parish: ALNWICK

County: NORTHUMBERLAND

Crown Lands NSW/Western Lands Office Approval

I ..... (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given.

Signature: .....

Date: .....

File Number: .....

Office: .....

Subdivision Certificate

I, David Simm

*Authorised Person/~~*General Manager/*Accredited Certifier~~, certify that the provisions of s.109J of the *Environmental Planning and Assessment Act 1979* have been satisfied in relation to the proposed subdivision, new road or reserve set out herein.

Signature: .....

~~Accreditation number:~~ .....

Consent Authority: *MAITLAND CITY COUNCIL*

Date of endorsement: 7.6.17

Subdivision Certificate number: 151963

File number: DA15 1963

*Strike through if inapplicable.

Survey Certificate

I, BRIAN LESLIE JAMES BLIGHT

of, LAND DEVELOPMENT SOLUTIONS PTY LTD P.O. BOX 853 THE JUNCTION, NSW 2291

a surveyor registered under the *Surveying and Spatial Information Act 2002*, certify that:

*(a) The land shown in the plan was surveyed in accordance with the *Surveying and Spatial Information Regulation 2012*, is accurate and the survey was completed on 10th May 2017

~~*(b) The part of the land shown in the plan (*being/*excluding ^ .....) was surveyed in accordance with the *Surveying and Spatial Information Regulation 2012*, is accurate and the survey was completed on, ... the part not surveyed was compiled in accordance with that Regulation.~~

~~*(c) The land shown in this plan was compiled in accordance with the *Surveying and Spatial Information Regulation 2012*.~~

Signature: ..... Dated: 10/05/2017

Surveyor ID: 41

Datum Line: X - Y

Type: *Urban/~~*Rural~~

The terrain is *Level-Undulating ~~/ *Steep-Mountainous.~~

*Strike through if inapplicable.

^Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.

Statements of intention to dedicate public roads, public reserves and drainage reserves.

IT IS INTENDED TO DEDICATE THE EXTENSIONS TIGERHAWK DRIVE AND SETTLERS BOULEVARD TO THE PUBLIC AS PUBLIC ROAD.

Plans used in the preparation of survey~~/compilation.~~

DP1108020	DP1202106
DP1145348	DP1206108
DP1150600	DP1210544
DP1152173	DP1220220
DP1152174	DP1220220
DP1155332	DP1220290
DP1155695	DP1224018
DP1187087	

If space is insufficient continue on PLAN FORM 6A

Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A

Surveyor's Reference: 4070-BLVD

Req:R126509 /Doc:DP 1224700 P /Rev:23-Jun-2017 /NSW LRS /Pgs:ALL /Prt:17-Dec-2020 17:41 /Seq:5 of 6
© Office of the Registrar-General /Src:INFOTRACK /Ref:20 Heritage Drive, Chisholm, NSW 2322

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Office Use Only

Registered: 23.06.2017

Office Use Only

DP1224700

PLAN OF SUBDIVISION OF LOT 3 DP1220220 AND EASEMENTS OVER LOT 2532 DP1224018

Subdivision Certificate number: 151963

Date of Endorsement: 7.6.17

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - See 60(c) *SSI Regulation 2012*
- Statements of intention to create and release affecting interests in accordance with section 88B *Conveyancing Act 1919*
- Signatures and seals- see 195D *Conveyancing Act 1919*
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919 IT IS INTENDED

TO CREATE:

1. EASEMENT FOR ELECTRICITY & OTHER PURPOSES 3.3 WIDE
2. EASEMENT FOR GAS MAIN 2 WIDE

TO RELEASE:

1. PART OF RIGHT OF CARRIAGEWAY 4 WIDE (DP1187087)
2. PART OF EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 2 WIDE (DP1187087)
3. PART OF EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 15 WIDE (DP1187087)
4. PART OF EASEMENT FOR UNDERGROUND GAS PIPELINE 2 WIDE (DP1187087)
5. EASEMENT FOR UNDERGROUND GAS PIPELINE 2 WIDE (DP1001954)
6. RIGHT OF CARRIAGEWAY 17 WIDE (DP1152174)
7. RIGHT OF CARRIAGEWAY 31.465 WIDE AND VARIABLE (DP1202106)

Executed by **Jemena Gas Networks (NSW) Ltd** ACN 003 004 322 in accordance with section 127 of the *Corporations Act 2001* (Cth) by:

Signature of Director

Joanne Pearson

Full Name of Director (please print)

Signature of Director/Secretary

Tina Ooi

Full Name of Director/Secretary (please print)

Surveyor's Reference: 4070-BLVD

Req:R126509 /Doc:DP 1224700 P /Rev:23-Jun-2017 /NSW LRS /Pgs:ALL /Prt:17-Dec-2020 17:41 /Seq:6 of 6
© Office of the Registrar-General /Src:INFOTRACK /Ref:20 Heritage Drive, Chisholm, NSW 2322

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Office Use Only

Registered: 23.06.2017

Office Use Only

DP1224700

PLAN OF SUBDIVISION OF LOT 3 DP1220220 AND EASEMENTS OVER LOT 2532 DP1224018

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - See 60(c) *SSI Regulation 2012*
- Statements of intention to create and release affecting interests in accordance with section 88B *Conveyancing Act 1919*
- Signatures and seals- see 195D *Conveyancing Act 1919*
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

Subdivision Certificate number: 151963

Date of Endorsement: 7.6.17

Executed for and on behalf of **Ausgrid** by Michael McHugh ..... its duly constituted Attorney pursuant to Power of Attorney registered No. Book 4693 No 331 in the presence of:

..... Signature of Attorney

.....
Signature of Witness

Lisa Jane Anderson
.....
Print name of Witness

570 GEORGE STREET
SYDNEY NSW 2000
.....
Address of Witness

EXECUTED by **MAITLAND NOMINEE HOLDINGS PTY LIMITED ACN. 122 853 114** in accordance with section 127 of the Corporations Act:

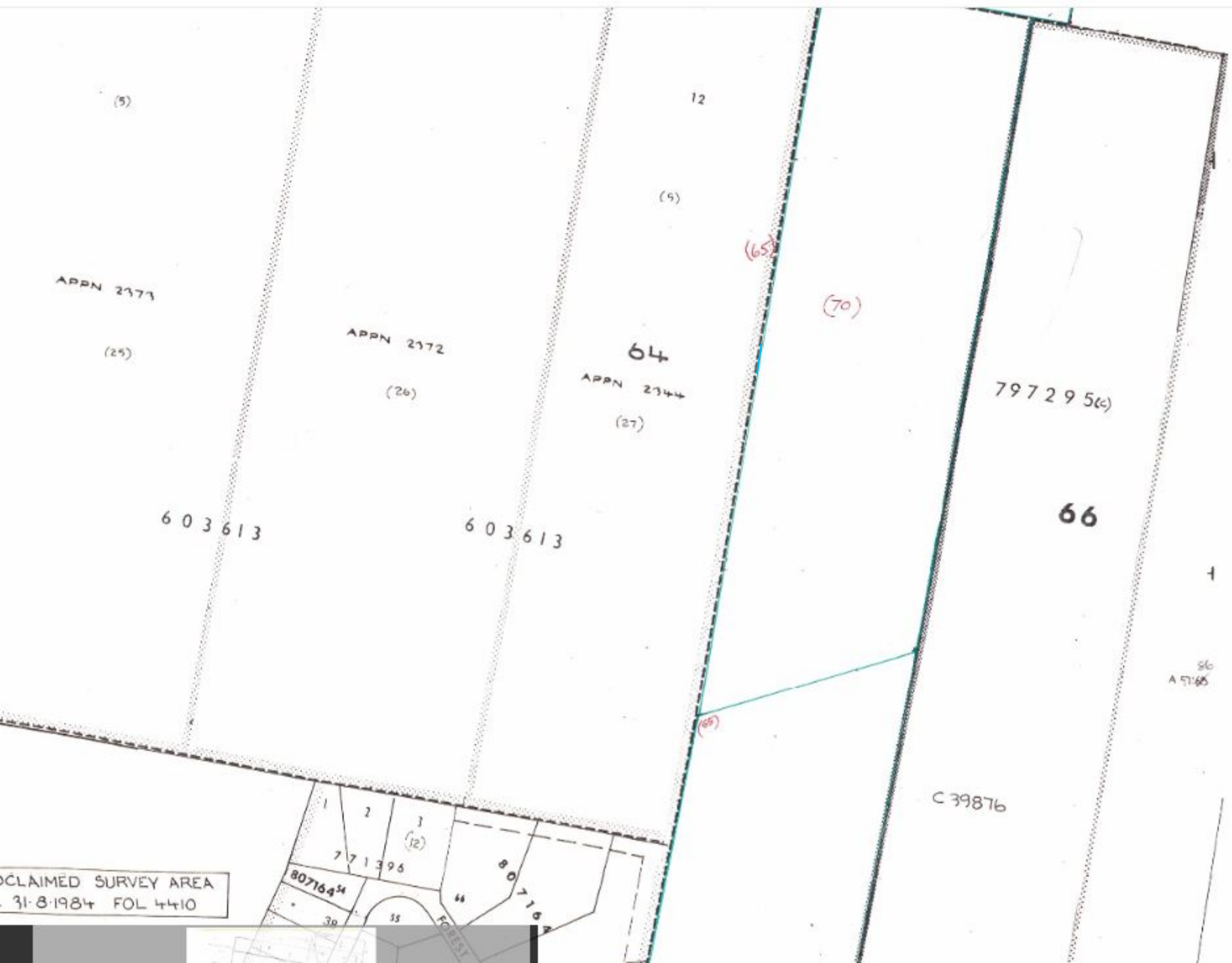
....
Signature of director Signature of director/secretary

.....Trent.Alston..... .....
Name (please print) Name (please print)

STREET ADDRESS SCHEDULE

LOT	STREET NUMBER	STREET NAME	STREET TYPE	LOCALITY
1	20	HERITAGE	DRIVE	CHISHOLM

Surveyor's Reference: 4070-BLVD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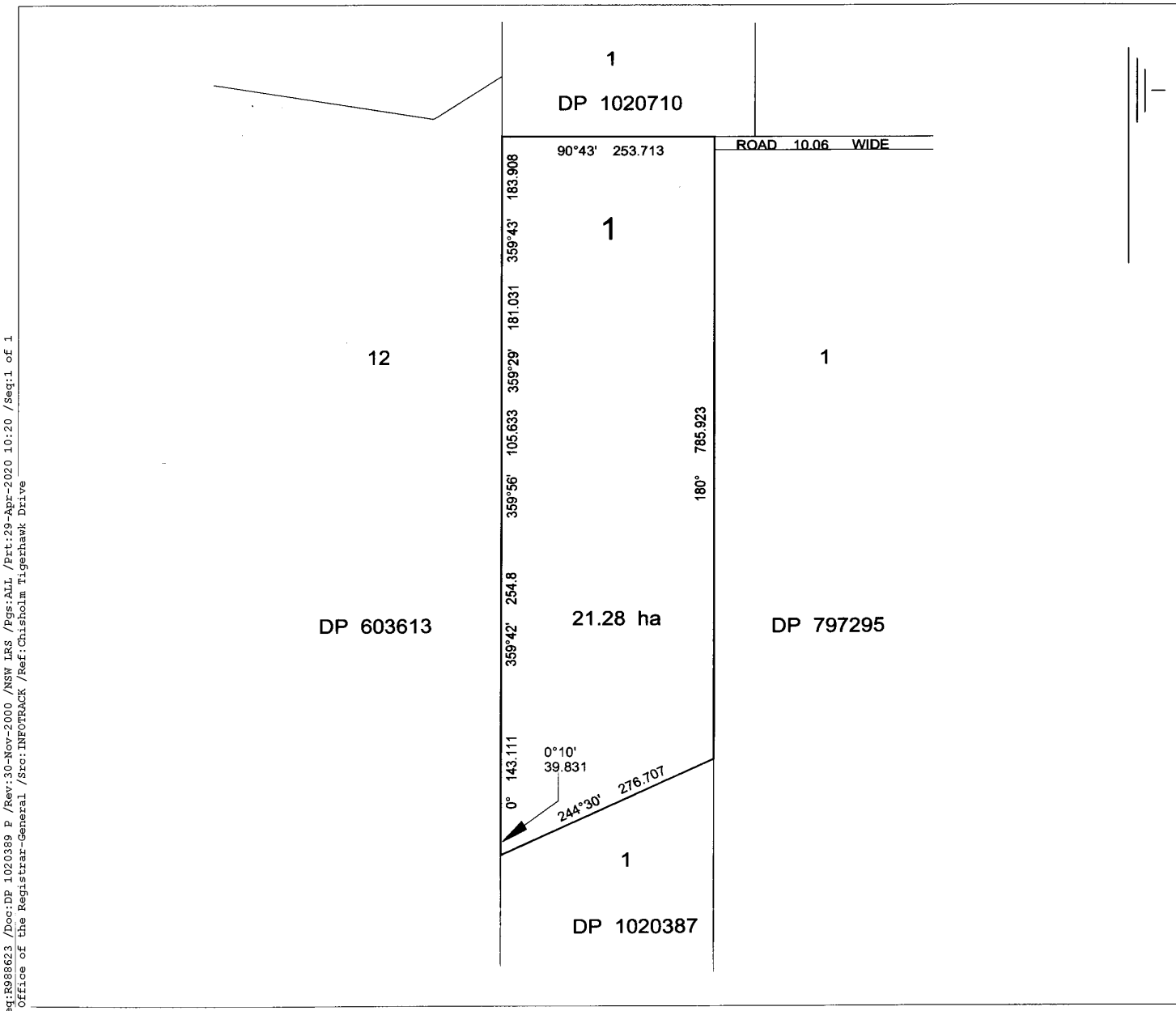
12
(9)
APPN 2373
(25)
APPN 2372
(26)
64
APPN 2374
(27)
(65)
(70)
797295(c)
66
603613
603613
(68)
C39876
1
2
3
(12)
717396
80716454
80716
44
35
39
FOREST
OCLAIMED SURVEY AREA
31·8·1984 FOL 4410

InfoTrack



DP 1020389

Registered: 24-11-2000

Title System: OLD SYSTEM

Purpose: LIMITED TITLE CREATION

Ref. Map : U5472-8

Last Plan :

CA : 83605

PLAN OF LAND COMPRISED IN

DEED BK 3096 NO 286

Lengths are in metres. Reduction Ratio - NTS

L.G.A : MAITLAND

LOCALITY : THORNTON

PARISH : ALNWICK

COUNTY : NORTHUMBERLAND

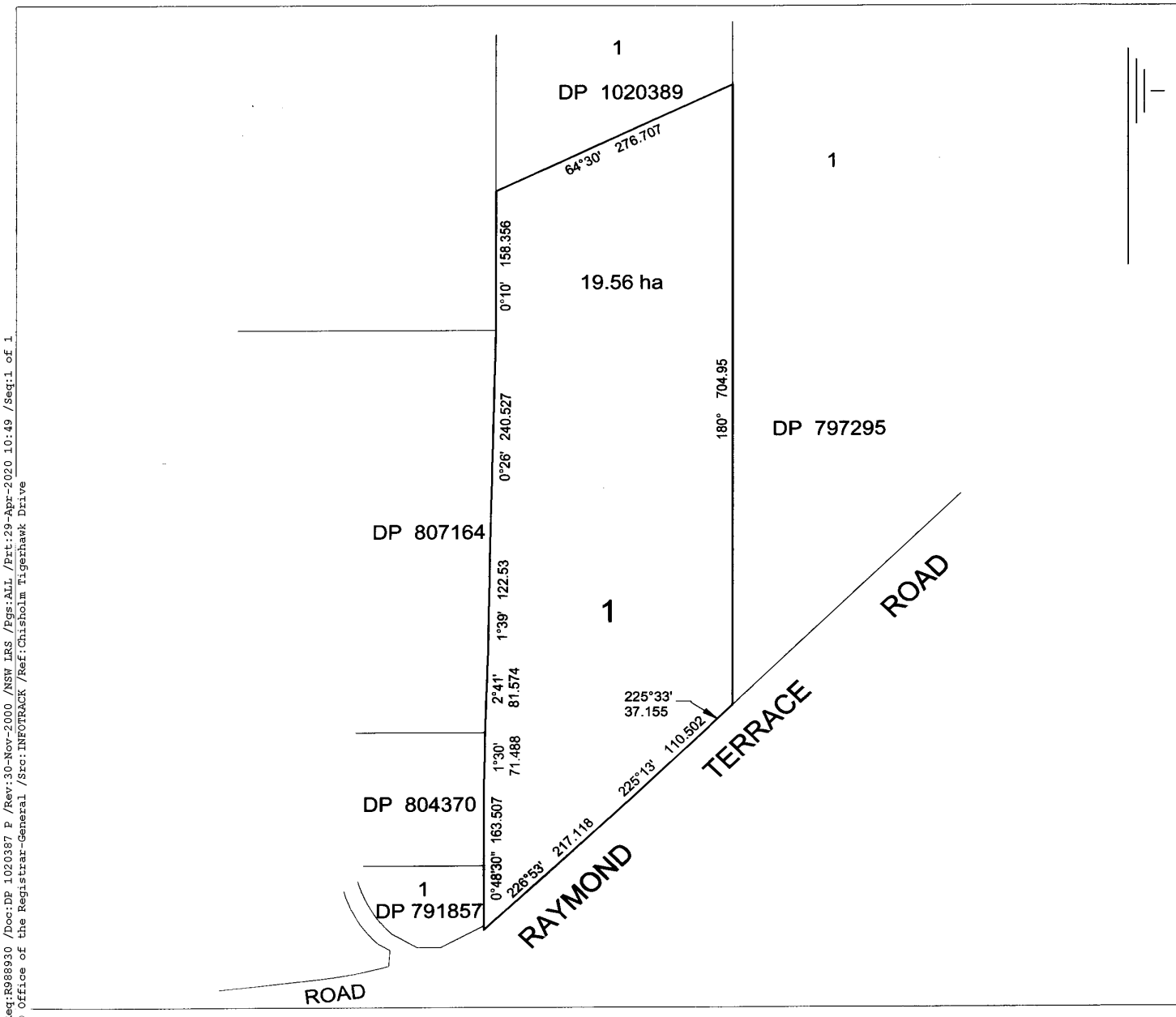
THIS PLAN WAS PREPARED SOLELY TO IDENTIFY THE LAND IN THE ABOVE DEED AND THE BOUNDARIES HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL

THIS PLAN IS NOT A CURRENT PLAN IN TERMS OF SEC. 7A CONVEYANCING ACT, 1919.

LTO Ref. : TCB TC

Req:R988623 /Doc:DP 1020389 P /Rev:30-Nov-2000 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:20 /Seq:1 of 1
© Office of the Registrar-General /Src:INFOTRACK /Ref:Chisholm Tigerhawk Drive

InfoTrack



DP 1020387

Registered: 24-11-2000

Title System: OLD SYSTEM

Purpose: LIMITED TITLE CREATION

Ref. Map : U5472-8

Last Plan :

CA : 83604

PLAN OF LAND COMPRISED IN

DEED BK 2991 NO 497

Lengths are in metres. Reduction Ratio - NTS

L.G.A : MAITLAND

LOCALITY : THORNTON

PARISH : ALNWICK

COUNTY : NORTHUMBERLAND

THIS PLAN WAS PREPARED SOLELY TO IDENTIFY THE LAND IN THE ABOVE DEED AND THE BOUNDARIES HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL

THIS PLAN IS NOT A CURRENT PLAN IN TERMS OF SEC. 7A CONVEYANCING ACT, 1919.

LTO Ref. : TCB TC

Req:R988930 /Doc:DP 1020387 P /Rev:30-Nov-2000 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:49 /Seq:1 of 1
© Office of the Registrar-General /Src:INFOTRACK /Ref:Chisholm Tigerhawk Drive

InfoTrack
Req:R988844 /Doc:DP 0603613 P /Rev:24-Nov-1992 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:42 /Seq:1 of 1
© Office of the Registrar-General /Src:INFOTRACK /Ref:Chisholm Tigerhawk Drive

PLAN FORM 2

Plan Drawing only to appear in this space

* OFFICE USE ONLY

D. P. 603613

Registered: 10-10-1979

C.A.: 78084 OF 27-11-1978

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U5472 -8*, 52*, 54*

Last Plan: D. P. 346885

PLAN OF SUBDIVISION OF PARTS OF LOTS A & B, D.P. 346885 AND THE PARTS OF PORTIONS 63 & 64 IN C.T. VOL. 8380 FOL. 56 BEING PT LOT 1 DP 109297, PT LOT 1 DP 109298 & PT LOT 1 DP 109299.

Reduction Ratio 1: 12,500
Lengths are in metres.

~~Mun./Shire~~ City: MAITLAND

Locality: MORPETH

Parish: ALNWICK

County: NORTHUMBERLAND

~~This is/is not~~ the first plan ~~/ of my plan~~ ~~2~~ sheets.
(Delete if inapplicable).

I, JOHN MORRISON MONTEATH
of MONTEATH & POWYS, NEWCASTLE
a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan ~~, with respect to ab, ac & bc~~
is accurate and has been made ~~/ is accurate~~ (2) under my immediate supervision in accordance with the Survey Practice Regulations, 1933, and was completed on 1
20TH JULY, 1972 71/341
Signature
Surveyor registered under Surveyors Act, 1929, as amended.
Delete one either (1) or (2). 1 Insert date of survey.

Panel for use only for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to user.

Signatures and seals only.

THE COMMON SEAL of STEGGLES PTY. LIMITED was affixed hereto by the authority of the Board of Directors in the presence of

Council Clerk's Certificate

I hereby certify that –

(a) the requirements of the Local Government Act, 1919, (other than the requirements for the registration of plans), and

*(b) the requirements of section 349 of the †Metropolitan Water, Sewerage and Drainage Act, 1924, as amended, †Hunter District Water, Sewerage, and Drainage Act, 1938, as amended

have been complied with by the applicant in relation to the proposed Subdivision
(Insert "new road", "subdivision" or "consolidated lot") set out hereon

Subdivision No. 78084

Date 27-11-78

(Signature) Council Clerk

*This part of certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Metropolitan Water Sewerage and Drainage Board and the Hunter District Water Board.
†Delete if inapplicable.

DIAGRAM "A"
NOT TO SCALE

DIAGRAM "B"
NOT TO SCALE

DIAGRAM "C"
NOT TO SCALE

(A) BENEFITED BY RIGHT OF WAY - A709637
(B) BENEFITED BY RIGHT OF WAY - A704692
(C) BENEFITED BY RIGHT OF WAY - D295756

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

SURVEYOR'S REFERENCE: 71/341

I, Bruce Richard Davies, Registrar General for New South Wales, certify that this negative is a photograph made as a permanent record of a document in my custody this 24th day of October, 1979

InfoTrack

Req:R988969 /Doc:DP 0346885 P /Rev:30-May-1997 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:51 /Seq:1 of 1
© Office of the Registrar-General /Src:INFOTRACK /Ref:Chisholm Tigerhawk Drive

Plan Form No 6 (for transfers, leases, etc.)

D135369

F.P. 346885 (E)

Municipality of Morpeth & Shire of Tarro

PLAN

of part of the land in Certs of Title Vol. 3214 Fol. 119, Vol. 3209 Fol. 5 and Vol. 3207 Fol. 243

Parish of Alnwick County of Northumberland

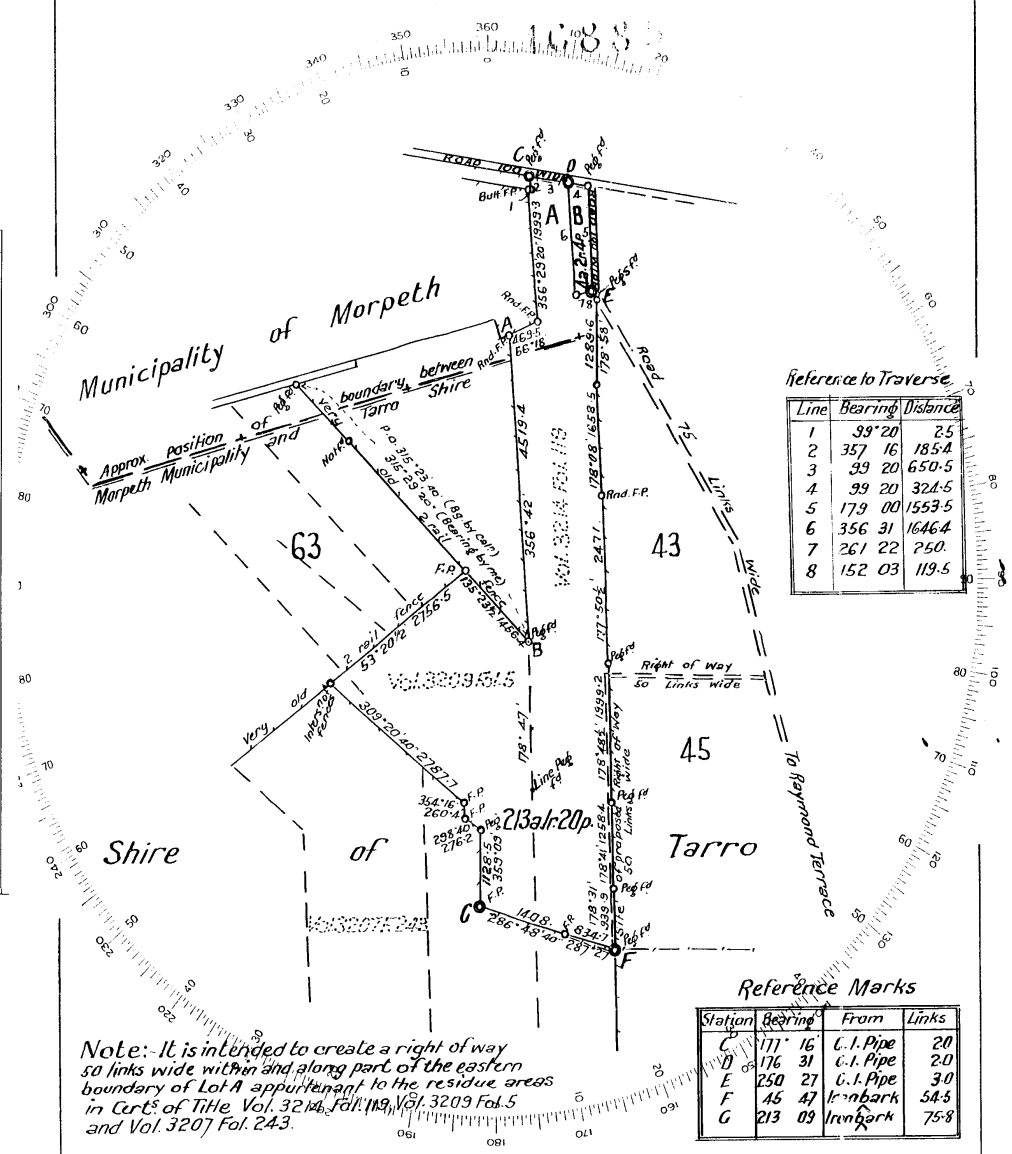
Scale 20 Chains to an Inch.

CONVERSION TABLE ADDED IN DEPARTMENT OF LANDS

DP 346885

LINKS	METRES
0.2	0.040
2	0.402
2.5	0.503
3	0.604
10	2.012
20	4.023
54.5	10.964
75.8	15.249
93.9	18.890
100	20.117
119.5	24.040
185.4	37.297
250	50.292
260.4	52.384
276.2	55.563
278.7	56.066
324.5	65.279
469.5	94.448
650.5	130.860
834.7	167.915
939.9	189.078
1128.5	227.018
1258.4	253.150
1289.6	259.426
1408	283.245
1456.4	292.981
1553.5	312.514
1646.4	331.203
1658.5	333.637
1999.2	402.175
1999.3	402.195
2471	497.086
2756.5	554.520
2787.7	560.796
4519.4	909.159
27565	5545.196

AC RD P	HA
4 2 4	1.831
213 1 20	86.35



Reference to Traverse

Line	Bearing	Distance
1	99° 20	25
2	357 16	185·4
3	99 20	650·5
4	99 20	324·5
5	179 00	1553·5
6	356 31	1646·4
7	261 22	250.
8	152 03	119·5

Reference Marks

Station	Bearing	From	Links
C	111° 16'	C.I. Pipe	2·0
D	176 31	C.I. Pipe	2·0
E	250 27	C.I. Pipe	3·0
F	45 47	Ironbark	54·5
G	213 09	Ironbark	75·8

Note:- It is intended to create a right of way 50 links wide within and along part of the eastern boundary of Lot A appurtenant to the residue areas in Certs of Title Vol. 3214 Fol. 119, Vol. 3209 Fol. 5 and Vol. 3207 Fol. 243.

Approved by Council and covered by Council Clerks Certificate No. ... of ...

Council Clerk

Subscribed and declared before me at East Maitland this 12th day of January A.D. 1942

Justice of Peace

I Cephas Norman Scott of East Maitland a Surveyor registered under the Surveyor's Act, 1929, do hereby solemnly and sincerely declare (a) that all boundaries and measurements shown on this plan are correct, (b) that all survey marks found and relevant physical objects on or adjacent to the boundaries are correctly represented, (c) that all physical objects indicated actually exist in the positions shown, (d) that the whole of the material facts in relation to the land are correctly represented, (e) that the survey represented in this plan has been made in accordance with the Survey Practice Regulations, 1933 *~~(1) by me~~ (2) under my supervision, the character and extent of which was as required by the Survey Practice Regulations, 1933, and was completed on 6th May 1941 ... and the reference marks have been placed as shown hereon.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Oaths Act, 1900

(Signature) Cephas N Scott

Surveyor registered under the Surveyors Act, 1929.

Datum Line of Azimuth A.B.

*Strike out either (1) or (2). †Insert date of Survey.

Signatures of parties to be made in this margin.

This is the plan marked "..." referred to in

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
29/4/2020 10:20AM

FOLIO: 1/1020389

First Title(s): OLD SYSTEM
Prior Title(s): BK 3096 NO 286

Recorded	Number	Type of Instrument	C.T. Issue
27/11/2000	DP1020389	DEPOSITED PLAN	FOLIO CREATED EDITION 1
27/11/2000	CA83605	CONVERSION ACTION	
30/4/2002	8465492	TRANSFER OF MORTGAGE	EDITION 2
3/12/2003	AA217605	TRANSFER OF MORTGAGE	
26/7/2004	AA801726	DISCHARGE OF MORTGAGE	
26/7/2004	AA801728	TRANSFER	
26/7/2004	AA801729	MORTGAGE	EDITION 3
5/10/2005	AB814538	DISCHARGE OF MORTGAGE	
5/10/2005	AB814540	MORTGAGE	EDITION 4
7/6/2006	AC358143	CAVEAT	
13/12/2006	AC809629	CAVEAT	
21/12/2006	AC828324	DISCHARGE OF MORTGAGE	
21/12/2006	AC828325	TRANSFER	
21/12/2006	AC828326	MORTGAGE	
21/12/2006	AC828328	REQUEST	EDITION 5
3/1/2007	AC840584	WITHDRAWAL OF CAVEAT	
3/1/2007	AC840585	MORTGAGE	EDITION 6
17/1/2007	AC865575	TRANSFER	EDITION 7
27/3/2007	AD17280	CAVEAT	
26/4/2007	AD25076	APPLICATION FOR PREPARATION OF LAPSING NOTICE	
26/4/2007	AD71783	WITHDRAWAL OF CAVEAT	
30/4/2007	DP1108020	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

Chisholm Tigerhawk Drive PRINTED ON 29/4/2020

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Received: 29/04/2020 10:20:41

Req:R988630 /Doc:DL AA801728 /Rev:29-Jul-2004 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:20 /Seq:1 of 2
© Office of the Registrar-General /Src:INFOTRACK /Ref:Chisholm Tigerhawk Drive

Form: 01T
Licence: 01-08-067
Licensee: Midware Systems
HEARD McEWAN LAWYERS

TRANSFER

New South Wales
Real Property Act 1900

AA801728D

PRIVACY NOTE: this information is legally required and will become part of the public record

STAMP DUTY Office of State Revenue use only

Office of State Revenue
NSW Treasury
Client No: 95757970 1852
Duty: 12-00 Trans No: 2055137
Asset details: 2055137

Office of State Revenue
NSW Treasury
Client No: 95757970 1852
VENDOR DUTY ENDORSED
Trans No: NOT LIABLE

(A) **TORRENS TITLE** If appropriate, specify the part transferred
Folio Identifier 43/1009594, 1/1020387, 1/1020389 and 1/1020710

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODE
	HOLMAN WEBB DX 233 SYDNEY L.T.O. BOX 406T Reference (optional): VN1 104139	T TW (Sheriff)

(C) **TRANSFEROR** STEGGLES POULTRY PTY LIMITED (ACN 000 011 156) OVER SEE ANNEXURE A

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ 12,000,000.00 and as regards

(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple.

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable):

(H) **TRANSFEREE** BLUE ROCK DEVELOPMENTS PTY LIMITED (ACN 101 204 925) as to a 65/100 share and THORNTON DEVELOPMENTS PTY LIMITED (ACN 102 623 405) as to a 35/100 share

(I) **TENANCY:** Tenants in Common

(J) **DATE** 8 / 7 / 2004

Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.
Corporation: STEGGLES POULTRY PTY LIMITED (ACN 000 011 156)
Authority: Section 127 of the Corporations Act 2001

Signature of authorised person: x
Name of authorised person: PETER JOHN BARTER
Office held: DIRECTOR

Signature of authorised person:
Name of authorised person: ALAN FRANCIS HOHNEN
Office held: SECRETARY

Certified correct for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature:
Signatory's name: MALCOLM JOHN HEARD
Signatory's capacity: Solicitor for the transferee

Sm B
E 73

All handwriting must be in block capitals.

Number additional pages sequentially

Req:R988630 /Doc:DL AA801728 /Rev:29-Jul-2004 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:20 /Seq:2 of 2
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RP88/ANNEX **REGISTRATION DIRECTION ANNEXURE AA801728**

y for First and Second Schedule directions

SM13

DO NOT USE BOTH SIDES OF THIS FORM

FIRST SCHEDULE DIRECTIONS

FOLIO IDENTIFIER	DIRECTION	DETAILS
43/1009594		
1/1020387		
1/1020389		
1/1020710	PROP	BLUE ROCK DEVELOPMENTS PTY LIMITED IN 65/100
		SHARE AND THORNTON DEVELOPMENTS PTY LIMITED IN
		35/100 SHARE AS TENANTS IN COMMON

SECOND SCHEDULE DIRECTIONS

FOLIO IDENTIFIER	DIRECTION			DETAILS

Req:R988631 /Doc:DL AC828325 /Rev:03-Jan-2007 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:20 /Seq:1 of 3
© Office of the Registrar-General /Src:INFOTRACK /Ref:Chisholm Tigerhawk Drive

Form: 01T
Licence: 03-10-204
Licensee: Gadens Lawyers

(5)

TRANSFER

New South Wales
Real Property Act 1900

AC828325B

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

NEW SOUTH WALES DUTY
08-12-2006 0003929083-001
SECTION 18(2)
DUTY $ **********2.00

(A) **TORRENS TITLE**

If appropriate, specify the part transferred. ✓

12/603613, 43/1009594, 1/1020387, 1/1020710 and 1/1020389

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
	HOLMAN WEBB DX 233 SYDNEY L.T.O. BOX 406T 1232794L Reference (optional): ~~SXH/2647126~~ SUN254/1081	T TW (Sheriff)

(C) **TRANSFEROR**

Blue Rock Developments Pty Limited ACN 101 204 924 and Thornton Developments Pty Limited ACN 102 623 405

(D) **CONSIDERATION**

Pursuant to Contract for Sale of Land dated 5/12/06

(E) **ESTATE**

The transferor acknowledges ~~pursuant to a Deed of Retirement & Appointment of Manager~~ and as regards the land specified above transfers to the transferee an estate in fee simple. ✓

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable): 1. 2. 3.

(H) **TRANSFEREE**

TRD (Thornton North) Pty Limited ACN 119 932 482

(I) **TENANCY:**

DATE 13 / 12 / 06
dd mm yy

(J) Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.

Corporation: Blue Rock Developments Pty Limited ACN 101 204 924

Authority: Section 127 Corporations Act

Signature of authorised person: Jackson

Name of authorised person: John Carson

Office held: Director

Signature of authorised person:

Name of authorised person: LARRY KING

Office held: Director

3184009..01 SXH TBS

Lapse AC 358143

All handwriting must be in block capitals.

Page 1 of 2 3
number additional pages sequentially

Caveat AC 358143
AC 809629

Req:R988631 /Doc:DL AC828325 /Rev:03-Jan-2007 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:20 /Seq:2 of 3
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Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.

Corporation: Thornton Developments Pty Limited ACN 102 623 405

Authority: Section 127 Corporations Act

Signature of authorised person: A. P

Name of authorised person: Alex Puporace

Office held: Director

Signature of authorised person: Peter A. Taranto

Name of authorised person: Peter Taranto

Office held: Director

I certify that the transferee, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this transfer in my presence.

Signature of witness:

Name of witness:

Address of witness:

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

Signature of transferee:

If signed on the transferee's behalf by a solicitor, licensed conveyancer or barrister, insert the signatory's full name and capacity below:

STEVE HEALY
SOLICITOR
GADENS LAWYERS

3184009..01 SXH TBS

All handwriting must be in block capitals.

Req:R988631 /Doc:DL AC828325 /Rev:03-Jan-2007 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:20 /Seq:3 of 3
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gadens lawyers

Our reference Mayank Gupta 2648123
Direct line 9931 4778
Email mgupta@nsw.gadens.com.au
Partner responsible Paul Armstrong

Gadens Lawyers
Sydney Pty Limited
ABN 69 100 963 308

Skygarden Building
77 Castlereagh Street
Sydney NSW 2000
Australia

DX 364 Sydney

tel +61 2 9931 4999
fax +61 2 9931 4888

www.gadens.com.au

13 December 2006

By Hand Delivery

The Registrar - General
The Department of Lands
1 Prince Albert Road
SYDNEY NSW 2000

Dear Registrar

Registered proprietor	**Blue Rock Developments Pty Limited and Thornton Developments Pty Limited**
Property	**439-477 Raymond Terrace Road and 321-329 McFarlanes Road, Thornton, NSW**
Folio identifier	**12/603613, 43/1009594, 1/1020387, 1/1020389, 1/1020710**
Caveator	**Maitland Development Co Pty Ltd**
Caveat Number	

We act for Maitland Development Co Pty Ltd, the caveator over the above property.

The caveator consents to the registration of the following documents.

1. Transfer from Blue Rock Developments Pty Limited and Thornton Developments Pty Limited to TRD (Thornton North) Pty Limited.
2. Discharge of Mortgage AB814540.
3. Withdrawal of Caveat AC358143.
5. Register of Mortgage by Challenger Challenger Life No. 2 Limited.
4. Register of Mortgage by Suncorp-Metway Limited.

Yours sincerely

Mayank Gupta
for **GADENS LAWYERS**

3/3

3187643..01 MSG MSG

Liability limited by a scheme approved under Professional Standards Legislation

Req:R988632 /Doc:DL AC865575 /Rev:22-Jan-2007 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 10:20 /Seq:1 of 1
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Form: 01T
Licence: 03-10-204
Licensee: Gadens Lawyers

(5)

TRANSFER

New South Wales
Real Property Act 190

AC865575R

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authc
required by this form for the establishment and maintenance of the Real
that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

NEW SOUTH WALES DUTY
15-12-2006 0003945838-001
SECTION 54(3)
DUTY $ **********10.00

(A) **TORRENS TITLE**

If appropriate, specify the part transferred.

12/603613, 43/1009594, 1/1020387, 1/1020710 and 1/1020389

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
1232794	HOLMAN WEBB DX 233 SYDNEY L.T.O. BOX 406T Reference (optional): ~~SXH/2647126~~ SUN 254/1081	T TW (Sheriff)

(C) **TRANSFEROR**

TRD (Thornton North) Pty Limited ABN 39 091 336 793

(D) **CONSIDERATION**
(E) **ESTATE**
(F) **SHARE TRANSFERRED**

The transferor acknowledges pursuant to a Deed of Retirement & Appointment of Manager and as regards the land specified above transfers to the transferee an estate in fee simple.

(G) Encumbrances (if applicable): 1. AC828326 2. AC840585 3.

(H) **TRANSFEREE**

Maitland Nominee Holdings Pty Limited ACN 122 853 144

(I) **TENANCY:**

DATE 14 / 12 / 06
dd mm yy

(J) I certify that the transferor, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this transfer in my presence.

~~Signature of witness~~:
~~Name of witness~~:
~~Address of witness~~:

Executed by the transferor pursuant to Section 127 of the Corporations Act in the presence of:-

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

Signature of transferor:

Sole Director & Secretary
GREGORY MAURICE CAHILL

Certified correct for the purposes of the Real Property Act 1900 by the transferee.

Signature:

Signatory's name: STEPHEN HEALY

Signatory's capacity: solicitor for transferee

Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.

Corporation:

3182107..01 SXH GXS

All handwriting must be in block capitals.

Req:R989563 /Doc:CT 13994-058 CT /Rev:21-Jan-2011 /NSW LRS /Pgs:ALL /Prt:29-Apr-2020 11:45 /Seq:1 of 2
© Office of the Registrar-General /Src:INFOTRACK /Ref:Chisholm Tigerhawk Drive

13994058

[redacted]ICATE OF TITLE

NEW SOUTH WALES

...L PROPERTY ACT, 1900

Appln. Nos.2344, 2372
and 2373

Prior Titles Vol.6738 Fols.139
and 140
Vol.8380 Fol. 56

Vol. 13994 Fol. 58

EDITION ISSUED

9 11 1979

13994 Fol. 58

(Page 1) Vol. .....

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

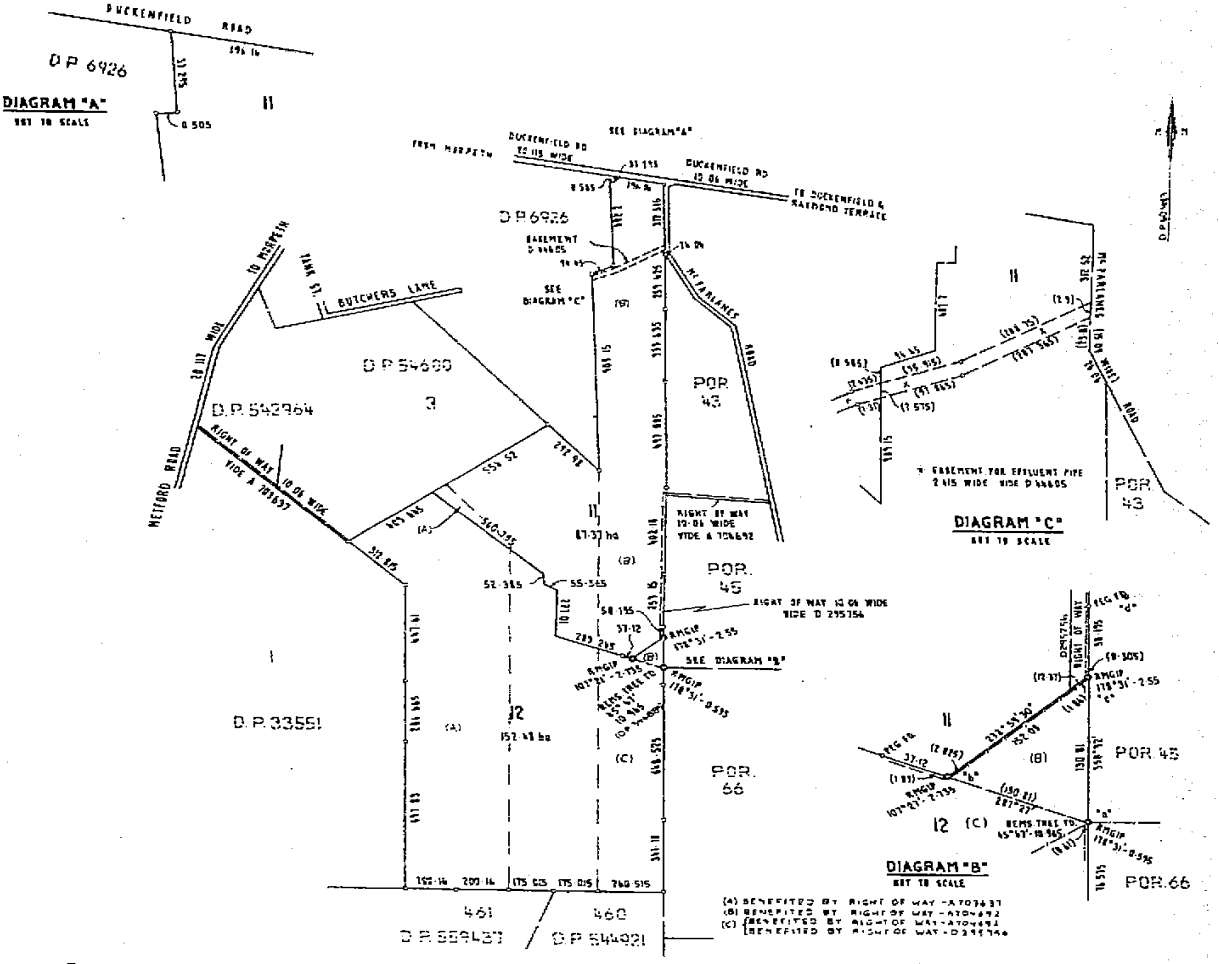
CANCELLED

Registrar General.

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 12 in Deposited Plan 603613 at Morpeth in the City of Maitland Parish of Alnwick and County of Northumberland being part of Portion 63 granted to Edward Charles Close on 30-6-1823 and part of Portion 64 granted to Edward Charles Close on 6-7-1833.

FIRST SCHEDULE

~~PATRICK FRANCIS BOWE of Maitland, Commercial Traveller and PETER JOHN BOWE of Morpeth, Farmer, as Tenants in Common in Equal Shares as to the part of the land above described formerly comprised in Certificates of Title Volume 6738 Folios 139 and 140 and STEGGLES PTY. LIMITED as to the part formerly comprised in Certificate of Title Volume 8380 Folio 56.~~

GRY

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grants above referred to.
2. A703637 P Right of way appurtenant to the part of the land above described shown so benefited in Deposited Plan 603613 affecting the part of the land in Deposited Plan 542964 shown so burdened in Deposited Plan 603613.
3. A704692 P Right of way appurtenant to the part of the land above described shown so benefited in Deposited Plan 603613 affecting the part of Portion 43 shown so burdened in Deposited Plan 603613.
4. D295756 P Right of way appurtenant to the part of the land above described shown so benefited in Deposited Plan 603613 affecting the part of Lot 11 shown so burdened in Deposited Plan 603613.

RG 2/62

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

PERSONS ARE CAUTIONED AGAINST ALTERING OR AVOIDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE REGISTRAR GENERAL'S OFFICE.

S 661187 J

Vol. 13934 Fol. 58

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED	Signature of Registrar General
Steggles Pty. Limited by Transfer S661187, Registered 28-8-1981				

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	PARTICULARS	REGISTERED	Signature of Registrar General	CANCELLATION	

(Page 2 of 2 pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

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Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
29/4/2020 12:04PM

FOLIO: 12/603613

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 13994 FOL 58

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
19/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/12/1999	DP1001954	DEPOSITED PLAN	EDITION 1
19/6/2000	6867787	CHANGE OF NAME	
19/6/2000	6867788	MORTGAGE	EDITION 2
30/4/2002	8465492	TRANSFER OF MORTGAGE	EDITION 3
13/6/2003	DP1053679	DEPOSITED PLAN	
2/7/2003	9752488	DISCHARGE OF MORTGAGE	
2/7/2003	9752489	TRANSFER	
2/7/2003	9752490	MORTGAGE	EDITION 4
5/10/2005	AB814539	DISCHARGE OF MORTGAGE	
5/10/2005	AB814540	MORTGAGE	EDITION 5
7/6/2006	AC358143	CAVEAT	
13/12/2006	AC809629	CAVEAT	
21/12/2006	AC828324	DISCHARGE OF MORTGAGE	
21/12/2006	AC828325	TRANSFER	
21/12/2006	AC828326	MORTGAGE	EDITION 6
3/1/2007	AC840584	WITHDRAWAL OF CAVEAT	
3/1/2007	AC840585	MORTGAGE	EDITION 7
17/1/2007	AC865575	TRANSFER	EDITION 8
30/4/2007	DP1108020	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

Chisholm Tigerhawk Drive PRINTED ON 29/4/2020

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Received: 29/04/2020 12:04:26

NSW LAND REGISTRY SERVICES

InfoTrack

NSW LRS - Owner Enquiry

Search Summary

Owner Name:	maitland nominee holdings	Matter:	Chisholm Tigerhawk Drive
Include Properties Previously Owned?	Yes		

Current Owner Names (Auto Titles)

Owner Name	Locality	Title Reference	Dealing
MAITLAND NOMINEE HOLDINGS PTY LIMITED	CHISHOLM	1/1224700	

Purchaser/Lessee Names (From 1/6/1971)

Owner Name	Locality	Title Reference	Dealing
MAITLAND NOMINEE HOLDINGS PTY LIMITED	BERRY PARK	1/1020710	T AC865575
MAITLAND NOMINEE HOLDINGS PTY LIMITED	BERRY PARK	43/1009594	T AC865575
MAITLAND NOMINEE HOLDINGS PTY LIMITED	CHISHOLM	1719/1206108	TZ AJ626817
MAITLAND NOMINEE HOLDINGS PTY LIMITED	MORPETH	12/603613	T AC865575
MAITLAND NOMINEE HOLDINGS PTY LIMITED	THORNTON	1/1020387	T AC865575
MAITLAND NOMINEE HOLDINGS PTY LIMITED	THORNTON	1/1020389	T AC865575

This information is provided as a searching aid only. The Registrar General does not guarantee that the information provided discloses details of all land/premises owned/leased by the party searched against. The information returned relates to owners/lessees registered from 1971 onwards except in relation to current lease information which is returned from 1998 onwards. Manual indexes are available for records registered prior to 1971. Note: * indicates Lessee name.

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Received: 29/04/2020 12:07:29

LAND REGISTRY SERVICES

InfoTrack

NSW LRS - Owner Enquiry

Search Summary

Owner Name:	avid residential	Matter:	Chisholm Tigerhawk Drive
Include Properties Previously Owned?	Yes		

Current Owner Names (Auto Titles)

Owner Name	Locality	Title Reference	Dealing
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	1010/1242456	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	1011/1242456	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	1020/1242456	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	1021/1242456	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	2726/1237666	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3096/1246288	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3098/1246288	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3099/1246288	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3107/1246288	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3108/1246288	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3110/1246288	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3111/1246288	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	3112/1246288	
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AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	5123/1246095	
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AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	728/1240614	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	177/1194158	CN AK828267
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	2029/1213486	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	2425/1224017	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	2426/1224017	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	2531/1224018	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	4/1222785	T AM682852

AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	720/1210544	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOM	1/1247459	
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOM	2/1247459	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3178/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3180/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3182/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3183/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3184/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3185/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3190/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3191/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3194/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3199/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3200/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3203/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	CHISOLM	3204/1246543	
AVID RESIDENTIAL ESTATES PTY LTD	MORPETH	1/716824	T AP371980

Purchaser/Lessee Names (From 1/6/1971)

Owner Name	Locality	Title Reference	Dealing
AVID RESIDENTIAL ESTATES PTY LIMITED	CHISHOLM	1/1250089	TZ AP241511
AVID RESIDENTIAL ESTATES PTY LTD	BERRY PARK	1/1020710	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	BERRY PARK	43/1009594	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	176/1194158	CN AK828267
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	229/1208924	CN AK828267
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	234/1208924	CN AK828267
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	255/1208924	CN AK828267
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	256/1208924	CN AK828267
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	2532/1224018	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	4/1220220	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	5/1220220	T AM682852
AVID RESIDENTIAL ESTATES PTY LTD	CHISHOLM	5/1222785	T AM682852

This information is provided as a searching aid only. The Registrar General does not guarantee that the information provided discloses details of all land/premises owned/leased by the party searched against. The information returned relates to owners/lessees registered from 1971 onwards except in relation to current lease information which is returned from 1998 onwards. Manual indexes are available for records registered prior to 1971. Note: * indicates Lessee name.

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Received: 29/04/2020 12:11:52

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
17/12/2020 5:19PM

FOLIO: 2329/1219189

First Title(s): OLD SYSTEM
Prior Title(s): 2233/1217125

Recorded	Number	Type of Instrument	C.T. Issue
19/4/2016	DP1219189	DEPOSITED PLAN	FOLIO CREATED EDITION 1
16/8/2016	DP1220220	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

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Received: 17/12/2020 17:19:26

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
17/12/2020 5:19PM

FOLIO: 3/1220220

First Title(s): OLD SYSTEM
Prior Title(s): 2329/1219189

Recorded	Number	Type of Instrument	C.T. Issue
16/8/2016	DP1220220	DEPOSITED PLAN	FOLIO CREATED EDITION 1
17/3/2017	AM230466	REQUEST	EDITION 2
30/3/2017	AM271580	DISCHARGE OF MORTGAGE	EDITION 3
23/6/2017	DP1224700	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS

*** END OF SEARCH ***

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Received: 17/12/2020 17:19:08

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
17/12/2020 5:18PM

FOLIO: 1/1224700

First Title(s): OLD SYSTEM
Prior Title(s): 3/1220220

Recorded	Number	Type of Instrument	C.T. Issue
23/6/2017	DP1224700	DEPOSITED PLAN	FOLIO CREATED EDITION 1

*** END OF SEARCH ***

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Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/1224700

SEARCH DATE	TIME	EDITION NO	DATE
17/12/2020	5:18 PM	1	23/6/2017

LAND

LOT 1 IN DEPOSITED PLAN 1224700
AT CHISHOLM
LOCAL GOVERNMENT AREA MAITLAND
PARISH OF ALNWICK COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP1224700

FIRST SCHEDULE

MAITLAND NOMINEE HOLDINGS PTY LIMITED

SECOND SCHEDULE (7 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 DP1209575 EASEMENT TO DRAIN WATER 1.5 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
3 DP1216020 EASEMENT TO DRAIN WATER 1.5 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
4 DP1217125 EASEMENT TO DRAIN WATER 1.5 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
5 DP1219189 EASEMENT TO DRAIN WATER 1.5 METRE(S) WIDE APPURTENANT TO LAND ABOVE DESCRIBED
6 DP1219189 EASEMENT TO DRAIN WATER 2.5 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
7 DP1220220 POSITIVE COVENANT

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. InfoTrack an approved NSW Information Broker hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900.

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Received: 17/12/2020 17:18:37

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Summary of Owners Report

Address: - 20 Heritage Drive, Chisholm

Description: - Lot 1 D.P. 1224700

As regards the part numbered (1) on the attached Cadastral Records Enquiry Report

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
10.08.1938 (1938 to 1967)	James Patrick O'Hearn (Farmer)	Book 1823 No. 927
17.03.1967 (1967 to 1973)	John Anthony O'Hearn (Farmer)	Book 2831 No. 291
08.05.1973 (1973 to 2004)	Steggles Pty Limited Now Steggles Poultry Pty Limited	Book 3096 No. 286 Now 1/1020389
26.07.2004 (2004 to 2006)	Blue Rock Developments Pty Limited Thornton Developments Pty Limited	1/1020389
21.12.2006 (2006 to 2007)	TRD Thornton North) Pty Limited	1/1020389
17.01.2007 (2007 to 2017)	# Maitland Nominee Holdings Pty Limited	1/1020389 Now 1/1224700 (Intervening titles not investigated)

 # Denotes current registered proprietor

As regards the part numbered (2) on the attached Cadastral Records Enquiry Report

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
08.08.1921 (1921 to 1944)	William Edstein (Farmer)	Vol 3214 Fol 119 Now Vol 5337 Fol 38
24.07.1944 (1944 to 1950)	Herbert Edstein (Farmer) Cecil John Edstein (Farmer) Arthur Edstein (Farmer) (Transmission Application not investigated)	Vol 5337 Fol 38
21.07.1950 (1950 to 1950)	Herbert Edstein (Farmer) Cecil John Edstein (Farmer)	Vol 5337 Fol 38
04.09.1950 (1950 to 1952)	Cecil John Edstein (Farmer)	Vol 5337 Fol 38
11.06.1952 (1952 to 1953)	William Henry Campbell (Retired Police Officer)	Vol 5337 Fol 38
09.03.1953 (1953 to 1961)	Francis Herbert Hill (Dealer)	Vol 5337 Fol 38
06.12.1961 (1961 to 1961)	Roy Leslie Pegler (Accountant) (Section 14 Application not investigated)	Vol 5337 Fol 38

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Continued as regards the part numbered (2) on the attached Cadastral Records Enquiry Report

Date of Acquisition and term held	**Registered Proprietor(s) & Occupations where available**	**Reference to Title at Acquisition and sale**
06.12.1961 (1961 to 1970)	Percy Clifford Bird (Skin and Hide Merchant)	Vol 5337 Fol 38 Now Vol 8380 Fol 56
09.10.1970 (1970 to 2003)	Steggles Pty Limited Now Steggles Poultry Pty Limited	Vol 8380 Fol 56 Now 12/603613
02.07.2003 (2003 to 2006)	Blue Rock Developments Pty Limited Thornton Developments Pty Limited	12/603613
21.12.2006 (2006 to 2007)	TRD Thornton North) Pty Limited	12/603613
17.01.2007 (2007 to 2017)	# Maitland Nominee Holdings Pty Limited	12/603613 Now 1/1224700 (Intervening titles not investigated)

 # Denotes current registered proprietor

Leases, as regards the whole: - NIL

Easements, as regards the whole: - NIL

Yours Sincerely
Mark Groll
17 December 2020

APPENDIX 4

Environmental Consulting Services
10 Fort Street
Petersham
NSW 2049

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Simon Caples**

Report **891904-S**
Project name CHISHOLM
Project ID CHISHOLM
Received Date May 26, 2022

Client Sample ID			**CP1**	**CP2**	**CP3**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S22-My0063192**	**S22-My0063193**	**S22-My0063194**
Date Sampled			**May 26, 2022**	**May 26, 2022**	**May 26, 2022**
Test/Reference	LOR	Unit			
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	68	65	134
Total Recoverable Hydrocarbons					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5

Client Sample ID			CP1	CP2	CP3
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S22-My0063192	S22-My0063193	S22-My0063194
Date Sampled			May 26, 2022	May 26, 2022	May 26, 2022
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	115	107	103
p-Terphenyl-d14 (surr.)	1	%	123	116	118
Heavy Metals					
Arsenic	2	mg/kg	5.7	5.1	6.0
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	15	13	14
Copper	5	mg/kg	37	23	19
Lead	5	mg/kg	14	13	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	12	17	10
Zinc	5	mg/kg	55	85	52
% Moisture	1	%	23	25	24

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
BTEX	Sydney	May 27, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons	Sydney	May 27, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	May 27, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	May 27, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	May 27, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	May 27, 2022	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	May 27, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	May 26, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

web: www.eurofins.com.au
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Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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Girraween NSW 2066
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Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Environmental Consulting Services
Address: 10 Fort Street
Petersham
NSW 2049

Project Name: CHISHOLM
Project ID: CHISHOLM

Order No.:
Report #: 891904
Phone: 02 9518 1161
Fax:

Received: May 26, 2022 1:20 PM
Due: May 31, 2022
Priority: 3 Day
Contact Name: Simon Caples

Eurofins Analytical Services Manager : Robert Biviano

Sample Detail						Asbestos - AS4964	Moisture Set	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254								
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794								
Mayfield Laboratory - NATA # 1261 Site # 25079								
Perth Laboratory - NATA # 2377 Site # 2370								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	CP1	May 26, 2022		Soil	S22-My0063192	X	X	X
2	CP2	May 26, 2022		Soil	S22-My0063193	X	X	X
3	CP3	May 26, 2022		Soil	S22-My0063194	X	X	X
Test Counts						3	3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Total PAH*	mg/kg	-			0.5	N/A	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	91			70-130	Pass	
Toluene	%	93			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ethylbenzene	%	87			70-130	Pass	
m&p-Xylenes	%	79			70-130	Pass	
o-Xylene	%	83			70-130	Pass	
Xylenes - Total*	%	80			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	82			70-130	Pass	
TRH C10-C14	%	126			70-130	Pass	
Naphthalene	%	115			70-130	Pass	
TRH C6-C10	%	79			70-130	Pass	
TRH >C10-C16	%	119			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	104			70-130	Pass	
Acenaphthylene	%	108			70-130	Pass	
Anthracene	%	107			70-130	Pass	
Benz(a)anthracene	%	99			70-130	Pass	
Benzo(a)pyrene	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	%	102			70-130	Pass	
Benzo(g.h.i)perylene	%	107			70-130	Pass	
Benzo(k)fluoranthene	%	110			70-130	Pass	
Chrysene	%	103			70-130	Pass	
Dibenz(a.h)anthracene	%	111			70-130	Pass	
Fluoranthene	%	104			70-130	Pass	
Fluorene	%	105			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	109			70-130	Pass	
Naphthalene	%	103			70-130	Pass	
Phenanthrene	%	102			70-130	Pass	
Pyrene	%	104			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	101			80-120	Pass	
Cadmium	%	108			80-120	Pass	
Chromium	%	117			80-120	Pass	
Copper	%	120			80-120	Pass	
Lead	%	103			80-120	Pass	
Mercury	%	116			80-120	Pass	
Nickel	%	118			80-120	Pass	
Zinc	%	88			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	S22-My0072592	NCP	%	75			70-130	Pass	
TRH >C10-C16	S22-My0072592	NCP	%	73			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S22-My0065990	NCP	%	82			75-125	Pass	
Cadmium	S22-My0065990	NCP	%	87			75-125	Pass	
Chromium	B22-My0051081	NCP	%	98			75-125	Pass	
Copper	B22-My0051081	NCP	%	102			75-125	Pass	
Lead	S22-My0065990	NCP	%	83			75-125	Pass	
Mercury	S22-My0065990	NCP	%	102			75-125	Pass	
Nickel	B22-My0051081	NCP	%	91			75-125	Pass	
Zinc	S22-My0068523	NCP	%	94			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S22-My0063193	CP	%	97			70-130	Pass	
Acenaphthylene	S22-My0063193	CP	%	100			70-130	Pass	
Anthracene	S22-My0063193	CP	%	98			70-130	Pass	
Benz(a)anthracene	S22-My0063193	CP	%	93			70-130	Pass	
Benzo(a)pyrene	S22-My0063193	CP	%	97			70-130	Pass	
Benzo(b&j)fluoranthene	S22-My0063193	CP	%	92			70-130	Pass	
Benzo(g.h.i)perylene	S22-My0063193	CP	%	80			70-130	Pass	
Benzo(k)fluoranthene	S22-My0063193	CP	%	107			70-130	Pass	
Chrysene	S22-My0063193	CP	%	94			70-130	Pass	
Dibenz(a.h)anthracene	S22-My0063193	CP	%	92			70-130	Pass	
Fluoranthene	S22-My0063193	CP	%	101			70-130	Pass	
Fluorene	S22-My0063193	CP	%	96			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S22-My0063193	CP	%	89			70-130	Pass	
Naphthalene	S22-My0063193	CP	%	94			70-130	Pass	
Phenanthrene	S22-My0063193	CP	%	95			70-130	Pass	
Pyrene	S22-My0063193	CP	%	102			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S22-My0063192	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S22-My0063192	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S22-My0063192	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S22-My0063192	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S22-My0063192	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S22-My0063192	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S22-My0063192	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S22-My0072591	NCP	mg/kg	110	170	41	30%	Fail	Q15
TRH C15-C28	S22-My0072591	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S22-My0072591	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Naphthalene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S22-My0063192	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S22-My0072591	NCP	mg/kg	99	140	33	30%	Fail	Q15
TRH >C16-C34	S22-My0072591	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S22-My0072591	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Phenanthrene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S22-My0063192	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S22-My0064149	NCP	mg/kg	3.4	3.1	7.0	30%	Pass	
Cadmium	S22-My0064149	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S22-My0064149	NCP	mg/kg	8.4	9.6	14	30%	Pass	
Copper	S22-My0064149	NCP	mg/kg	6.3	6.5	4.0	30%	Pass	
Lead	S22-My0064149	NCP	mg/kg	8.1	11	33	30%	Fail	Q15
Mercury	S22-My0064149	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S22-My0064149	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S22-My0064149	NCP	mg/kg	17	17	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S22-My0063192	CP	%	23	23	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Robert Biviano	Analytical Services Manager
Chamath JHM Annakkage	Senior Analyst-Asbestos
Gabriele Cordero	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Sayeed Abu	Senior Analyst-Asbestos

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Environmental Consulting Services
10 Fort Street
Petersham
NSW 2049

Attention:	Simon Caples
Report	891904-AID
Project Name	CHISHOLM
Project ID	CHISHOLM
Received Date	May 26, 2022 Jun
Date Reported	01, 2022

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name CHISHOLM
Project ID CHISHOLM
Date Sampled May 26, 2022
Report 891904-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
CP1	22-My0063192	May 26, 2022	Approximate Sample 41g Sample consisted of: Light brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
CP2	22-My0063193	May 26, 2022	Approximate Sample 43g Sample consisted of: Light brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
CP3	22-My0063194	May 26, 2022	Approximate Sample 39g Sample consisted of: Brown coarse-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	May 26, 2022	Indefinite

eurofins | Environment Testing

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NATA # 1261 Site # 18217

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NSW 2049

Project Name: CHISHOLM
Project ID: CHISHOLM

Order No.:
Report #: 891904
Phone: 02 9518 1161
Fax:

Received: May 26, 2022 1:20 PM
Due: May 31, 2022
Priority: 3 Day
Contact Name: Simon Caples

Eurofins Analytical Services Manager : Robert Biviano

Sample Detail						Asbestos - AS4964	Moisture Set	Eurofins Suite B7
Melbourne Laboratory - NATA # 1261 Site # 1254								
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794								
Mayfield Laboratory - NATA # 1261 Site # 25079								
Perth Laboratory - NATA # 2377 Site # 2370								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	CP1	May 26, 2022		Soil	S22-My0063192	X	X	X
2	CP2	May 26, 2022		Soil	S22-My0063193	X	X	X
3	CP3	May 26, 2022		Soil	S22-My0063194	X	X	X
Test Counts						3	3	3

Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. Information identified on this report with the colour **orange** indicates sections of the report not covered by the laboratory's scope of NATA accreditation.
6. This report replaces any interim results previously issued.

Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).
If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (**% w/w**)
F/fld	Airborne fibre filter loading as Fibres (**N**) per Fields counted (**n**)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (**C**)
g, kg	Mass, e.g. of whole sample (**M**) or asbestos-containing find within the sample (**m**)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (**V** = **r** x **t**)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (**r**)
min	Time (**t**), e.g. of air sample collection period

Calculations

Airborne Fibre Concentration: $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{V}\right)$

Asbestos Content (as asbestos): $\%\, w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos): $\%_{WA} = \sum \frac{(m \times P_A)_x}{x}$

Terms

%asbestos	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 *Appendix 2*, else assumed to be 15% in accordance with WA DOH *Appendix 2* (**P_A**).
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
AF	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
AFM	Airborne Fibre Monitoring, e.g. by the MFM.
Amosite	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
AS	Australian Standard.
Asbestos Content (as asbestos)	Total % w/w asbestos content in asbestos-containing finds in a soil sample (**% w/w**).
Chrysotile	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
COC	Chain of Custody.
Crocidolite	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
Dry	Sample is dried by heating prior to analysis.
DS	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
FA	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
Fibre Count	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
Fibre ID	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
HSG248	UK HSE HSG248, *Asbestos: The Analysts Guide*, 2nd Edition (2021).
HSG264	UK HSE HSG264, *Asbestos: The Survey Guide* (2012).
ISO (also ISO/IEC)	International Organization for Standardization / International Electrotechnical Commission.
K Factor	Microscope constant (**K**) as derived from the effective filter area of the given AFM membrane used for collecting the sample (**A**) and the projected eyepiece graticule area of the specific microscope used for the analysis (**a**).
LOR	Limit of Reporting.
MFM (also NOHSC:3003)	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*, 2nd Edition [NOHSC:3003(2005)].
NEPM (also ASC NEPM)	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
Organic	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
PCM	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
PLM	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
SMF	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
SRA	Sample Receipt Advice.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
UK HSE HSG	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
UMF	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
WA DOH	Reference document for the NEPM. Government of Western Australia, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (updated 2021), including Appendix Four: *Laboratory analysis*
Weighted Average	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (**$\%_{WA}$**).

Comments

The samples received were not collected in an approved asbestos bag and was therefore sub-sampled from the 250mL glass jar. Valid sub-sampling procedures were applied so as to ensure that the sub-samples to be analysed accurately represented the samples received.

The sample received WAS not collected in an approved asbestos bag and was therefore sub-sampled from the 250mL glass jar. Valid sub-sampling procedures were applied so as to ensure that the sub-sample to be analysed accurately represented the sample received.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Asbestos Counter/Identifier:

Sayeed Abu	Senior Analyst-Asbestos
Chamath JHM Annakkage	Senior Analyst-Asbestos

Authorised by:

Chamath JHM Annakkage	Senior Analyst-Asbestos
Sayeed Abu	Senior Analyst-Asbestos

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

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Sample Receipt Advice

Company name:	Environmental Consulting Services
Contact name:	Simon Caples
Project name:	CHISHOLM
Project ID:	CHISHOLM
Turnaround time:	3 Day
Date/Time received	May 26, 2022 1:20 PM
Eurofins reference	891904

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 20.7 degrees Celsius.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Please advise if subsampling is allowed from the jar for asbestos analysis.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Robert Biviano on phone : or by email: RobertoBiviano@eurofins.com

Results will be delivered electronically via email to Simon Caples - simon@ecsgroup.com.au.

Global Leader - Results you can trust

REVELOP

10 August 2022

Maitland City Council
285–287 High Street
PO Box 220
Maitland NSW 2320

Attention: Brian Gibson- Principal Planner

Re: **Response to additional information request**

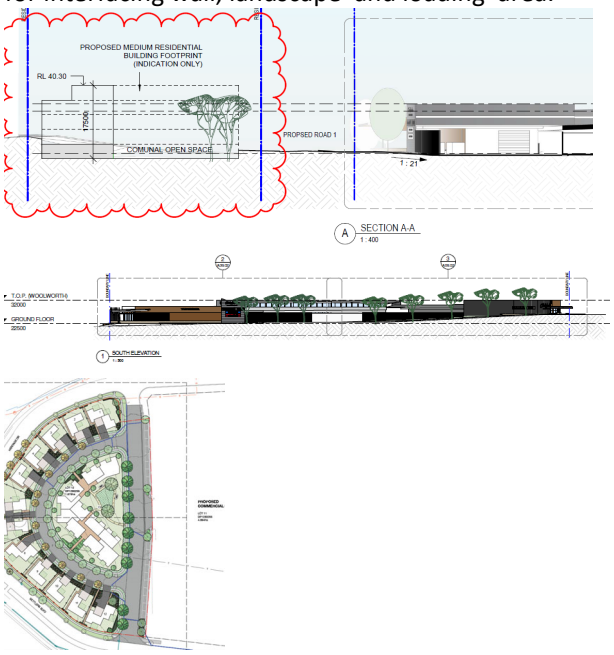
Address: **4 HERITAGE DRIVE CHISHOLM NSW 2905**

Application No: **DA/2021/1702**

Dear Brian

We refer to the Urban Design comment via email on 26/07/2022 regarding subject application, we hereby would like to submit the documents and detailed response as per table attached.

The above and attached satisfies the issues raised by Council.

No.	Council's comment	Applicant's response
1	• Bulk and scale, and interfaces at southern end need to be carefully considered • The Panel will want to understand the relat ionship between landscaping and retaining in terms of scale, cross sections etc. Ther e is a need for more detail on cross section s, particularly between interfaces R1 and B 1 zones, pedestrian interfaces / landscape outcomes	Refer to section AA on DA11.01 for interface between R1 and B1 zone. Detailed landscape treatments is included in DA/2022/105, please refer to landscape drawings submitted for DA2022/105 as attached. Refer to Architectural drawing 09.02 south elevation for interfacing wall, landscape and loading area. 

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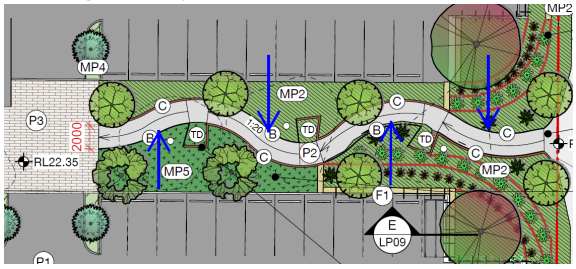
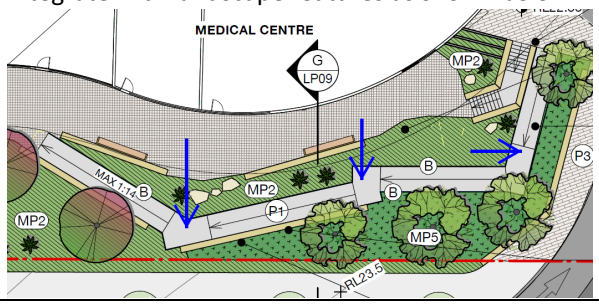
2	<u>Interface</u> The size of retaining walls at each corner of the development looks like the levels and design of the areas have not changed. Whilst additional landscaping sections have been provided along Tigerhawk Dr to show the landscaping solution, and which should help to soften the effect a bit, it is not really a comprehensive solution to the root of the problem.	Refer to updated landscape plans with demonstrated section in LP01 to LP12. Corners at Settler Blvd and Tigerhawk drive will be terrace landscaping with Corten feature signage, refer to section I-I. Signage will be submitted with separate DA for as whole centre signage strategy. Refer to section DD and EE for updated landscaping solution using Gabion walls and Corten terrace features.
3	<u>Pedestrian priority and amenity</u> The vegetated and shaded pedestrian spine linking the shopping centre with Tigerhawk Drive is an excellent outcome. It is noted the request to straighten the footpath to facilitate direct access to the shopping centre has not been incorporated. It is also noted the walkway is lined with ~900mm high walls. These walls should be removed as the current design will make the walkway feel enclosed and will restrict movement (eg passing others/CPTED). The lining of the pathway by ~900mm high walls also exists at the pedestrian entry on Heritage Drive (adjoining the driveway). Are these pathways sufficiently wide to enable people with trolleys to pass in opposite directions.	The spine walkway is 2m wide. It is wide enough for trolley users, however most of the trolley user will use the carpark area with trolleys to the parked car. 900mm high Corten walls are now make them open one side along the walkway to sense the landscape and hardscape at both sides. Refer to LP05 landscape drawing and as per detailed below. 
4	The ramp adjoining Allied Health is shown at a 1:18 grade – it is recommended to minimise duplications, improve wayfinding and minimise opportunities for concealment, consider minimising the extent of the ramp (eg by increasing the slope) and/or integrating it into the other public walking areas.	Refer to updated landscape drawing LP06 and section GG for increased gradient ramp. Extended landings are introduced as breakout zone to integrate with landscape features as shown below. 
5	<u>Sustainable Development</u> Shading of car parking through planting of trees is a good outcome for reducing urban heat, with it recommended in the RFI to consider planting more trees along the carpark edges to help this further. The design response appears to have reduced the number of trees within the car park	Refer to updated LP03 to LP05, trees within car parking area are added as per original DA submission.

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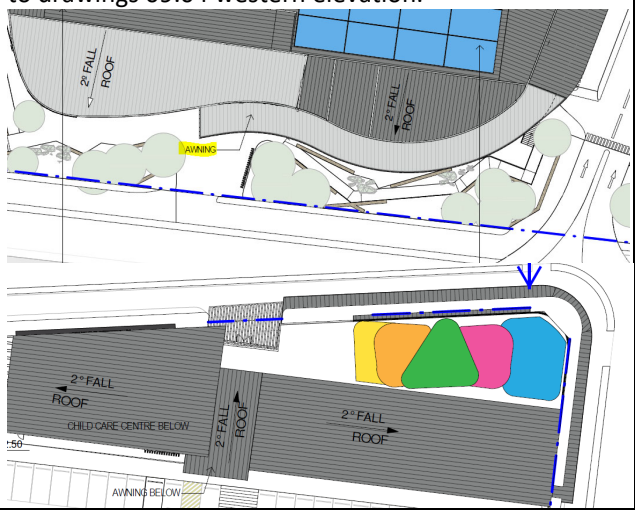
6	Provide shading to the east & west facing glazing (built elements and/or landscaping). This does not appear to have been addressed.	Refer to architectural plans A02.07, there are awning along medical centre and Gym/Swim school building. Windows at Swim School has been moved down for interaction between inside and outside. Privacy will be addressed via internal screen and obscure glass. Refer to drawings 09.04 western elevation. 

We look forward council to expedite the process of assessment and development approval at your earliest.
I can be contacted on 8203 0362 should you require anything further or to discuss this matter.

Kind Regards,

Anthony El-Hazouri

Director
Revelop Building and Developments Pty Ltd

Attachments:

1. Updated Architectural plans-prepared by BN
2. Updated Retail Landscape- prepared by Moir Landscape Architects
3. Residential Landscape prepared by Moir Landscape Architects

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REVELOP

01 September 2022

Maitland City Council
285–287 High Street
PO Box 220
Maitland NSW 2320

Attention: Brian Gibson- Principal Planner

Re: **Amendment of Development Application**
Address: **4 HERITAGE DRIVE CHISHOLM NSW 2905**

Application No: **DA/2021/1702**

Dear Brian

We refer to council's concern on constriction of link road to access loading bay under DA/2021/1702, we hereby would like to submit the amendment of Development Application as per section 37 of Environment Planning and Assessment Regulation 2021.

Details of amendment:

1. To include part of the land R1 General Residential to use us future local road (Link road as per Precinct Plan adopted in February 2017 in accordance with clause 1.2 (i) of Part F.7 of the Maitland Development Control Plan) into DA/2021/1702 **(4 Heritage Drive Chisholm NSW 2905).**

2. The said link road will be included in DA/2021/1702 (Retail DA) as well as in DA/2022/105 (Subdivision DA).

3. We request the condition relating to this should be:

The "link road" as defined in the Plan marked A and referenced in condition 1 as xxxxxxx shall be constructed under the subject DA.

Upon completion of this Link Road, said road may be dedicated to council and no longer be an obligation any other Development approval, namely DA/2022/105{SUBDIVISION DA}.

For the avoidance of doubt, the link road may be constructed, dedicated, and made usable without the need for the full works under the subject DA to be completed.

4. The application has been made on the NSW planning portal.

5. Details of drawings where amendments are made.

No.	Original DA drawing	Amended DA drawing
1	Architectural A2.03 Rev F Proposed Ground Floor Plan	Architectural A2.03 Rev F1 Proposed Ground Floor Plan with Scope of Work- Link Road
2	Architectural A2.01 Rev D Proposed Site Plan	Architectural A2.01 Rev D1 Proposed Site Plan with Scope of Work-Link Road

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REVELOP

We look forward council to expedite the process of assessment and development approval at your earliest. I can be contacted on 8203 0362 should you require anything further or to discuss this matter.

Kind Regards,

Anthony El-Hazouri

Director
Revelop Building and Developments Pty Ltd

Attachments:

1. Architectural A2.03 Rev F1
2. Architectural A2.01 Rev D1
3. Appendix A -Scope of Work for Link Road
4. Owner's consent letter from owner of 2 Heritage Drive Chisholm

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CHISHOLM SC PTY LTD

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T +61 2 8203 0362
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01 Sept 2022

Maitland City Council
285–287 High Street
PO Box 220
Maitland NSW 2320

Attention: Brian Gibson- Principal Planner

Landowners Consent for Lodgement of Development Application in accordance with the Environmental Planning and Assessment Act 1979 (Section 4.12)

As a Director of Chisholm SC Pty Ltd ATF Chisholm Investment Trust, ABN 81 344 205 838, and the registered owner of **Lot 12 DP 1280255 (2 Heritage Drive Chisholm NSW 2905),** we hereby consent to the making of Development Application under the Environmental Planning and Assessment Act 1979 (Section 4.12) for the above location and to include part of the land (Link road as per Precinct Plan adopted in February 2017 in accordance with clause 1.2 (i) of Part F.7 of the Maitland Development Control Plan) into DA/2021/1702 **(4 Heritage Drive Chisholm NSW 2905),**.

This letter authorises Chisholm SC Pty Ltd ATF Chisholm Investment Trust**,** to lodge the subject Application and land owners consent associated with the abovementioned land **Lot 12 DP 1280255**.

Yours faithfully,

Signed sealed and delivered by)
Chisholm SC Pty Ltd ATF Chisholm Investment Trust,)
ABN 81 344 205 838)
With S 127(1) of the Corporation Act 2001:)

…… ……

Signature of Director Signature of Director (or Company Secretary)

CHARBEL JOHN HAZZOURI ANTHONY CHARBEL EL-HAZOURI

…… ……

Print full name Print full name

URBIS

STATEMENT OF ENVIRONMENTAL EFFECTS

Chisolm Shopping Village –
20 Heritage Drive, Chisolm

Prepared for
CHISHOLM SC PTY LTD AF CHISHOLM SC INVESTMENT TRUST
December 2021

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	David Hoy
Associate Director	Christophe Charkos
Senior Consultant	Naomi Ryan
Assistant Planner	Kirraly Northey
Project Code	P0035655
Report Number	V3 – Final

Urbis acknowledges the important contribution that Aboriginal and Torres Strait Islander people make in creating a strong and vibrant Australian society.

We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

All information supplied to Urbis in order to conduct this research has been treated in the strictest confidence. It shall only be used in this context and shall not be made available to third parties without client authorisation. Confidential information has been stored securely and data provided by respondents, as well as their identity, has been treated in the strictest confidence and all assurance given to respondents have been and shall be fulfilled.

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You must read the important disclaimer appearing within the body of this report.

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EXECUTIVE SUMMARY

This SEE has been prepared by Urbis on behalf of Chisholm SC Pty Ltd AF Chisholm SC Investment Trust (**the Proponent**), to accompany a development application (**DA**) which seeks approval for the development of Chisholm Shopping Village located at 20 Heritage Drive, Chisholm. Consent is sought for the built form, land uses, fit out for specific uses, ancillary car parking, landscaping, public domain improvements and associated site works.

Chisholm Shopping Village will be a planned retail and community focal point providing an important local hub for services, employment, and hospitality facilities to serve the rapidly growing residential population within the suburb of Chisholm.

The proposed development represents a long awaited and significant investment in the Maitland local government area (**LGA)**. The additional community uses proposed will increase the community's opportunity for linked trips. This will positively contribute to the overall vitality of the centre and will help support the retail component by introducing new services and as such a greater choice to the market.

The objectives of the proposal are:

- To ensure that the future development on the site remains consistent with the intent of Council's original adopted resolution for the centre, i.e. overall retail/commercial floor space of 12,600m^2.
- To maintain the existing role and function of the Chisholm Shopping Village in Council's adopted retail centres hierarchy.
- To ensure that the development satisfies the objectives of the B1 zone under the Maitland Local Environmental Plan 2011, which are very much focussed on convenience-based retail.
- To ensure that the proposal can achieve the objectives of the adopted Precinct Plan for the Chisholm Shopping Village site including providing a 'full line' supermarket, and
- To provide an activated and legible public space for the use of the local community and the provision of community services such as a child care centre, learn to swim centre, gym and medical centre.

The assessment provided in this SEE concludes that the proposed development achieves key objectives of the State and local planning policy framework and Council's resolution dated 11 May 2010.

Chisholm Shopping Village will provide a positive community benefit for the local and wider population of Chisholm and Maitland.

This SEE has assessed potential impacts of the development under the provisions of section 4.15 of the *Environmental Planning and Assessment Act 1979* (EP&A 1979). The planned centre will have minimal impacts on the environmental, economic, and social function of the site and surrounding area.

The built form and landscaping responds to the location and topography of the site and will represent an attractive addition to the area. The proposed centre will provide a vibrant community hub and will activate the public domain surrounding the centre throughout the day and into the evening.

In view of the above, we conclude that the proposed development should be approved subject to Council's standard conditions of consent.

1. INTRODUCTION

1.1. OVERVIEW

This Statement of Environmental Effects (**SEE**) has been prepared on behalf of Chisholm SC Pty Ltd AF Chisholm SC Investment Trust (**the Proponent)** to accompany a Development Application (**DA**) for the construction of a neighbourhood scale shopping centre known as Chisholm Shopping Village at 20 Heritage Drive, Chisholm (**the site**).

The proposed development is to a one-to-two storey mixed use retail/commercial development with basement level parking, comprising the following land uses:

- a full-line supermarket,
- retail premises,
- indoor recreation facilities,
- food and drink premises,
- childcare centre, car wash and
- a medical centre.

Consent is also sought for bulk excavation, new structure, fit-out and commissioning of the proposed centre based child care facility. All other fit outs and signage will be subject to future applications.

The DA seeks consent for the following:

- Site preparation and early works including removal of all vegetation, retaining walls and bulk earth works;
- All land uses proposed within Chisholm Shopping Village including Retail Premises, Food and Drink Premises, Health Services Facility (Medical Centre), Recreation Facility (Indoor) and Centre based child care facility;
- Fit out of the Centre based child care facility;
- Development of the shopping centre and ancillary uses including all external walls and structures. All detailed internal tenancy fit outs will be subject to separate approval (with the exception of the Centre based child care facility);
- A total commercial / retail Gross Floor Area of 8,060m^2 and 3,320m^2 GFA for a Medical Centre, centre based child care facility and recreation facility (Indoor);
- An on site detention system which will be provided as a combination of below ground tanks and surface storage within the proposed carpark;
- All internal driveways and hard stand areas to accommodate loading and 682 car parking spaces and a basement car park with ancillary car wash facility; and
- Landscaping and public domain works including tree planting, paving, construction of driveways and perimeter footpaths.

This proposal has been prepared in accordance with the *Environmental Planning and Assessment Act 1979* (**EP&A Act**) and the *Environmental Planning and Assessment Regulation 2000* (**the Regulations**). The development consent is sought in accordance with Part 4 of the EP&A Act.

1.2. COST OF WORKS

The proposed works have an estimated cost of $36,955,000 (including GST) and development consent is sought in accordance with Part 4 of the EP&A Act. A Quantity Surveyors (**QS**) Cost Estimate Report has been prepared by Altus Group and is provided at **Appendix B.**

The cost of works is above $30 million; accordingly, the DA is declared as regionally significant development, and will be determined by the Hunter and Central Coast Planning Panel (**HCCPP**).

1.3. REPORT STRUCTURE

This SEE is structured as follows:

- **Section 1 – Introduction**
- **Section 2 – Site Context:** identifies the site and describes the existing development and local and regional context.
- **Section 3 – Project History:** outlines the approvals history and pre-lodgement discussions with key stakeholders.
- **Section 4 – Proposed Development:** provides a detailed description of the proposal including the demolition and construction phase.
- **Section 5 – Strategic Context:** identifies and analyses the State, regional and local strategic planning policies relevant to the site and proposed development.
- **Section 6 – Statutory Context:** provides a detailed assessment of the State and local environmental planning instruments and plans relevant to the site and development.
- **Section 7 – Assessment of Key Issues:** identifies the potential impacts arising from the proposal and recommends measures to mitigate, minimise or manage these impacts.
- **Section 8 – Section 4.15 Assessment:** provides an assessment of the proposal against the matters of consideration listed in Section 4.15 of the EP&A Act.
- **Section 9 – Conclusion:** provides an overview of the development assessment outcomes and recommended determination of the DA.

1.4. PROJECT TEAM

The technical and design documents that have been prepared to accompany this DA are provided as attachments to this SEE and in Appendices **A** to **V.**

Table 1 Supporting Documentation

Document Title	Consultant	Appendix
Survey Plan	Land Development Solutions	**Appendix A**
Quantity Surveyor Report	Newton Fisher	**Appendix B**
Architectural Plans	BN Architects	**Appendix C**
Landscape Plans	Moir	**Appendix D**
Traffic Impact Assessment and Turning Templates	McLaren Traffic Engineering	**Appendix E**
Access Strategy	Vista Access	**Appendix F**
Regulatory Compliance Report (BCA and Fire Engineering)	McKenzie Group	**Appendix G**
Waste Management Plans	Elephants Foot	**Appendix H**
Preliminary Construction Management Plans	Richard Crooks	**Appendix I**
Economic Impact Assessment	Ethos Urban	**Appendix J**

Document Title	Consultant	Appendix
Bush Fire Assessment	Newcastle Bushfire	**Appendix K**
CPTED Report	Design Partnership	**Appendix L**
Section J Report	JHA	**Appendix M**
Hunter Water Stamped Plans	Hunter Water	**Appendix N**
Acoustic Assessment	Acoustic Logic	**Appendix O**
National Quality Framework Assessment Checklist	BN Architects	**Appendix P**
Civil Engineering Documentation including: Stormwater and Engineering Report and Stormwater Management Plan Sediment and Erosion Control Plan Bulk Earthworks Plan	Triaxial	**Appendix Q**
Supplementary Flora and Fauna Assessment & Arborist Report	EPS	**Appendix R**
Preliminary Site Contamination Investigation	GHD	**Appendix S**
Preliminary Geotechnical Investigation	Douglas Partners	**Appendix T**
Preliminary Environmental Site Assessment	Environmental Consulting Services	**Appendix U**
DCP Compliance Table	Urbis	**Appendix V**

2. SITE CONTEXT

2.1. SITE DESCRIPTION

The site is located within the Waterford County precinct within the suburb of Chisholm. The site is legally described as the northern part of Lot 11 DP 1280255 and owned by Chisholm SC Pty Ltd AF Chisholm SC Investment Trust.

The site comprises cleared grassland with some existing trees. The surrounding road network has been constructed including the recently completed Settlers Boulevard frontage. The site slope is between 3.6% and 5.2% generally sloping in a north westerly direction and has a total area of 42,287.6m^2 (4.23ha) with the following frontages and dimensions:

- Heritage Drive – 240.3m
- Tigerhawk Drive – 199.5m
- Settlers Boulevard – 173.5m

A site survey, prepared by Land Development Solutions is included at **Appendix A.** An aerial photograph of the site is included at **Figure 1.**

Figure 1 Aerial photo of the site

Source: Urbis

2.2. LOCAL CONTEXT

Chisholm is located centrally in the Lower Hunter Region within the Maitland to Newcastle growth corridor. The site is located approximately 11km from Maitland and 30km from Newcastle. It is at an approximate mid-point between the main urban areas of Maitland and East Maitland to the north-west and Thornton and Beresfield to the south.

Maitland is well serviced by major transport infrastructure including the New England Highway and M1 Freeway which provide road links to Newcastle and Sydney. Nearby Metford and Thornton railway stations provide reasonably frequent rail links to Maitland, Newcastle and the wider regional rail network.

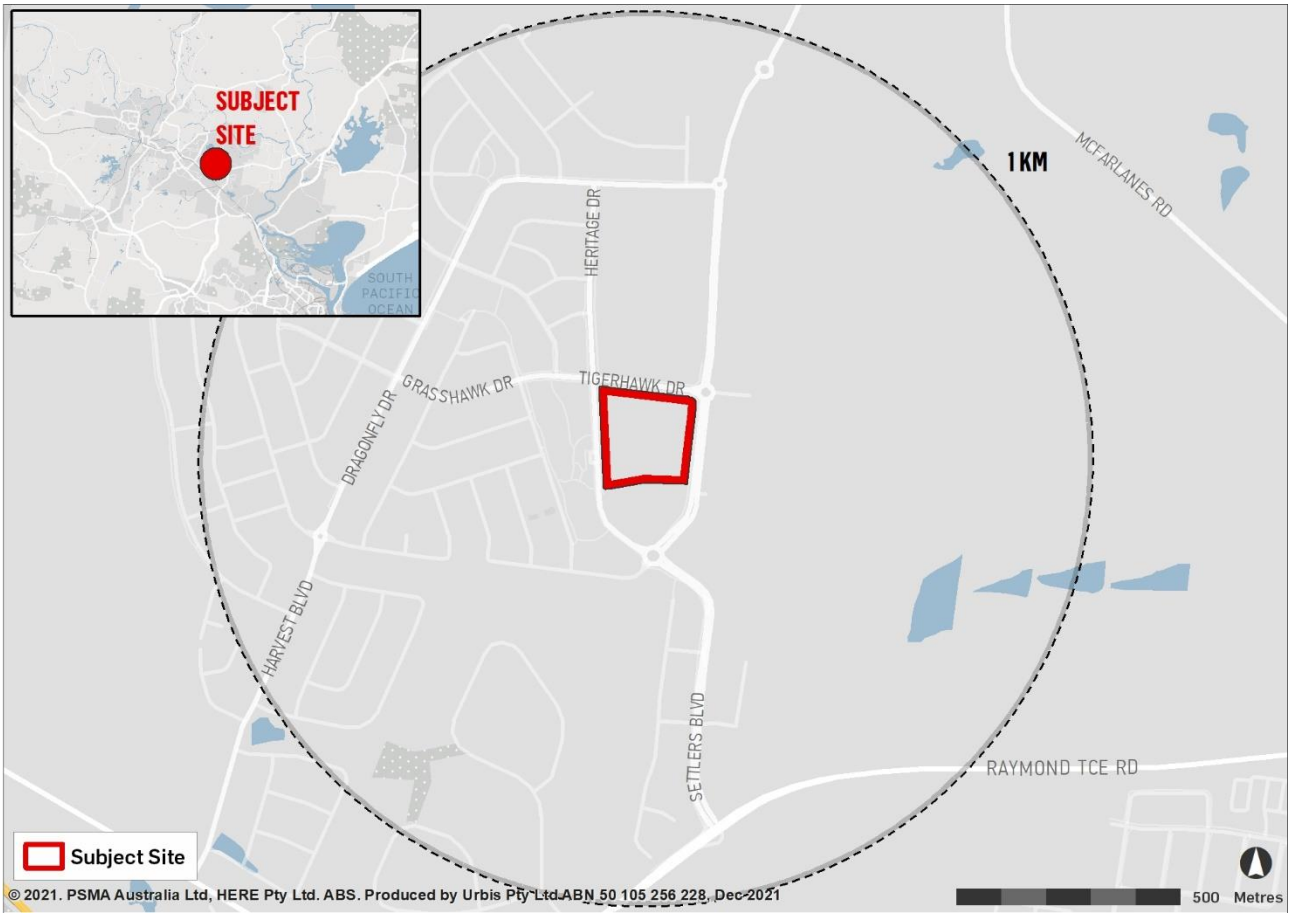
Maitland and Raymond Terrace are subregional centres which comprise commercial, retail, heath, educational, civic and community facilities and services. Newcastle is the main city that services the wider Hunter region.

Nearby retail centres include Thornton Shopping Centre that includes commercial and retail uses servicing the neighbouring suburb of Thornton and the regional centre, Stockland Greenhills at East Maitland.

The location of the site is shown on the map at **Figure 2.** The location of the site in relation to the nearest two retail centres is shown on the map at **Figure 3**.

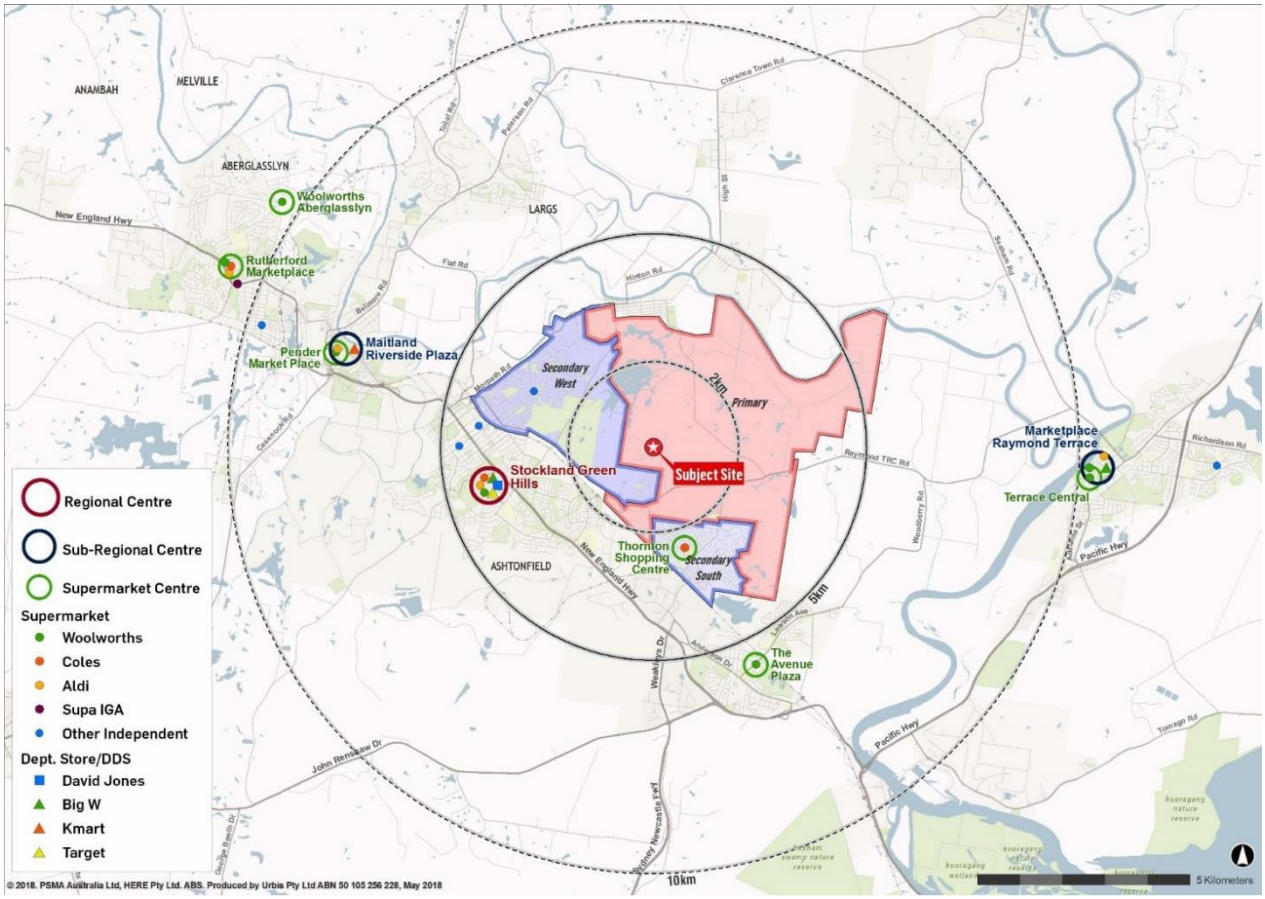
The area surrounding the site consists of recent residential and community infrastructure development (i.e., previous stages of the Waterford County development), riparian parkland, St Aloysius College, and remnant bushland. Photos of the site and surrounds are shown in **Figure 4**.

Figure 2 Location Map



Source: Urbis

Figure 3 Location of Nearby Centres



Source: Urbis

Figure 4 Site Photo

Picture 1 North eastern view from Heritage Drive

Picture 2 North Western View of Riparian Parklands from Heritage Drive

Picture 3 Eastern view of proposed site from Heritage Drive

Picture 4 Looking south east to the site from Heritage Drive

Picture 5 Looking across the site to the north

Picture 6 St Aloysius School – Northern view from proposed site

Source: BN Architects

2.3. SURROUNDING DEVELOPMENT CONTEXT

The site is located within the Thornton North (since renamed Chisholm) Urban Release Area and has undergone significant change over the past 10 years. Specifically, the surrounding development includes:

- **To the north** of the site is St Nicholas Early Education Centre, St Aloysius Catholic Primary School and St Bede's Catholic College, Chisholm. In addition, numerous display homes are located to the north and residential low-density dwellings.
- **To the east** of the site is riparian parkland and undeveloped open space.
- **To the south** of the site are residential low-density dwellings and larger lot residential lots. In addition, Little Zak's Academy, Chisholm is also located to the south of the site.
- **To the west** of the site is Whitewater Park providing open space and children's play equipment, and further west are residential low-density dwellings.

As outlined above, the site is primarily located amongst low density residential uses with minimal commercial and community uses servicing the day-to-day needs of the community. The proposed development will support the on-going residential growth of Chisholm noting that the closest retail centres including Thornton Shopping Centre and Stockland Greenhills are located 3.5km and 6.6km from the site respectively.

2.4. UTILITY SERVICES

The site is located within an urban release area which has been subdivided and is being progressively delivered. As such the public utility infrastructure for the proposed development is either available or can be made available.

3. PROJECT HISTORY

3.1. SITE HISTORY

- Chisholm Shopping Village is a planned shopping centre that was first identified in the Thornton North Structure Plan (TNSP). The TNSP was adopted by Council in 2003 to guide the long-term planning of the Thornton North (since renamed Chisholm) Urban Release Area.
- In August 2009, Waterford County submitted a rezoning application for the centre. The timing for the lodgement of the application coincided with Council's preparation of a Draft Centres Strategy for the Maitland LGA. The Draft Centres Strategy was informed by a Centres Study which recommended the site be zoned B1 Neighbourhood Centre.
- Despite this, the rezoning application for the site sought to rezone the site (approx. 3.2ha) to B2 Local Centre. In the rezoning application, it was argued at the time that the centre should be at least 6,000sqm and to be anchored by a new full line supermarket.
- The rezoning was ultimately supported by Council, its support included a resolution dated 11 May 2010 which stated:
  - *"To progress the rezoning of this site and to reinforce the scale and role of Chisholm as a **local centre** it is proposed that:*
    - *The area zoned for commercial be reduced to 2.5ha;*
    - *A 0.5:1 floor space ratio be applied to the commercial zoned area; and*
    - *DCP provisions and design guidelines be prepared to ensure quality planning and design outcomes for the Chisholm Local Centre site."*
- The implication of this resolution effectively capped the retail/commercial floor space of the centre at 12,500m^2. At the time of its Gazettal, the Chisholm Shopping Village site was the only centre within the LGA that had an FSR imposed on it.
- Subsequent to the rezoning, Council proceeded to adopt its Centres Strategy in January 2010 which included a hierarchy of centres. Notably, Chisholm was classified a "Neighbourhood Centre" whereas the existing Thornton centre was classified a "Town Centre":
- Maitland LEP was gazetted later in 2011. The zoning of the Chisholm Shopping Village site was "translated" into the Standard LEP format. This resulted in the site being zoned 'B1 Neighbourhood Centre' with a 0.5:1 FSR being maintained across the site. The new MLEP 2011 also included erroneous maps which resulted in an increase to the area of land zoned for B1 Neighbourhood Centre from 2.5ha to 3.9ha.
- Since the rezoning, Chisholm has been developed and the road layouts and cadastral boundaries defined. As such, the original maps of the LEP did not correspond to the cadastre.
- As part of ongoing discussions around the submission of the Precinct Plan for the site, Council also prepared a Planning Proposal to amend the Maitland LEP to rectify the mapping errors to ensure that the zoning and associated built form controls of the site reflected the cadastral boundaries.
- On 8 November 2016, Council resolved to forward the planning proposal to the Minister for Planning requesting a gateway determination for the following:
  - Rezone the entire 4.2ha site to B1 Neighbourhood Centre,
  - Decrease the Floor Space Ratio (FSR) to 0.3:1 to account for the larger site area and maintain a maximum GFA of 12,600m^2 over the site (original resolution, 2.5:1 – 12,500sqm GFA)
  - Remove the 8m building height to provide flexibility for the future built form, and
  - Include ***Recreation Facility (indoor)*** as a permitted use within the B1 Neighbourhood Centre zone.
- Gateway Determination was received from the Department of Planning and Environment (DP&E) on 9 December 2016. The planning proposal was recommended to proceed subject to amendments to be made prior to requirement for exhibition.

- The planning proposal was placed on exhibition from 17 February to 17 March 2017. One (1) submission was received from the proponent which was in support of the planning proposal.
- In its meeting on 11 April 2017 Council supported a resolution to request that the Minister for Planning to make the LEP. The planning proposal was subsequently forwarded to the Department of Planning for final assessment and drafting of the LEP on 08 May 2017.
- The Amendment to the MLEP 2011 was Gazetted on 21 July 2017.
- Following, the rezoning a development application (DA/2018/1526) with a CIV of $29,733,000 for a Neighbourhood Shopping Centre was approved on the 22nd October 2019. This development sought consent for the first stage of the development of Chisolm Village Centre.
- The site was subsequently sold, and the approved scheme has been revisited by the new owners. The revised scheme is the subject of this DA.
- Subdivision of the lot into two lots was approved on 28 September 2021 (DA/2021/677). The subdivision is currently being registered with Land Registry Services NSW.

3.2. PRECINCT PLAN HISTORY

Part 6.3 of the MLEP 2011 required the preparation of a site-specific DCP which required the Urban Release Area to inter alia provide

> *6.3 (3)(g) 'detailed urban design controls for significant development sites,*

A site specific DCP was subsequently prepared for the Thornton North Release Area. This DCP was incorporated into Part F of the Maitland DCP 2011 as F.7 Thornton North Release area.

Section 1.1 of Part F.7 of the DCP provided development consent could not be granted until a Precinct Plan had been prepared for the land. The Chisholm Shopping Village site was identified in section 1.2(i) of Part F.7 as requiring a separate precinct plan to include detailed urban design controls.

In terms of the precinct plan for the Chisholm Shopping Village site:

- A Draft Precinct Plan for the site was presented to Council in a meeting on 14 September 2016. Following the meeting Council indicated that they were generally satisfied with the Precinct Plan subject to some minor amendments to enable the plan to proceed to public exhibition.
- The Draft Precinct Plan included a number provisions including the provision of a 'full line supermarket' and development of a 'town square' in the first stage of the development of the centre.
- Minor amendments included a requirement for an Economic Impact Assessment (EIA) to be submitted with the Development Application to consider the mix of retail and commercial on the site to ensure the continued viability of both the Thornton and Chisholm centres.
- The final Draft Precinct Plan was submitted to Council on 25 October 2016 and subsequently endorsed to be placed on exhibition at a Council meeting on 8 November 2016.
- The Precinct Plan was exhibited for 28 days from 18 November to 16 December. Eight submissions were received generally in support of the plan. The results of the community consultation were reported back to Council on 28 February 2017 where it was unanimously resolved to adopt the precinct plan by Council.
- Maitland Development Control Plan 2011 was subsequently updated to incorporate the adopted amendments in March 2017.

3.3. PRE-LODGEMENT DISCUSSIONS

The proponent has held two (2) pre-DA meetings in 2021 to continue discussions for the Chisolm Shopping Village. These meetings were following earlier ongoing discussions in 2017 and 2018 regarding the site.

The discussions included the DA for the shopping centre complex (this application), a subdivision DA (separate to this application) and a residential DA (separate to this application). The two recent discussions included:

- A formal pre-lodgement meeting on 17 June 2021 to discuss the overall masterplan for the site.
- A second formal pre-lodgement meeting on 12 August to present the schematic design for the residential subdivision and amended driveway to the retail centre. We note that the majority matters raised by Council in the minutes to this meeting relates to the residential component.

The key matters raised in both meetings are summarised in **Table 2** below noting that any duplicated comments have only been addressed once.

Table 2 Council Pre-DA meeting

Council Comment	**Response**
17 June 2021	
Centre Proposal It is noted the proposal more closely reflects the design principles as outlined in the Thornton Urban Release Area (URA) Precinct Plan and is commended.	Noted. The proposed development is consistent with the Thornton Urban Release Area (URA) Precinct Plan.
The proposed loading dock being located on the unnamed “service” road at the rear is consistent with the Thornton Urban Release Area (URA) Precinct Plan. This interface is critical with the residential land and must consider visual, odour and acoustic impacts/ treatments. The building elevation adjoining the residential area shall be well articulated, have a variety of materials and treatments.	The loading dock location has been considered for its impacts on the potential future use of residential land at the adjoining interface. The proposed interface will be well articulated and have a variety of colours and materials. In addition, the loading dock is to be screened from the residences to the south with a minimum 4-metre-high barrier, and the barrier is to be constructed of solid, imperforate material with no gaps, a per the recommendations of the Noise Emission Report at **Appendix O.**
Further consideration needs to be given to the location of the proposed medical centre and parking associated with this.	The Architectural Drawings (**Appendix C**) illustrate the ramp access with a gradual incline to the pick-up area, a pedestrian crossing connection to the outdoor parking and a travelator to access the basement parking. No entry is provided to the Supermarket from the Medical Centre, all access to the Supermarket by customers is from within the internal mall. The medical centre entrance will stand alone on the eastern side of the centre..

Council Comment	Response
	Further, an Access Strategy has been prepared and included at **Appendix F** demonstrating the proposed development is capable of compliance.
Key corner sites - activated street frontage – fast food is not considered an appropriate use in such a key location. From experience of other similar sites, it was noted that internal connection points close to external access points can be problematic and this should be considered as part of the design (i.e. the short fast food drive through will block incoming traffic and effect traffic on Tigerhawk Drive and Settlers Boulevard, similarly the first internal right turn off the Settlers Boulevard driveway needs further consideration also) the potential to impact on the surrounding public road network needs to be strongly considered in the design layout.	The fast-food store location is not being considered for approval in this development application and will not be assessed at this stage.
External storage and service are sensitive interfaces and consideration should be given to amenity impacts from roads, parking areas and pedestrian areas.	Storage and service areas are proposed to be placed away from high foot traffic areas.
The underground car park shall be consistent with the external materials when visible from the public realm. Any ventilation ducts/grills shall integrate with the streetscape and be unobtrusive and/or screened.	The materials used for the basement parking are proposed to be consistent with the materials of the above ground development. The mechanical ventilation will ensure it is not visible to the public eye as illustrated in the Architectural plans (**Appendix C**) where material such as black battens and metal louvres are used to distort view impacts of service areas and equipment.
Car parking forward of the buildings/ within front setback to a landscaped strip with a minimum width of 3.0m is provided along the entire frontage/s of the site. Additional landscaping is required along Tigerhawk Drive to ensure that the development of the site is well resolved at its edges/interface with the street. Landscaping should be of high quality and differences in finished levels between the site and footways shall be retained with high quality materials which integrate well with the architecture of the buildings.	The Heritage Drive frontage does not provide car parking at ground level. Tigerhawk Drive has a 3m landscaped strip between the pedestrian path / road and where the car park begins to resolve the interface and provide high quality visual impact between the site and the road.
Ensure variations in roof form are provided in the development or between developments. Lift over-runs and service plant shall be concealed	The roof form has ensured variation across the proposed built form, with detailed imagery of the

Council Comment	Response
within roof structures. All roof plant is to be represented on plans and elevations and clearly integrated into the building. Any outdoor recreation areas on flat roofs shall be landscaped and incorporate shade structures and wind screens to encourage use.	various roof sections with their degree and direction of fall illustrated in the Architectural Plans (**Appendix C**).
Ensure proposed levels and gradients within the site are submitted given the slope of the site and ensure the proposal achieving practical access for all modes of transport.	The Geotechnical Report (**Appendix T**) identified a 6% slope to the west of the site with steeper slopes located within gullies at the central portion of the site (up to 7%). This report recommended that limited earthworks be completed to prepare for construction although it is concluded that there is low risk of instability. For cuts greater than 2m a higher risk category would be considered.
The proposal must include a shared path connectivity plan linking existing and proposed external paths to entry point for the development on all frontages of the development.	The Architectural Plans (**Appendix C**) show the proposed linkage of the footpath across all frontages, connecting the entry points.
Plans and documentation required: i. Staging Plan if proposed. ii. Economic Impact Assessment is required to consider the mix of retail and commercial offerings and the scale of any development to ensure continued viability of both Thornton and Chisholm centres. iii. Traffic Impact Assessment prepared by a suitably qualified consultant which considers the full development scenario of the centre, details relating to the overall traffic and pedestrian management, access to parking areas, pedestrian access provisions, assessment of the proposed car parking designs and traffic generation including an assessment on the surrounding road network and key intersections. Vehicle turning templates for articulated vehicles entering and exiting the loading dock areas will be required. Car parking would be required to meet the minimum standards contained under the Maitland DCP 2011 – Car Parking (the specific land uses proposed must be calculated in accordance with the DCP). The proposal must	Staging is not proposed as part of this DA. An Economic Impact Assessment has been provided at **Appendix J** and is summarised in **Section 8.7.2** outlining economic impacts of Chisolm Shopping Village from an economic perspective. A Traffic Impact Assessment has been provided at **Appendix E** and is summarised in **Section 7.4**.

Council Comment	Response
be accompanied by a detailed parking analysis as part of the broader traffic assessment. Consideration should be given to internal areas for taxi's, minibuses drop-off areas and bicycle racks/facilities.	
iv. Access Strategy prepared by a suitably qualified consultant which includes how safety and functionality of the pedestrian focal points and the public and school bus services that will congregate on Tigerhawk Drive. It should include a shared path connectivity plan linking all external paths to the entry point of the development.	The Access Report at **Appendix F** provides an assessment of the accessibility requirements and demonstrates that the proposed development is capable of complying with the necessary requirements.
v. Landscape plan which shows existing vegetation; vegetation proposed to be removed; proposed general planting landscape treatment; design details of hard landscaping elements; major earth cuts, fills and any mounding; street trees; and existing and proposed street furniture including proposed signage.	Landscape Plan have been provided at **Appendix D**, identifying the existing and proposed vegetation plan for the proposed works.
vi. Waste management plan for the construction and occupation of the development.	A Waste Management Plan has been prepared and is included at **Appendix H,** outlining the construction and operational plan for waste for the proposed works.
vii. Acoustic Assessment – which considers sound power level outputs of air condition plant and the location of the plant, loading bay etc. The application should specify the delivery route to the loading bay area that minimises the noise impact on residential areas (this should also include the loading bay/ service delivery for the fast-food premises).	An Acoustic Assessment has been detailed at **Appendix O** and considers the noise impacts for the surrounding residential area.
viii. An indicative materials schedule should be included which provides specifics on finishes, colours and external materials including ground level finishes such as paving.	The proposed material board is illustrated in the Architectural Plans at **Appendix C**.
ix. Any signage should show the location and dimension of all signage panels and demonstrate consistency with the Outdoor Advertising chapter of the DCP. Plans should indicate the intended method of night-time lighting – that is, either internal or external illumination. Please review SEPP64 Advertising	Signage does not form part of this DA and will be considered in future DA.

Council Comment	Response
and Signage for further information on advertising on private land. x. Bushfire Threat Assessment demonstrating compliance with Planning for Bush Fire Protection 2019. xi. Crime Prevention Through Environmental Design Assessment must also be submitted with the application.	A Bush Fire Assessment has been prepared at **Appendix K** and summarised in **Section 7.3** to demonstrate compliance with Planning for Bushfire Protection 2019. A Crime Prevention Through Environmental Design Report was prepared and included at **Appendix L**.
A detailed statement of environmental effects (SoEE) is required that fully addresses the likely environmental impacts of the development (including impacts on both the natural and built environments), the social and economic impacts in the locality, and how the environmental impacts of the development have been identified. The SoEE should demonstrate how identified impacts will be mitigated. The requirements of the Thornton North URA and related DCP should be addressed in detail. The SoEE must also address site suitability and demonstrate that in designing the proposal you have fully considered and responded to the applicable site constraints legislative provisions. Any departures from Council's policies and DCP should be justified with appropriate reasons for justification.	This report is the SEE that is prepared in accordance with *Environmental Planning and Assessment Act 1979*. It addresses all the relevant statutory and strategic requirements including the state and local planning instruments and provides an assessment of the proposed works in reference to these instruments.
A detailed bulk earthworks plan is required that responds sensitively to the topography of the land to restrict and control excessive earthworks. Cut and fill should minimise land shaping outside of the building footprints and ensure that the amount of cut and fill does not concentrate surface flows onto adjoining properties or impact the riparian area. The plan should indicate the total amount of cut and fill across the entire site with inclusion of existing levels of the land for such works, including the construction of building and those areas of the site external to building platforms. Any cut/fill batters or retaining along boundary lines shall be clearly indicated in regard to heights and offsets to boundaries. Earthworks and the treatment of edges will require detailed consideration.	A detailed bulk earthworks plan and cut and fill plan have been prepared by Triaxial and is included at **Appendix Q.**

Council Comment	Response
Any cut retaining walls shall be offset away from neighbouring boundaries and road reserves. In addition, provision of longitudinal section plans for retaining in relation to their relationship with boundaries and/or fencing is also required. Any departures from Council's DCP in this regard should be fully justified, in particular, where retaining is not offset from boundaries and should provide good justification given potential issues with construction of walls and sub soil drainage etc	A detailed bulk earthworks plan and cut and fill plan have been prepared by Triaxial and is included at **Appendix Q.**
Engineering Advice Stormwater - A stormwater management plan shall be submitted as part of any application that addresses water quantity and quality targets in accordance with Councils Manual of Engineering Standards (MOES).	A Stormwater Management Plan has been provided at **Appendix Q,** addressing the water quantity and quality targets in accordance with Councils Manual of Engineering Standards.
The commercial component of the proposal must consider the following: a) Vehicle access points from Heritage Drive, Settlers Boulevard, Tigerhawk Drive. b) Consider a right-hand turn lane from Settlers Boulevard within median. Changes in road levels need to be considered. c) Provide right hand turn lane from Heritage Drive. d) Consider the removal of the Tigerhawk Drive access. This will help extend the vehicle queue length for the fast-food outlets. Consideration should also be given for the carpark aisle near fast food 1 to exit only. e) Consider public transport, including bus zones and taxi ranks f) Provide pedestrian refuges at both access point on Heritage Drive and Settlers Boulevard. g) Consider the access point to undercover carpark. h) There appears to be a secondary access or pedestrian access to the underground carpark, confirm the type.	Multiple vehicle access points have been considered for entry and exit into the commercial premise with two, two-way access points from Heritage Drive and Settlers Boulevard as well as a one-way entry point from Tigerhawk Drive. Two pedestrian crossings are located at both access points from Heritage Drive and Settlers Boulevard. The basement entry is now only accessible heading west to avoid any congestion when crossing from the other side. Pedestrian access to the underground carpark has now been labelled on the updated architectural drawings. This access allows entry to the supermarket via the travelator from Heritage Drive. The car parking and service layout has been designed to comply with AS2890, as outlined in the **Appendix E**. The pedestrian walkways, stairs and ramps have been updated to provide for the ease of movement for all abilities.

Council Comment	Response
i) Ensure carparking layout and service areas comply with AS2890. j) Provide upgraded infrastructure to facilitate safe pedestrian movements to and from the development	
Urban Design Advice Overall supportive of the shopping centre design, proposed tenancies, size and location of open spaces and of links to surrounding features such as the school, future communities and open spaces.	The proposed design carefully considers of the proposed future use of tenancies and spaces within the centre, as well as the surrounding network.
Topography Elevations show areas where retaining walls are ~2m. Please minimise blank walls and retaining walls. Where this is inevitable, we will request a well-thought-out landscape design solution.	Retaining walls have been minimised where possible with stepped landscaping breaking up any tall, repetitive walls.
Road Design The proposed road that separates the residential from the town centre should be designed as a local road, to encourage regular pedestrian activity and provide visual and environmental amenity to future residents. It should feature footpaths, landscaping, street trees and street parking. The provision of wider footpaths on the southern/ residential side of the street, to encourage pedestrian activity away from the loading dock is supported. Perpendicular or angled parking near to the Town Centre is also acceptable, as long as CPTED issues have been addressed and conflicts between pedestrians and the loading dock have been minimised.	Noted, the proposed road design will be subject to a future application as part of the residential proposal to the south and will be consistent with council standards for local road design.
Building Advice Ensure the building meets accessibility and fire safety standards under both the BCA, Australian Standards and Guidelines and the requirements of Maitland DCP 2011 (where applicable). This will include disabled access, disabled car parking, disabled toilet facilities and accessible paths of travel.	A Regulatory Compliance Report has been prepared by McKenzie Group and included in **Appendix G** and an Access Report has been prepared by Vista Access Architects and included in **Appendix F.** The proposed development can comply with the Building Code of Australia subject to further assessment and design development as part of the Construction Certificate stage.

Council Comment	Response
<u>External Referrals</u> The application may be referred to the following external agencies for comment: ▪ Rural Fire Services and Transport NSW	Noted.
Plans Should include but not limited to development Plans including: ▪ Notification Plan; - Waste Management Plan (construction and operational waste management plan) - Survey Plan to investigate the existing site boundaries and any infrastructure restrictions, - Detailed site analysis that identifies constraints, prevailing characteristics of the locality and an understanding of the site and context, - Proposed site plan, floor plans, elevations, sections, Solar access diagrams, - Landscaping Plan with detail regarding plantings height at maturity, pot size and include details of retaining walls and fencing, - Vehicle manoeuvring and access plan, - Erosion and Sedimentation Control Plan, - Bulk Earthworks Plan, - Stormwater Management Plan, - Photomontages - Schedule of colours, materials and finishes, - Arborist report, - Contamination assessment, - Acoustic report,	All relevant plans have been provided to accompany the Development Application, refer to appendices.

Council Comment	Response
- Notification plan with site plan, elevations and floor plan.	
12 August 2021	
Careful consideration to the layout to Settlers Boulevard and Heritage Drive. The interface and presentation to Settlers Boulevard and Heritage Drive should consider: i. Further information on landscape buffer along road frontage – who owns/maintains. ii. Clearly show the proposed fencing locations and materiality. iii. Consider building variation to the road frontages it is undesirable to have large expanses of unpunctuated facades walls	The interface and presentation to Settlers Boulevard and Heritage Drive has been carefully considered in terms of landscaping, architectural articulation, building variation and fencing and materiality.
Engineering Advice The new link road is to be consistent with the existing stub near Heritage Drive, being 4.5m verge, 12m carriageway and 5.5m verge with full width footpath.	Noted, the proposed road design will be subject to a future application as part of the residential proposal to the south and will be consistent with council standards for local road design.
Provide right hand turn lane from Settlers Boulevard within median. Changes in road levels need to be considered.	A right hand turn land has not been provided, entry is limited to left hand turn in/out from Settlers Boulevard.
Provide right hand turn lane from Heritage Drive.	A right hand turn lane will be provided from Heritage Drive.
Remove Tigerhawk Drive exit. The traffic on to Tigerhawk is to be minimised. All traffic must exit via Settlers Boulevard or Heritage Drive.	Tigerhawk Drive has a proposed entrance. This arrangement is supportable from a traffic and access perspective as outlined within the Traffic and Parking Assessment at **Appendix E.**
The Tigerhawk Drive entry shall be shifted as far away from the roundabout without impacting existing Bus zones/infrastructure. This will require the extension of the central median in Tigerhawk to restrict right in movements.	Tigerhawk Drive has a proposed entrance which is located away from the existing roundabout and setback from the existing bus zone. This arrangement is supportable from a traffic and access perspective as outlined within the Traffic and Parking Assessment at **Appendix E.**
Consider public transport, including bus zones and taxi ranks.	The surrounding vicinity is serviced by public buses nearby the area. There are no train lines, and a taxi rank has not been proposed for this DA.

Council Comment	Response
Provide pedestrian refuges at both access point on Heritage Drive and Settlers Boulevard.	Pedestrian crossings have been provided at both the Settlers Boulevard entrance/exit and the Heritage Drive entrance/exit for safe access points.
Ensure carparking layout and service areas comply with AS2890.	The carparking layout and service areas will be in accordance with the Australian standards AS2890.
Provide upgraded infrastructure to facilitate safe pedestrian movements to and from the development	The proposal will integrate with the existing pedestrian infrastructure and provide upgrades where necessary.
Stormwater quality and quantity to be addressed for both the Subdivision DA and Shopping Complex DA in accordance with Council's Manual of Engineering Standards	The stormwater plans address the Council's Manual Engineering Standards at **Appendix Q.**
Urban Design Advice Consideration can be given to reduced setbacks along the new loop road on merit and additional assessment, given the proposed medium density character of the street. Suggest setbacks be a minimum of 1m and the new loop road should achieve a minimum of 25m separation from building face to building face. Suggest a smaller setback to the south side of the road (for detached dwellings and dual occupancy) and a larger setback to the superlot on the north side, to allow for ground floor terraces and better privacy for the potential residential flat building. Such concessions would be subject to further review following lodgement of the application..	The Shopping Centre Complex DA will be setback sufficiently from the future road. In addition, adequate perimeter landscaping is proposed along this boundary to provide a visual buffer between the proposal and the future residential which is still in the design development phase. Shorter setbacks will need to be considered for a future DA for the residential component.
General The Tigerhawk Drive entry shall be shifted as far away from the roundabout without impacting existing Bus zones/infrastructure. This will require the extension of the central median in Tigerhawk to restrict right in movements.	The Tigerhawk Drive entrance has been shifted west further from the roundabout to reduce traffic impact.

4. PROPOSED DEVELOPMENT

4.1. OVERVIEW

The SEE relates to the development of a neighbourhood scale shopping centre at 20 Heritage Drive, Chisholm.

The proposed development is a one-to-two storey mixed use retail/commercial development with basement level parking. The development comprises a full-scale supermarket, retail premises, indoor recreation facilities, food and drink premises, childcare centre, car wash and a medical centre. The project consists of bulk excavation, new structure, fit-out and commissioning of the proposed centre based child care facility only.

Specifically, this DA seeks consent for the following:

- Site preparation and early works including removal of all vegetation, retaining walls and bulk earth works;
- All land uses proposed within Chisholm Shopping Village including Retail Premises, Food and Drink Premises, Health Services Facility (Medical Centre), Recreation Facility (Indoor) and Centre based child care facility;
- Fit out of the Centre based child care facility;
- Development of the shopping centre and ancillary uses including all external walls and structures. All detailed internal tenancy fit outs will be subject to separate approval (with the exception of the Centre based child care facility);
- A total commercial / retail Gross Floor Area of 8,060m^2 and 3,320m^2 GFA for a Medical Centre, centre based child care facility and recreation facility (Indoor);
- All internal driveways and hard stand areas to accommodate loading and 557 car parking spaces and a basement car park with ancillary car wash facility;
- An on site detention system which will be provided as a combination of below ground tanks and surface storage within the proposed carpark; and
- Landscaping and public domain works including tree planting, paving, construction of driveways and perimeter footpaths.

The proposed development is illustrated in the Architectural Plans (**Appendix C**) prepared by BN Architects, and other supporting technical documents Appendices **A** to **V.** The overall built form and design is illustrated **Figure 5** to **Figure 9** below.

Key numeric aspects and areas of the and proposed land uses are provided at **Table 3** and **Table 4** and the various components of the proposed development are described in the following sections.

It is the intention of the main shopping centre to provide a flexible tenancy layout. Accordingly, the below tenancy dimensions should be read as indicative only with the final tenancy layouts and fit outs to be subject to separate approval. Signage will also be subject to a separate approval.

The following section provides a details description of key design aspects of the proposed development.

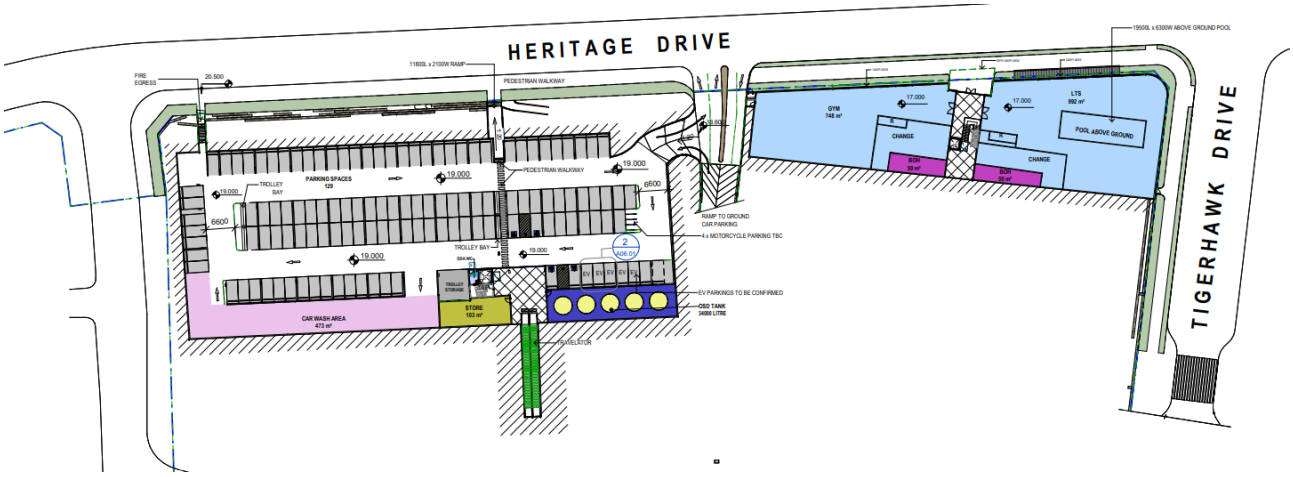
Figure 5 Chisolm Village Centre Main Entrance

Source: BN Architects

Figure 6 Childcare and fitness centre (Gym)

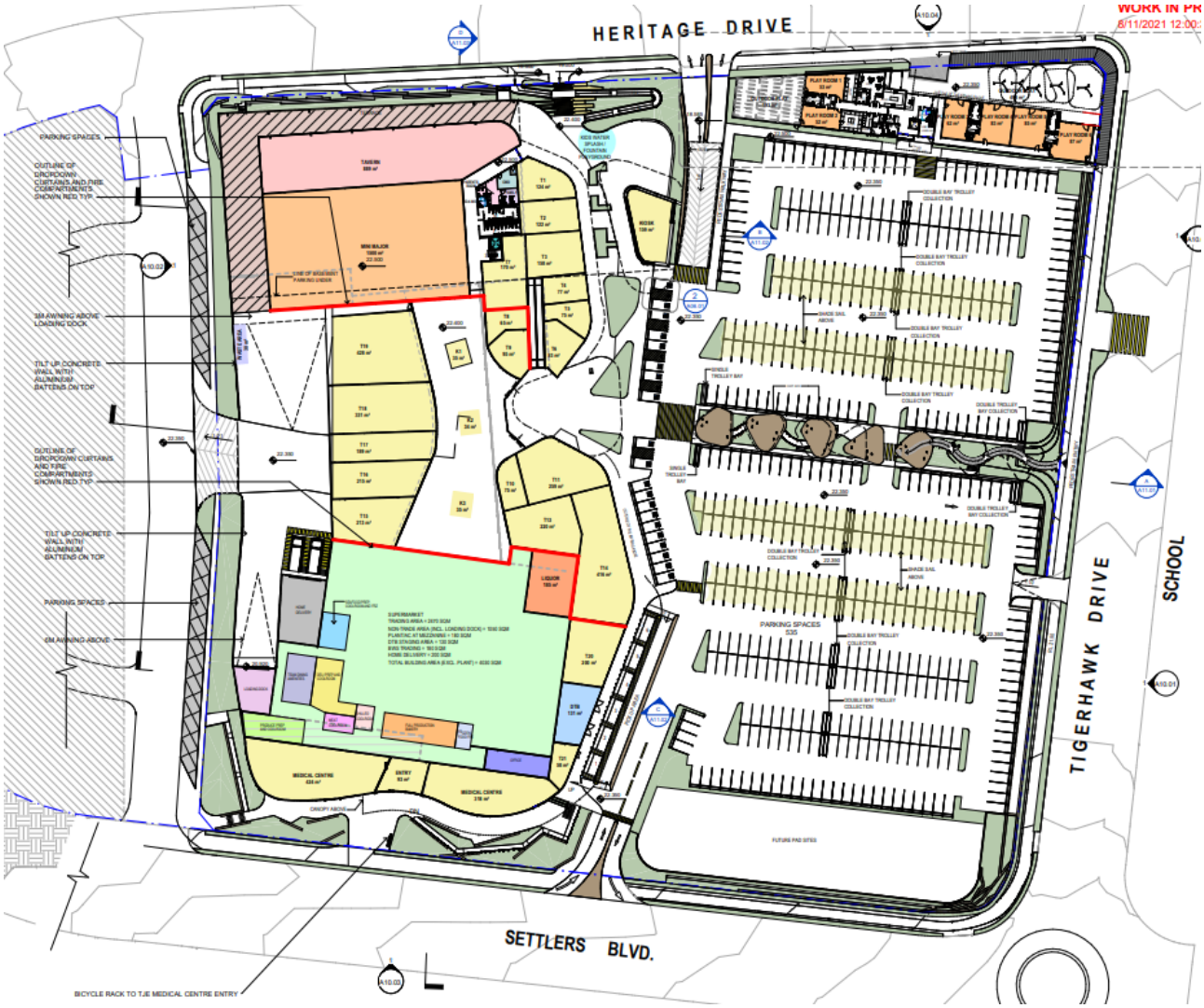
Source: BN Architects

Figure 7 Proposed Basement Floor Plan and Mezzanine Level



Source: BN Architects

Figure 8 Proposed Ground Floor Plan



Source: BN Architects

Figure 9 Proposed Roof Plan

Source: BN Architects

Table 3 Proposed Land Uses and Areas

Parameter	**Proposed GFA**
Site Area	43,940m^2
Tavern	705m^2
Supermarket	2,555m^2
Mini Major	1,140m^2
Retail	3,490m^2
Liquor	165m^2
Child Care	875m^2
Recreational Facility (Indoor)	1,745m^2

Parameter	Proposed GFA
Medical Care	700m^2
Amenities and Internal Plaza	1,525m^2
Total GFA	12,910m^2
Total FSR (12,910 m^2) / site area (43,940 m^2)	**0.29:1** (refer to Drawing No A00.20 Rev. A, for GFA calculations)

Table 4 Car parking schedule

Parameter	Parking
Car parking	Basement: 116 spaces Ground level: 537 spaces
Disabled	14
Parent spaces	10
Electric Vehicle (**EV**) Parking	5
Total	682
Trolley Bay	18 (ground level), 4 (basement level)
Bicycle Parking	4

4.2. DESIGN

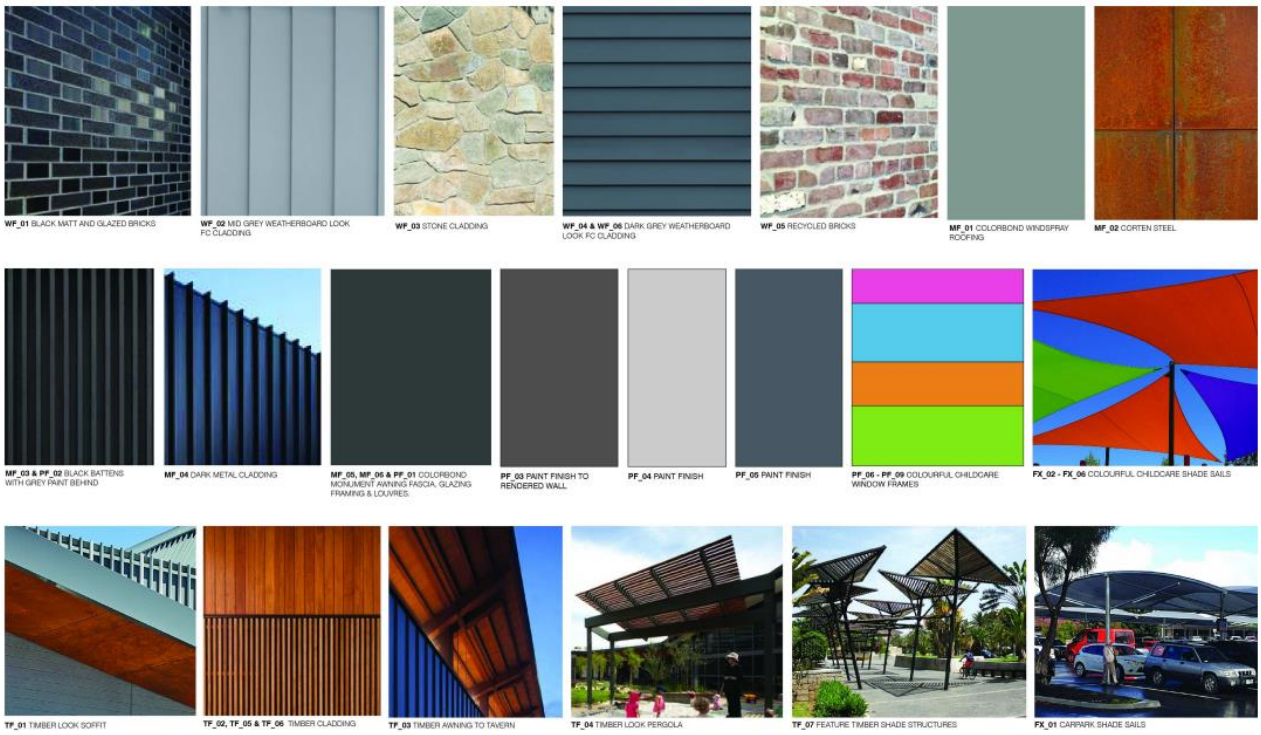
The proposed design reflects the site topography, proposed land uses and guiding principles of the Precinct Plan and incorporates the following key features:

- Provides an appropriate mix of land uses including space for a full line supermarket, other core retail uses, childcare centre, recreational facilities and medical centre.
- Siting and design which presents a unified coherent appearance reflective of the local and regional character.
- An accessible and convenient centre that provides safe and legible pedestrian and cycle connections to the surrounding schools, residential area and ‘Whitewater Park’.
- A high quality and contemporary architectural style that reflects the existing topography.
- Provision of a well-designed and accessible pedestrian plaza opposite the school for passive recreation providing a focal point and meeting place for the local community.
- Ensures that the service areas are well planned and provided separate to the main pedestrian and vehicle entry points.

4.3. MATERIALS AND FINISHES

A materials board is included in drawing DA-100.01 included within **Appendix C**. The colour and material selections have been made to create transitions and allowing the development to add value to its surrounding neighbourhood. below provides the proposed materials and finishes palette.

Figure 10 Proposed material board



Source: BN

4.4. LANDSCAPING

Site landscaping is to be in accordance with the accompanying Landscape Plans prepared by Moir landscape architects at **Appendix D**.

As shown in the submitted plans, the proposed landscaping will incorporate the following key features:

- Perimeter planting to visually soften facades and provide visual separation between the main car park area and the roadway.
- Terraced planting with gabion retaining is proposed to the Tigerhawk Drive to manage the level transition.
- Hedge planting with shade tolerant species along the interface with adjacent future residential precinct to the west.
- Planting of large and native evergreen carpark trees to provide shade and greenery against hard surfaces.
- The future pad site will be landscaped with turf.
- Sandstone boulders providing garden edging and informal seating opportunities in front of the proposed medical centre.
- The bio-retention basis will include water-sensitive planting and sandstone elements.
- Internal landscaping to highlight pedestrian entry points, feature paving to direct movement, bench seating, landscaping.
- In-ground water feature with sandstone boulder clusters and rubber soft fall tiled area with climbing play structure providing flexible play opportunities.
- Mounded garden beds with corten edging and floating timber seating to provide additional screening to adjacent carparking.

Reference should be made to these plans for all details in relation to landscaping. The site is largely clear of any significant trees and/or vegetation.

4.5. SITE PREPARATION AND CIVIL WORKS

Excavation and civil works will include some earthworks (cut and fill) and use of retaining walls to create a level building platform for the centre and proposed car park. A total of 42,710m^3 of cut and 22,480m^3 of fill is proposed to facilitate the development.

Site stormwater and drainage is to be in accordance with the Civil Plans and Stormwater Management Report provided by Triaxial at **Appendix Q.** Specifically, an on site detention system is also proposed which will be provided as a combination of below ground tanks and surface storage within the proposed carpark.

Reference should be made to these plans and accompanying report for all details in relation to stormwater and drainage.

4.6. CHILD CARE CENTRE

The proposed development includes the construction and fit out of a single-storey child care centre, located above the proposed learn to swim and gymnasium.

The characteristics of the proposal are:

- Five (5) play rooms to cater for different age ranges
- Two (2) outdoor play spaces with associated shading
- Staff and administration space
- Kitchen
- Bathroom and sperate accessible toilet
- Nappy change room
- Cot room

In terms of children numbers, the following breakdown is proposed:

- 0-2 years old = 28 children
- 2-3 years old = 40 children
- 3-6 years old = 44 children
- Total = 112 children
- 19 educators

This child care centre has been design in accordance to modern standards and practices. The proposed new internal layout of the building will allow for the appropriate room sizes for the different activities and facilities required for a child care.

4.7. CAR PARKING AND ACCESS

The proposed development includes an associated at-grade car parking area accommodating 535 car parking spaces with vehicular access provided via a two-way driveway from Heritage Drive, entry only driveway from Tigerhawk Drive (left in only) and a two-way driveway restricted to left in / left out on Settlers Boulevard:

- 10 x parent /plan car parking spaces;
- 10 x disabled car parking spaces; and
- 515 standard car parking spaces.

In addition, the proposal includes six (6) pick-up parking spaces to facilitate the supermarket direct to boot services.

An associated basement parking area is also proposed accommodating 126 car parking spaces with vehicular access via Heritage Drive:

- 4 x disabled car parking spaces;
- 5 x electric vehicle car parking spaces; and
- 117 x standard car parking spaces.

Additional car parking (21 spaces) is also proposed along the future access road, which is proposed between Heritage Drive and Settlers Boulevard. Loading and servicing area is also proposed for the development from the futures access area.

4.8. OPERATIONAL HOURS

The proposed operational hours are outlined below in Table 5.

Table 5 Proposed operational hours

Land Use	**Proposed Hours**
Supermarket and Mini Major	7:00am to 10:00pm, 7 days per week
Liquor	9:00am to 10:00pm, 7 days per week
Gym	24 hours, 7 days per week
Learn to Swim	7:00am to 10:00pm, 7 days per week
Medical	7:00am to 10:00pm, 7 days per week
Child care centre	7:00am to 7:00pm, Monday to Friday
Car wash	7:00am to 7:00pm, 7 days per week
Tavern	9:00am to 12:00am, 7 days per week

4.9. INFRASTRUCTURE DELIVERY

All urban services are either available, or easily connected into the site, enough such that the proposed development can be suitably services. Where necessary services will be augmented or upgraded to enable the functionality of the proposed development.

4.10. CONSTRUCTION MANAGEMENT

A Construction Management Plan (**CMP**) has been prepared by Richard Crookes Construction (**Appendix I**). Some of the details provided in the CMP include hours of work, civil and infrastructure works and services, site establishment, hoardings, fences and barriers, environmental and traffic management.

A construction works and management approach will also be updated by the appointed contractor engaged for works prior to commencement. This will include site inductions, safety work method statements, Traffic Management during construction, risk management (including viewing impact on neighbours), and change management.

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5. STRATEGIC PLANNING ASSESSMENT

5.1. HUNTER REGIONAL PLAN 2036 AND DRAFT HUNTER REGIONAL PLAN 2041

The *Hunter Regional Plan, 2036* (HRP) *'outlines a vision to grow and diversify the Hunter economy over the next 20 years so that it remains the biggest and most productive regional economy in Australia.'*

Direction 20 of the HRP '*Revitalise Existing Communities*', aims to concentrate development in existing communities to revitalise and enhance the area. Action 20.2 aligns with the vision of place-making for the Chisolm community. The facility will provide the neighbourhood with a local shopping centre to provide retail, health, childcare, fitness and recreation facilities. It will provide an attractive design that is accessible and safe for the local community.

Direction 23 of the HRP aims to *'Grow Centres and Renewal Corridors'.* This direction identifies strategic centres and that these and other smaller centres such as Chisholm operate as part of a network. Action 23.5 of the HRP seeks to ensure that locations for new centres are integrated with existing or planned residential development and do not undermine existing centres; encompass high quality urban design; and consider transport and access requirements.

Chisholm Shopping Village is entirely consistent with the HRP for the following reasons:

- Chisholm Shopping Village is integrated with the planned new community at Chisholm (part of the former Thornton North Release Area) which is aimed at delivering a future residential population of 12,500.
- The development of the centre has been specifically staged and accompanied by an EIA to ensure that it compliments existing centres (including Thornton), subsequent stages of Chisholm Shopping Village will also include an EIA as per the requirement of the Precinct Plan.
- The centre provides a high quality urban design outcome consistent with the objectives of the precinct plan framework which includes active street frontages and publicly accessible spaces for the community to gather and socialise. It positively addresses transport and access requirements including provision of bus set down areas as well as substantial areas for customer parking.

The NSW Government are currently undertaking their first five year review to extend the plan to 2041, to realign priorities. The updated Draft Hunter Regional Plan 20410 is now on exhibition until 4 March 2022. The priorities have been updated in the draft plan to ensure the objectives align with the region's future.

Some of the new ideas that the draft plan is aiming to include are greater diversification, promote economic self determination and greater recognition of the custodians of the land and net zero emissions. Whilst the ideas that best align with the proposed development for the Chisholm Shopping Village include 15-minute mixed-use neighbourhoods, planning for new land uses and infrastructure and development within already established neighbourhoods, improving the communities value. Two of the relevant objectives are further explained as follows.

Objective 3 of the Draft HRP aims to *"Create a 15 minute region made of mixed, multi-modal, inclusive and vibrant local communities"*. This objective identifies the value that is can be created from commercial developments that are in close proximity to everyday essentials. The strategies that the proposed development will provide include greater local access to everyday needs, an equipped neighbourhood within a rural community and a connection to other surrounding communities.

Objective 7 of the Draft HRP aims to *"Plan for businesses and services at the heart of healthy, prosperous and innovative communities"*. This objective identifies the evolving need for public places and activities for the community to enjoy. The strategies align with proposed Chisolm Shopping Village as it will enhance the vitality and viability of the Chisolm Centre generating employment and activity, increase the night time economy and provide health and education services for the local community.

5.2. MAITLAND CITY COUNCIL ACTIVITY CENTRES AND EMPLOYMENT CLUSTERS STRATEGY 2010

The *Activity Centres and Employment Clusters Strategy, 2010 (ACECS)* identifies Chisholm Shopping Village as a 'local centre' within an overall hierarchy of activity centres. The purpose of this strategy is to:

- *'Provide a logical hierarchy and network of activity centres and employment clusters which supports the growth of the local economy and employment in Maitland for the next 20 years;*
- *Provide clear direction as to the vision, role, function and potential growth for each activity centre and employment clusters to support the predicted population growth within the Maitland LGA over the next 20 years;*
- *Ensure all activity centres and employment clusters in Maitland are well designed and provide appropriate facilities and services in a pleasant environment for residents, employees and visitors;*
- *Guide future land use and development decisions which reflect the principles of this strategy, the vision of the activity centre or employment cluster, to support the residential growth within the Maitland LGA; and*
- *Ensure that future reviews of this strategy and future policies relating to activity centres and employment clusters are flexible and able to respond to the changing economic and social circumstances. This includes the recognition that the network and hierarchy of activity centres and employment clusters may change over time to facilitate new uses and working practices.*

The ACECS states the following objectives in relation to the future development of the Thornton North (Chisholm) local centre followed by a comment on how the proposed design meets these objectives.

Key policy objectives for Chisholm Neighbourhood Centre include:

- *Reinforce the role and function of Chisholm as a local centre within the network and hierarchy of activity centres, to support the higher order function of the town centre at Thornton and provide a focal point for community activity enabling a strong identity and sense of community to be built by the new residents of Chisholm;* ***(our emphasis)***

Comment: Chisholm Shopping Village will complement the higher order function of the nearby town centre at Thornton whilst also providing the necessary services and facilities required by the anticipated future population of Chisholm including a full line supermarket. Chisholm Shopping Village will ensure that the future population will have close and convenient access to the necessary retail and commercial services as well as community facilities.

- *Creation of a new local centre to support the growing residential population by providing a range of convenience shopping combined with some community activities within this area of the Maitland LGA;*

Comment: The proposed development will serve the growing food and grocery needs of trade area residentials. The resident population of the primary sector is estimated to reach 7,300 at 2026 and increase to a substantial 10,000 at 2031. There are currently no supermarkets or notable retail facilities in the primary sector, and there is the clear demand and need for a major supermarket in the local area.

- *To create a walkable neighbourhood with convenient access to employment, retail premises, community facilities and other services, with less dependence on cars for travel. This can be achieved with the integration of live/work units in and around the centre to encourage the location of small home-based businesses;*

Comment: The centre will allow for residents within Chisholm to access the facilities and services close to their homes, reducing car dependency and encouraging healthy lifestyles via the extensive footpath and cycle network throughout the release area which connects directly to the centre.

- *Provide safe, pleasant pedestrian and cycleway routes connecting the activity centre to the surrounding residential neighbour and to provide good connectivity with public transport; and*

Comment: The proposed centre is domestic in scale and will be provided with a safe and legible public domain that will allow connectivity into Waterford County's extensive and well-established pedestrian and cycle network as well as the potential to provide opportunities for additional public transport services as demand increases.

- *Create a village atmosphere with the mix of uses and integration a range of housing options like shop-top housing close to or within the centre to provide out of hours activity and contribute to the creation of Chisholm as a vibrant activity centre.*

Comment: Chisholm Shopping Village will provide an appropriate mix of uses for this level of centre. Once completed, the proposed uses will create a vibrant and active community hub throughout the day and into the evening.

5.3. MAITLAND CENTRES STUDY (HILL PDA 2009, REVIEWED APRIL 2016)

The Maitland Centres Study was reviewed by Hill PDA in April 2016. The study provides projections for retail expenditure and floorspace demand for the Maitland LGA over the 20 years to 2031. The Study updates the earlier 2009 Maitland Centres Study. The study notes the following in relation to Thornton North (Chisholm)

- *"The 2009 study recommended that the supportable floor space for Chisholm would be 2,000 - 4000sqm*
- *BTS population suggest that Thornton North will continue to grow strongly reaching a population of 3,211 persons by 2031 which equates to an annual average growth rate of 11%.*
- *Population growth has been solid around Thornton however the study notes that there is limited opportunity for Thornton town centre to expand to cater for the additional growth in its trade area.*
- *Given that the CNC would double the current offering at Thornton town centre the mix and scale of any proposal would need to be carefully evaluated to ensure continued viability of both centres and that an EIA be required for any proposal and that alternative uses be sought if the level of retail/commercial provision would be to the detriment of Thornton Town Centre and surrounding centres."*

Comment: This proposal has carefully considered the potential impacts of the Chisholm Shopping Village on neighbouring centres. The adopted Precinct Plan and DCP includes a requirement for a DA to be accompanied by an Economic Impact Assessment (EIA). An EIA has been prepared by Ethos Urban for development and is included at **Appendix JAppendix N.** The Economic Impacts of the proposal are discussed in detail at **Section 6.4**.

5.4. MAITLAND LOCAL STRATEGIC PLANNING STATEMENT 2040+

The Maitland Local Strategic Planning Statement (**LSPS**) sets out a 20 year land use vision, outlining how growth and change will be sustainably managed in the future. It identified the local planning priorities for the region to provide certainty around future land use and areas for planning and investigation.

The Thornton (Chisolm) region is identified as a Local centre and plays an important role in identifying and delivering local development to support the community. It is located in the Eastern Precinct and has a key initiative for opportunities to create new jobs and support the growing economy.

The local Chisolm Shopping Village will provide strengthen the local economy, provide jobs and improve connection to essential and recreational facilities. The following planning priorities within the LSPS are aligned to the overall aim of the Chisolm Village Centre as follows:

- Local Planning Priority 03 - Support a place based planning approach to guide better planning and urban design outcomes for our centres and neighbourhoods.
- Local Planning Priority 07 - Strengthen our local economy through attracting investments, creating jobs and fostering innovation.
- Local Planning Priority 18 - Work collaboratively to deliver infrastructure and services to support the planned growth.

5.5. SECTION 7.11 – MAITLAND COUNCIL S94A LEVY CONTRIBUTIONS PLAN 2008

The proposed Chisolm Shopping Village development is subject to the Maitland Council S94A Contributions Plan 2016. This plan's purpose is to authorise a payment levy of contributions that will assist Council to provide quality public services and amenities to meet the needs of the community and its visitors.

Council requires payment of the levies for a development cost of $36,955,000 as follows:

- 1% of the proposed cost of carrying out the development where the cost is greater than $200,000

Upon development approval for the proposed Chisolm Shopping Village, the determined cost by the consent authority will be paid by time notified in the conditions, if no time is specified the levy will be paid prior to issuing of CC.

6. STATUTORY PLANNING ASSESSMENT

6.1. RELEVANT ACTS

6.1.1. Environmental Planning and Assessment Act 1979 (EP&A Act)

The proposal is considered to be consistent with the objects of the EP&A Act. The proposal is consistent with the site-specific provisions outlined within the environmental planning instruments and has been designed having regard to the environmental sensitivities of the site. The proposal will also provide for the orderly and economic use of the land for high density residential purposes close to existing public transport connections.

An assessment against Section 4.15 of the EP&A Act is provided in **Section 8** of this SEE.

In accordance with Section 4.46 of the EP&A Act, the proposal is an integrated development. The application will require consideration and concurrence approval by the relevant authority in relation to section 100B of the *Rural Fires Act 1997*.

6.1.2. Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) aims to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development.

A comprehensive Flora and Fauna Impact Assessment was previously prepared for the greater site in 2007 by Ecotone Ecological Consultants. A supplementary Flora and Fauna Assessment (**FFA**) was prepared by EPS dated 07 June 2018 which focuses on the development site (refer to **Appendix R**).

The FFA outlines the following:

> *"It is considered under the BC Act that offsets are not required as part of the project. To trigger offsets, the minimum threshold for native vegetation clearing is > 0.25ha. As the impact footprint on native vegetation is below this threshold, the site is not mapped as being of high biodiversity value on the Biodiversity Value Map, and the 5 part test has concluded a non-significant impact, the proposal does not trigger the need for offsetting via the NSW Biodiversity Offset Scheme."*

Thereby, no further assessment is required under the BC Act in respect to biodiversity offsets.

6.1.3. Rural Fires Act 1997

The site is mapped as bushfire prone land specifically as Vegetation Category 1 and Buffer.

Under Section 100B of the *Rural Fire Act 1997* 'a child care centre' is nominated as a special fire protection purpose, thereby the proposed development is classified as integrated development and requires approval from NSW Rural Fire Service.

A Bush Fire Assessment has been prepared by Newcastle Bushfire Consulting and included in **Appendix K.**

6.2. STATE ENVIRONMENTAL PLANNING POLICIES

6.2.1. State Environmental Planning Policy (State and Regional Development) 2011

The proposed works have an estimated cost of $36,955,000 (including GST) and development consent is sought in accordance with Part 4 of the EP&A Act. A Quantity Surveyors (**QS**) Cost Estimate Report has been prepared by Newton Fisher and is provided at **Appendix B.**

The cost of works is above $30 million; accordingly, the DA is declared as regionally significant development, and will be determined by the Hunter and Central Coast Planning Panel (**HCCPP**).

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

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) applies to the whole of the state. Clause 7(1) requires the consent authority to consider whether land is contaminated and if land can be remediated and made suitable for the proposed development prior to granting development consent to the DA.

A Preliminary Site Contamination Assessment was undertaken as part of the original planning proposal (refer **Appendix S**). This report concluded that the majority of the site was suitable for residential development. Additionally, it its assessment of the planning proposal to rezone the Chisholm Shopping Village site in 2010 Council stated the following in relation to application of SEPP 55.

"This site was rezoned to Residential 2(a) as a part of Amendment 86 to the Maitland LEP 1993, therefore the land use proposed is suitable on this site."

The site is therefore considered suitable for the development and the requirements of SEPP 55 have been satisfied.

6.2.3. State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across NSW by identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure such a classified roads and prescribing consultation requirements for certain development.

Under clause 104 and Schedule 3 of State Environmental Planning Policy (Infrastructure) 2007, the proposed development is 'traffic generating development' as it is for the purposes of shops and commercial premises above the relevant size or capacity with access to any road (2000sqm). Referral to Roads and Maritime Services (RMS) will therefore be required under the ISEPP.

A Traffic Impact Assessment has been prepared by McLaren Traffic Engineering and included at **Appendix E.** The traffic generation associated with the proposal is limited and is not considered to adversely impact the efficiency of movement of people to and from the site. Further discussion of traffic and parking impacts is provided in **Section 7.4** below.

6.2.4. State Environmental Planning Policy (Education Establishment and Child Care Facilities) 2017

The *State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017* (SEPP Education and Child Care) aims to ensure that early education and care facilities are established effectively and consistently. It incorporates standardised planning provisions relating to child care centres, schools, universities and TAFEs.

Under SEPP Education and Child Care, a consent authority must take into consideration the Child Care Planning Guideline when assessing a DA for a child care facility. Part 3 of the Guideline includes matters which must be considered by the consent authority when assessing a DA for a child care facility. Part 4 of the Guidelines provides the requirements for internal and external areas of Childcare facilities as per the National Quality Framework (NQF). The table below illustrates the proposed development's compliance with the relevant provisions of the Child Care Planning Guidelines.

Part 3 of the Guideline includes matters which must be considered by the consent authority when assessing a DA for a child care facility. An assessment of the proposal under Part 3 is provided in **Table 6** below.

If a DA satisfies the design criteria, a consent authority cannot refuse the DA on the basis of design. The SEPP prevents a council from imposing more onerous standards or refusing a DA on the basis that they have not been complied with, and the standards include proximity to other centres, indoor and outdoor space requirements, colour schemes if not heritage affected, site area/coverage/dimensions and other stated design criteria in Part 3 of the guideline.

Part 4 of the Guidelines provides the requirements for internal and external areas of Childcare facilities as per the National Quality Framework (NQF). The National Quality Framework Assessment Checklist has been completed for the proposal to address the National Regulations, this is included in **Appendix P.**

Table 6 Part 3 – Child Care Planning Guidelines

Matters for Consideration	Proposed	Complies
3.1 Site selection and location		
Objective: To ensure that zone considerations are assessed when selecting a site. Objective: To ensure that the site selected for a proposed child care facility is suitable for the use. Objective: To ensure that sites for child care facilities are appropriately located. Objective: To ensure that sites for child care facilities do not incur risks from environmental, health or safety hazards.	The site located is considered appropriate for the following reasons: - The child care will provide facilities and services to meet the day to day needs of residents - The site will be in close proximity to a cluster of local stores and services including a medical centre, school, and learn of swim centre - The child care will front Heritage Drive primarily which is appropriate for a child care centre - The development will not result in adverse environmental impacts to adjoining properties. - The DA is accompanied by technical reports which conclude the site is environmental safe and the scale of the proposal is suitable	✓
3.2 Local character, streetscape and the public domain interface		
Objective: To ensure that the child care facility is compatible with the local character and surrounding streetscape. Objective: To ensure clear delineation between the child care facility and public spaces. Objective: To ensure that front fences and retaining walls respond to and complement the context and character of the area and do not dominate the public domain.	The proposed design and landscaping are compatible with the B1 Neighbourhood Centre zone and provides an appropriate character response to the surrounding and future streetscape. In addition, the proposal provides a clear entrance (via a concrete path) and clearly delineates the private and public realm.	✓
3.3 Building orientation, envelope and design		
Objective: To respond to the streetscape and site, mitigate impacts on neighbours, while optimising solar access and opportunities for shade. Objective: To ensure that the scale of the child care facility is compatible with adjoining development and the impact on adjoining buildings is minimised.	The site will achieve adequate solar access, with numerous windows and glazed door to maximum indoor solar access. Both the large open play space are substantial and will receive direct sunlight. As noted above, the proposed built form is compatible with the objectives of the B1 Neighbourhood Centre zone and is appropriate in relation to its context and the	✓

Matters for Consideration	Proposed	Complies
Objective: To ensure that setbacks from the boundary of a child care facility are consistent with the predominant development within the immediate context. Objective: To ensure that buildings are designed to create safe environments for all users. Objective: To ensure that child care facilities are designed to be accessible by all potential users.	built form contributes to the area's character. The accompanying Access Report (**Appendix F**) confirms the proposal will (or is capable of) meet the applicable standards and requirements for access to buildings for people with disability. Detailed design in accordance with the relevant standards will be included with any future Construction Certificate.	
3.4 Landscaping		
Objective: To provide landscape design that contributes to the streetscape and amenity.	The landscaping solution prepared will contribute to the streetscape and amenity.	✓
3.5 Visual and acoustic privacy		
Objective: To protect the privacy and security of children attending the facility. Objective: To minimise impacts on privacy of adjoining properties. Objective: To minimise the impact of child care facilities on the acoustic privacy of neighbouring residential developments.	The child care centre is located appropriately on the corner of Tigerhawk and Heritage Drive within the site and is protected as the centre is located above street level. There will be no overlooking of indoor rooms or outdoor play spaces from adjoining residential/ mixed-use properties. In addition, there will be no privacy impacts to the residential dwellings nearby the site. The Acoustic Assessment (**Appendix O**) found that the proposal will not have unreasonable impacts upon nearby receivers.	✓
3.6 Noise and air pollution		
Objective: To ensure that outside noise levels on the facility are minimised to acceptable levels. Objective: To ensure air quality is acceptable where child care facilities are proposed close to external sources of air pollution such as major roads and industrial development.	The existing background noise level is suitable for the proposed childcare centre (**Appendix O** as outlined in the Acoustic Report. The proposal is not located proximate to a busy road or land uses that would give rise to air pollution	✓
3.7 Hours of operation		
Objective: To minimise the impact of the child care facility on the amenity of neighbouring residential developments.	The proposed hours of operation area 7:00am to 7:00pm, Monday to Friday which	✓

Matters for Consideration	Proposed	Complies
	is considered appropriate for a B1 Neighbourhood Centre zone.	
3.8 Traffic, parking and pedestrian circulation		
Objective: To provide parking that satisfies the needs of users and demand generated by the centre. Objective: To provide vehicle access from the street in a safe environment that does not disrupt traffic flows. Objective: To provide a safe and connected environment for pedestrians both on and around the site.	The Traffic Impact Assessment (refer to **Appendix E**) confirms the proposal will not adversely impact existing traffic flows and the provided car parking is appropriate.	✓

6.3. MAITLAND LOCAL ENVIRONMENTAL PLAN 2011

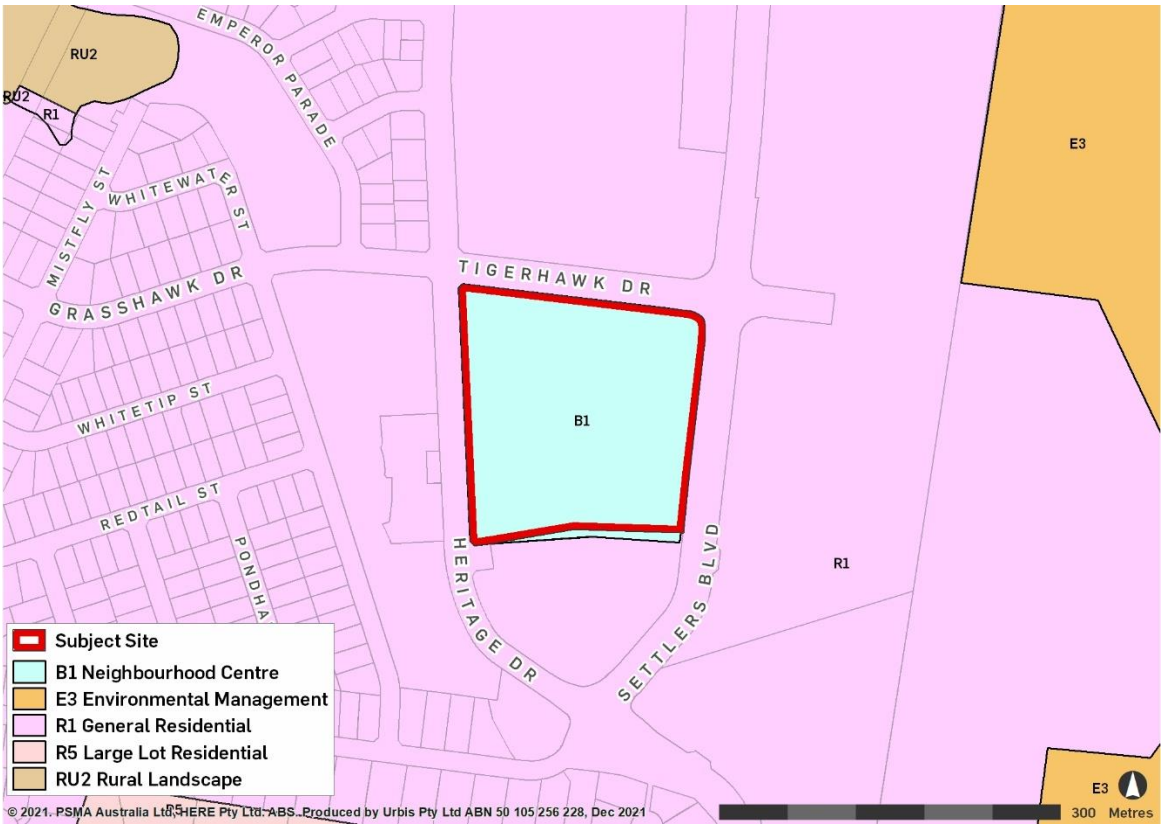
Maitland Local Environmental Plan 2011 (**MLEP**) is the primary environmental planning instrument applying to the site and the proposed development.

The proposed development has been assessed against the relevant development standards contained in the MLEP as discussed in detail below.

6.3.1. Zoning, Permissibility and Objectives

The site is within the B1 Neighbourhood Centre zone (see **Figure 11** below).

Figure 11 Land Zoning map illustrating the site



Source: MLEP 2011

The relevant objectives of the B1 Neighbourhood Centre zone are:

- *To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood.*
- *To provide retail, business and community facilities to meet the needs of a growing population.*

Chisholm Shopping Village is consistent with the B1 Neighbourhood Centre zone objectives for the following reasons:

- Chisholm Shopping Village is a planned neighbourhood scale shopping centre that was first identified in the Thornton North Structure Plan (TNSP). The proposed centre and uses are of a scale that will enable the centre that serves the needs of the population of this urban release area whilst ensuring that the role and function of neighbouring centres is not impacted.
- In addition to the retail uses, the proposed seeks to provide additional complementary community land uses such as child care centre, medical centre, gymnasium and food and drink premises which cater to the day to day needs of the community.
- The small-scale nature of the centre is consistent with the local hierarchy of centres noting that Thornton Shopping centre is clearly a higher order centre as it supports greater community facilities, a public school, sporting fields and is within walking distance of Thornton Rail Station. The B1 zone prevents the centre from becoming a higher order centre.
- Notwithstanding the first zone objective, it has always been the intention that the scale of Chisholm Shopping Village will support a level of retail that can grow according to the needs of a growing population. This was reflected the second zone objective and in the Maitland Centres in 2009 which stated,

  > *"In light of constraints in Thornton Town Centre, it is recommended that a new village centre is planned for development commensurate with residential development in the Thornton North Release Area."*

- The level of floor space proposed is consistent with the resolution of Council when it progressed the original planning proposal for the site in May 2010 to apply what is effectively a GFA cap on the commercially zoned land and is compliant with the floor space ratio (FSR) control prescribed by the MLEP 2011.
- An Economic Impact Assessment has been prepared by Ethos Urban (see **Appendix** J**)** which clearly demonstrates that both the Thornton Local Centre and Chisholm Shopping Village can serve the needs of the growing population and without significant long-term economic impacts.

The proposed development is defined as a mixed-use development comprising of numerous land uses. The proposed uses are permitted with development consent in the B1 zone. The uses are defined in the MLEP 2011 as:

centre-based child care facility *means*

(a) a building or place used for the education and care of children that provides any one or more of the following—

(i) long day care,

(ii) occasional child care,

(iii) out-of-school-hours care (including vacation care),

(iv) preschool care, or

(b) an approved family day care venue (within the meaning of the Children (Education and Care Services) National Law (NSW))

Medical centres *means premises that are used for the purpose of providing health services (including preventative care, diagnosis, medical or surgical treatment, counselling or alternative therapies) to out-patients only, where such services are principally provided by health care professionals. It may include the ancillary provision of other health services.*

***Recreation facility (indoor**) means a building or place used predominantly for indoor recreation, whether or not operated for the purposes of gain, including a squash court, indoor swimming pool, gymnasium, table tennis centre, health studio, bowling alley, ice rink or any other building or place of a like character used for indoor recreation, but does not include an entertainment facility, a recreation facility (major) or a registered club.*

***Commercial premises** means any of the following—*

(a) business premises,

(b) office premises,

(c) retail premises.

Note: The proposal seeks consent for shops and food and drink premises, which fall under the parent definition of Commercial Premises (Retail Premises) above.

6.3.2. LEP Provisions

The following table assesses the compliance of the proposed development with other relevant clauses in the MLEP 2011.

Table 7 MLEP 2011 Compliance Table

Relevant Clause	Provision	Proposal	Complies
Clause 4.3 – Height of Buildings	No provision	The proposed built form ranges between one-to-two storeys in height and is considered appropriate for surrounding context considering there is no building height restriction applying to the site.	N/A
Clause 4.4 – Floor Space Ratio	0.3:1	The proposed development has an FSR of 0.29:1 based upon a gross floor area of 12,910m^2 and a site area of 43,940m^2 (refer to Drawing No A00.20 Rev. A, for GFA calculations).	Yes
Clause 6.2 – Public Utility Infrastructure	(1) Development consent must not be granted for development on land in an urban release area unless the Council is satisfied that any public utility infrastructure that is essential for the proposed development is available or that adequate arrangements have been made to make that infrastructure available when it is required.	Council was previously satisfied that public utility infrastructure that is essential for the proposed development is available or that adequate arrangements have been made to make that infrastructure available when it is required. No change in this regard.	Yes
Clause 6.3 – Development Control Plan	DCP required prior to development in an Urban Release Area	Part F.7 Thornton Urban Release Area of the Maitland DCP has been adopted addressing the provisions of	Yes

Relevant Clause	Provision	Proposal	Complies
		clause 6.3(3) of the LEP, as such Council can grant consent to the DA. An assessment of the proposal against the DCP is provided below in **Appendix V.**	
7.1 Acid Sulphate Soils	Class 5. Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.	The proposed development will not distribute, expose or drain acid sulfate soils and cause environmental damage given the site is not located in close proximity to Class 1, 2, 3 or 4 land.	Yes
7.2 Earthworks	(1) The objectives of this clause are as follows— (a) to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land, (b) to allow earthworks of a minor nature without requiring separate development consent.	The proposed development will require excavation and civil works, including the use of retaining walls to create a level building pad for the proposal, refer to **Appendix Q.**	Yes

6.4. MAITLAND DEVELOPMENT CONTROL PLAN 2011 (MDCP 2011) AND PRECINCT PLAN

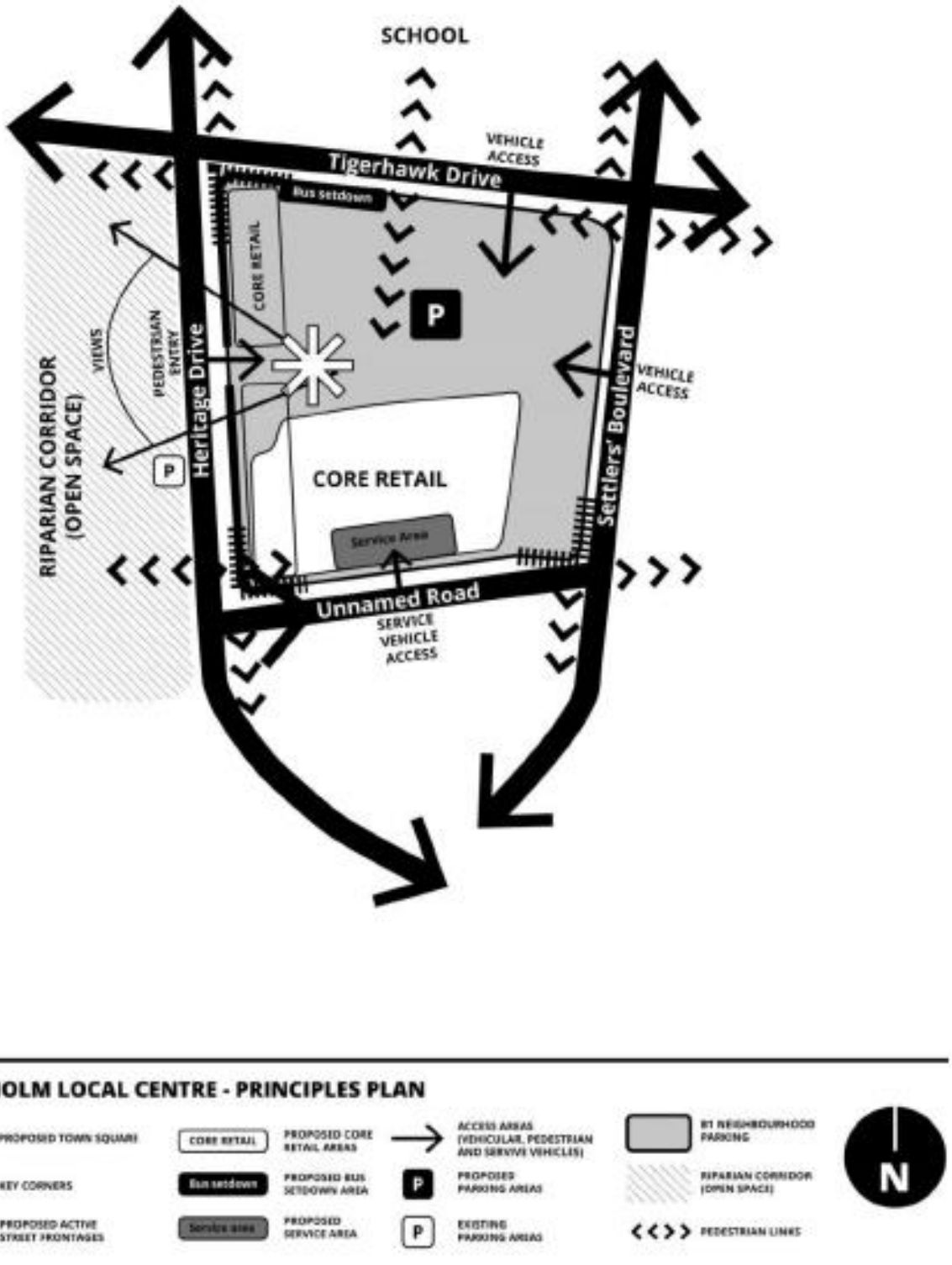
Maitland Development Control Plan 2011 (the DCP) provides detailed planning controls relevant to the site and the proposal. The relevant controls of the DCP are identified and assessed in the table prepared by Urbis at **Appendix V.**

A Precinct Plan was adopted in February 2017 in accordance with clause 1.2 (i) of Part F.7 of the Maitland Development Control Plan as a key development site. The Precinct Plan is shown at **Figure 12** below. It is evident that the proposed layout is consistent with the adopted Precinct Plan, which has been looked upon favourably in the Pre-DA discussions.

The provision of space within the core retail area for one ‘major supermarket’ will ensure that the needs of the future residential population of the Chisholm release area is adequately serviced. Future food and beverage uses with abundant opportunities for outdoor dining along the main Heritage Drive frontage will encourage activity of the site into the evening providing a vibrant local village atmosphere consistent with the overall vision of the Precinct Plan to foster a strong sense of place.

Overall, the proposal achieves an appropriate balance of policy compliance and contextual building envelope response to the local and emerging character.

Figure 12 Adopted Precinct Plan



Source: MDCP 2011

6.5. OTHER REGULATORY DOCUMENTS

The following regulatory documents were considered in the design, future operation and the assessment of the proposed child care centre to which it was found to be compliant with the provisions found in:

- Education and Care Services National Regulations; and
- ACECQA National Quality Standards

The end operator is required to meet the physical space and operational requirements in order to gain a child care licence/service approval. Further, they will liaise with and seek advice from the Department of Education and Communities with regard to meeting these Regulations and obtaining all relevant approvals to operate.

7. ASSESSMENT OF KEY ISSUES

7.1. BUILT FORM AND URBAN DESIGN

7.1.1. Building Design and the Public Domain

The proposed development caters to the changing context of the locality, while being sympathetic to surrounding developments in close vicinity. The contemporary mix of materials and finishes provide visual interest and contribute to the overall design of the development.

Both the Architectural Plans (**Appendix C**) and Landscape Plans (**Appendix D**) will ensure that the loading dock and back of house areas fronting the proposed road will be suitably screened by architectural elements and landscaping.

The proposed layout ensures a high quality and cohesive built environment which will provide for an attractive centre for the Chisholm community. The proposed layout allows for a placed based approach with a well-defined ground plane that concentrates pedestrian activity around the main entrance and public plaza central to the site.

The proposal will provide additional activation and opportunities for high amenity outdoor seating areas associated with Food and Drink premises along the designated active frontage to Heritage Drive fronting Whitewater Park.

7.1.2. Building Scale and Height

As demonstrated in the Architectural Plans at **Appendix C** the development will have a positive visual impact on the character of the surrounding release area. The contemporary built form will activate a large development site and will positively address and enhance the surrounding streetscape. The proposed building heights relate to key frontages and corners adding modulation of the structure and visual interest across the site.

7.1.3. Overshadowing and Solar Access

Shadow diagrams between 9:00am and 3:00pm on June 21 have been prepared by BN Architects and included in **Appendix C.** The diagrams illustrate the proposal will not have any overshadowing impacts on surrounding development or the public domain.

The centre will provide public areas of high amenity with good solar access and opportunities for passive recreation. The hard and natural landscaping of the site and publicly accessible areas will respond to character of the area and contribute to a sense of place and community.

7.2. ECOLOGICALLY SUSTAINABLE DEVELOPMENT

A Section J Report has been prepared by JHA and is included at **Appendix M** to demonstrate design compliance for the proposal.

In terms of ESD, the following commitments are proposed:

- Five (5) electric vehicle parking spaces;
- Solar panels on the roof with a target of 500KW;
- 5 x 34,000L rainwater tanks to enable rainwater reuse; and
- 6-star green start and NABERS.

The proponent is committed to developing a high quality ESD response for the proposed development.

7.3. BUSHFIRE

The site is mapped as bushfire prone land and therefore a Bushfire Assessment Report has been prepared by Newcastle Bushfire Consulting and is included at **Appendix K.** The report has assessed the proposed development against the requirements of section 4.14 of the EP&A Act 1979, AS3959 (2018) Building in

Bushfire Prone Areas and Planning for Bushfire Protection, 2019. The Bushfire Assessment Report confirms that referral to NSW Rural Fire Service is required.

The Bushfire Assessment Report breaks down the assessment into two subparts, firstly for the commercial development and secondly for the child care centre given this use is classified as Special Fire Protection Purpose under section 100B of the Rural Fires Act 1997. The following sections summarise the findings of the bushfire assessment.

Commercial Development:

A bushfire threat assessment for the commercial development concludes that the Bushfire Attack Level (BAL) is BAL-LOW to the north, south and west, and BAL-19 to the east. The recommended Asset Protection Zone (APZ) is 140 metres to the north, south and west, and 41 metres to the east. The APZ will be required to be maintained for the life of the development and defendable space provided on-site.

Child Care Development:

The bushfire threat assessment for the child care development concludes that the BAL is BAL-LOW. The vegetation that surrounds the child care centre is primarily maintained lands and therefore the recommended APZ is 140 metres. The APZ will be required to be maintained for the life of the development and defendable space provided on-site.

Recommendations:

The Bushfire Assessment Report recommends that development consent be granted subject to the following recommendations (extracted directly below):

1. *"The proposed building works shall comply with National Construction Code 2019 Structural Fire Safety requirements.*
2. *At the commencement of building works and in perpetuity, the site shall be managed as an inner protection area (IPA) as outlined within Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service's document Standards for Asset Protection Zones.*
3. *Water, electricity and gas are to comply with Planning for Bush Fire Protection (2019) Section 7. The hydrant network shall be expanded to comply with AS 2419.1.*
4. *Landscaping is to be undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and managed and maintained in perpetuity.*
5. *An Emergency/Evacuation Plan is to be prepared consistent with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plan, with the new buildings incorporated in the plan."*

In conclusion the proposed development offers compliance with the Planning for Bush Fire Protection (2019), and the above recommendations will reduce the bushfire risk on site.

7.4. ACCESS, PARKING AND TRAFFIC

A Traffic Impact Assessment and Turning Templates have been prepared by McLaren and included at **Appendix E.** The report provides an assessment of the proposed vehicular site access arrangements, on-site car and bicycle parking provision, car park layout and design, vehicle servicing requirements and the traffic impacts anticipated as a result of the proposed development.

The following sections provide an overview of access, parking and traffic.

7.4.1. Access

The proposed car parking and vehicular access is provided as follows:

- Separated entry and exit driveways, with minimum widths of 3.6m, facilitating access to Settlers Boulevard:
  - Restricted to left in / left out.
- 6.4m width exit driveway and 4.4m width entry driveway facilitating access to / from Heritage Drive:

  - No turn restrictions.
- 5.7m entry only driveway from Tigerhawk Drive;
- 18.6m width two-way driveway facilitating access to the New Link Road (to be deliver under the residential DA);
- Pedestrian sight triangle of 2m by 2.5m at the property boundary at all relevant driveways ;
- Minimum 6.6m width parking aisles with 2.6m wide visitor spaces (User Class 3A);
- Compliant ramp grades not exceeding 20% and no grade change greater than 12.5%;
- Minimum 5.4m length, 2.6m width spaces for parents / visitors;
- Minimum 5.4m length, 2.4m width disabled spaces with adjacent associated 5.4m length, 2.4m width shared space;
- Minimum 0.3m clearance to high objects from trafficable areas; and
- Minimum headroom of 2.2m for general circulation and 2.5m headroom clearance provided over disabled and adaptable parking areas.

In summary the car parking and access has been designed in accordance with the relevant clauses and objectives of *AS2890.1:2004, AS2890.2:2002* and *AS2890.6:2009*. Swept path testing has been undertaken and are reproduced within **Appendix E.**

7.4.2. Parking

Table 8 outlines the required parking as per the Maitland DCP 2011 and the *RTA Guide to Traffic Generating Development 2002* adopted by Transport for NSW (TfNSW). The TfNSW rates were used for the medical centre given the Maitland DCP 2011 does not prescribe a rate.

Table 8 Council DCP and TfNSW Parking Rates

Land Use	Scale	Document	Rates	Spaces Required
Supermarket	3,912m^2	DCP	1 per 16m^2 GFA	349.8
Liquor	185m^2	DCP	1 per 16m^2 GFA	
Major Retail	1,500m^2	DCP	1 per 16m^2 GFA	
Shops	3,695m^2	DCP	1 per 25m^2 GFA	147.8
Tavern	890m^2	DCP	1 per 10m^2 GFA	89
Medical Centre	745m^2	TfNSW	4 per 100m^2 GFA	29.8
Food and Drink Premises	160m^2	DCP	1 per 25m^2 GFA	6.4
Child Care Centres	112 children	DCP	1 per 4 children	28
Gymnasium	800m^2	DCP	7.5 per 100m^2 GFA	60
Swim School	1,040m^2 20 children	First Principles	2 per child	40

Land Use	Scale	Document	Rates	Spaces Required
Car Wash	475m^2	DCP	1 per 40m^2 GFA	11.9
Total	-	-	-	**762.7.7 (763)**

As illustrated above, strict application of the DCP requires the provision of approximately 763 car parking spaces. The proposed development provides for 682 car parking spaces including 21 spaces along the proposed new road (to be deliver as part of the future residential DA). Therefore, the proposed development has a shortfall of 81 parking spaces from the prescribed rate.

McLaren outlined that the DCP car parking rates are generally applicable to standalone developments and do not consider cross utilisation of car parking of different uses or consideration to different peak parking periods. Therefore, McLaren recommend that the proposed development be assessed against the *RTA Guide to Traffic Generating Development 2002* as these guidelines consider cross utilisation of retail uses.

Further, the DCP does not consider that some land uses will not overlap with one another, specifically:

- The child care centre will not operate on weekends;
- Gymnasiums and win schools do not operate at their peaks on weekends;
- Taverns peaks parking periods occur in the afternoon.

With this in mind, by adopting the TfNSW (RMS) parking rates for shopping centres and gymnasiums, the proposed development requires the provision of 682 car parking spaces. The proposed development will provide 661 on-site car parking spaces and as such result in a surplus of 65 car parking spaces based on the RMS parking rates.

With consideration to parking profiles for gymnasiums, shopping centres and taverns / pubs, the proposed development would operationally demand 644 car parking spaces based upon TfNSW (RMS) parking rates.

The anticipated parking profiles is outlined below, based upon TfNSW data (extracted from Traffic Impact Assessment):

- **Weekday Parking Profile:** *the shopping centre, tavern and gymnasium portion of the development is expected to demand 590 car parking spaces during weekdays, although this does not consider the parking demand generated by the swim school or child care centre. Including the parking demand of the swim school and child care centre results in a total anticipated parking demand of 658 (590 + 28 + 40). A further reduction could be applied as the peak parking demand occurs at 12pm, when parents are not at the child care centre. Hence, a further reduction of 14 spaces (half of 28, being staff vehicles) can be applied, resulting in the parking demand of 644 car parking spaces. The proposed development provides 682 car parking spaces, including the parking along the New Link Road, resulting in a surplus of 38 car parking spaces over the expected peak parking demand.*
- **Weekend Parking Profile:** *the shopping centre, tavern and gymnasium portion of the development is expected to demand 589 car parking space on weekends, although this does not consider the parking generated by the swim school if it operates on weekends. Including the parking demand associated with the swim school, the proposed development will result in an anticipated parking demand of 629 (589 + 40) car parking spaces. The proposed development provides 682 car parking spaces, including the parking along the New Link Road, resulting in a surplus of 53 car parking spaces over the expected peak parking demand.*

Additionally, the proximity to residential land provides ease for active transport methods as a mode of transport with well-established pedestrian and cycle. The site is also accessible through public transport services, with the potential to provide additional services as transport demand increases.

In view of the above, the provision of 661 on-site car parking spaces accommodates the anticipated parking demand of the site. The TfNSW parking rates are the more applicable rates for the subject site, as they consider parking demands associated with multiple land uses (i.e. shopping centres) rather than assessing each component of the site in isolation, which reflects the parking rates within the DCP.

Further modelling and justification have been included in the Traffic Impact Assessment at **Appendix E.**

7.4.3. Traffic Generation

The traffic generation rates for the relevant land uses are provided *RTA Guide to Traffic Generating Development 2002.* It is noted that that the TfNSW (RMS) Guide does not provide traffic generation rates for swim school developments and as such, a first principles assessment has been conducted. This is based on a traffic generation rate of two (2) trips per child on-site at any one time.

The traffic generation of the proposed development has been estimated to be some 580 (weekday AM peak hour), 1,106 (weekday PM peak hour) and 1,189 (Weekend peak hour) two-way vehicle trips during the AM (292 in, 288 out), PM (551 in, 555 out) and midday weekday (597 in, 592 out) respectively. The impacts of the traffic generation have been modelled using SIDRA INTERSECTION 9.0, indicating that there will be no detrimental impact to the performance of the assessed intersections as a result of the generated traffic

A signalised intersection warrant assessment has been undertaken for the intersection of Heritage Drive / Tigerhawk Drive and indicates that a signalised intersection does not meet the TfNSW warrants.

7.5. CONSTRUCTION AND TRAFFIC MANAGEMENT

A Construction Management Plan (**CMP**) has been prepared by Richard Crooks Construction and submitted at **Appendix I.** The CMP outlines the approach to construction management of the proposed development and will be updated by the appointed contractor, engaged for the works and prior to works commencing.

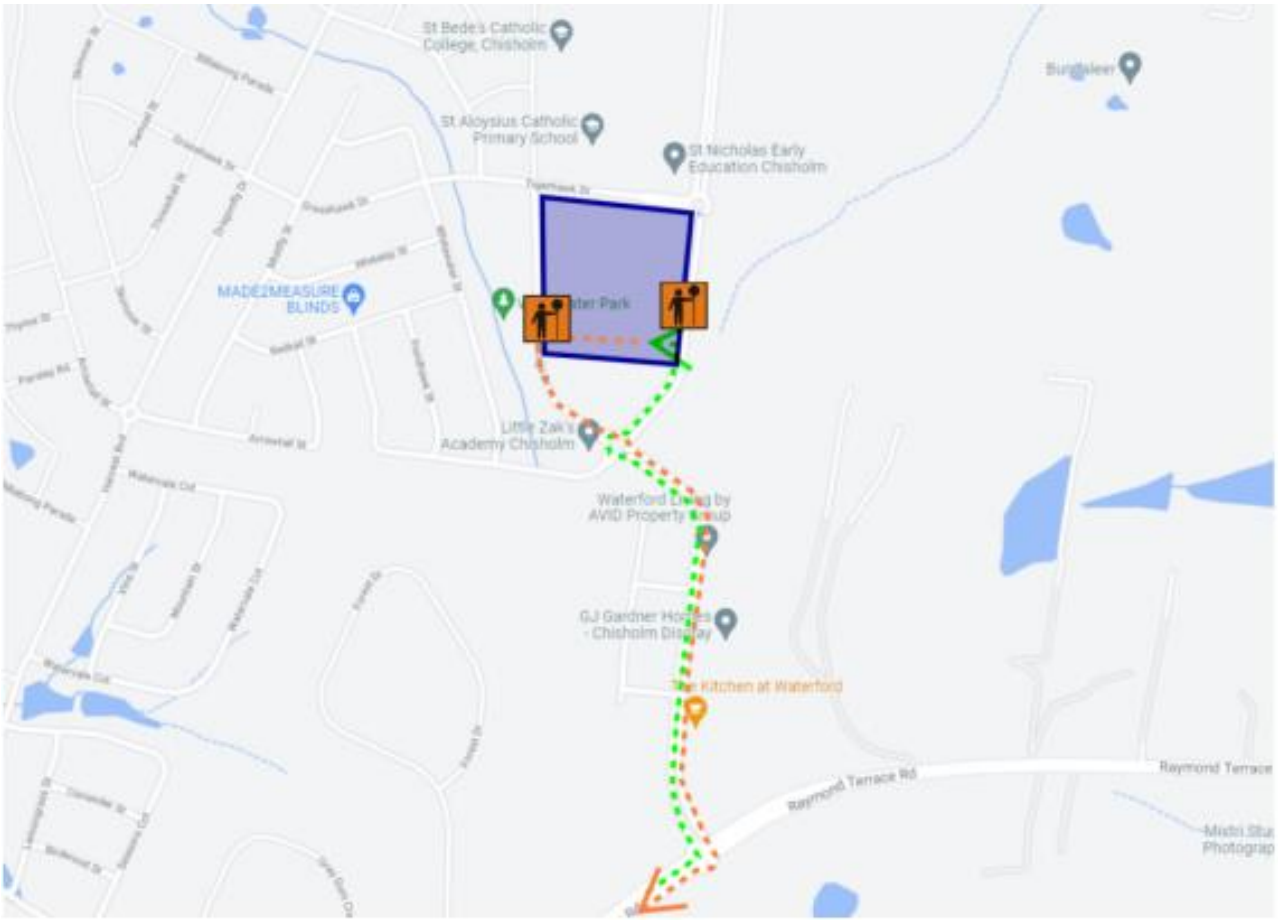
The following site management measures will be undertaken prior to commencement:

- Installation of hoardings, site accommodation and amenities.
- Completion of pre-construction dilapidation reports of all public and private roadways, adjoining and adjacent paving, structures, buildings and residences.
- Implementation of stormwater management and erosion control procedures.
- Erection of roadway and footpath signage and provide accredited traffic management personnel as described in the Traffic Management Plans to ensure protection of the public, safe access to and from the site by heavy vehicles and the safe unloading and loading of machines and materials.
- Erection of statutory signage including name, address and contact details for the PCA and for the Builder including an out of hours name and telephone number for the Builder.
- Initiation all appropriate "dial before you dig" searches to determine the existence of all in ground services that may be affected by the works.

In respect to traffic management, a nominated traffic consultant will complete a formal Traffic Management Plan before the commencement of works on the site. Richard Crooks Construction has recommended the site that utilises Raymond Terrace Road, operated by a Roundabout. Vehicles will then turn Right at Settlers Boulevard roundabout that provides a left turn entry to the site, then left turn exit from site departure via alternative exit gate on to Heritage Drive.

It is anticipated that construction access and interfaces to Tigerhawk Drive will be required, and the principal contractor will coordinate with the council and school along this boundary. **Figure 13** outlines the recommended construction vehicle route.

Figure 13 Recommended construction traffic routes



Source: Richard Crooks Construction

7.6. WASTE MANAGEMENT

7.6.1. Construction Waste Management

Waste materials generated through excavation and construction works will be minimised by reuse on site, recycling or disposal at an appropriate waste facility.

The following construction and demolition waste management strategies are proposed:

- On site stockpiling for reuse as fill and/or landscaping where possible.
- Materials such as concrete, timber, metal (ferrous and nonferrous), plasterboard and glass to be separated wherever possible to enhance resource recovery.
- Bricks/pavers cleaned and separated wherever possible for reuse or to enhance resource recovery.
- Considerable vegetation can be chipped onsite for volume reduction.
- Containers (cans, plastic, glass) to be recycled.
- Reuse fixtures and fittings where possible.
- Hazardous or special waste (for example spills and contaminated wastes) to be dealt with appropriate management methods specified by a licensed asbestos and site hygienist, should such waste materials be found at the site.

7.6.2. Operational Waste Management

An Operational Waste Management Plan has been prepared by Elephants Foot and submitted at **Appendix H** providing details regarding operational details of the proposed development in respect to waste.

The areas allocated for waste storage and collection area detailed in the table below, and the waste rooms are illustrated in

Figure 14**.**

Table 9 Waste room areas

Location	Waste Room Type	Equipment	Area
Ground Level Loading Dock	Retail, Gym, Tavern & Medical Centre Communal Compactors & Bins	General Waste: 1 x 23m3 compactor Paper/Cardboard Recycling: 1 x 23m3 compactor Comingled Recycling: 12 x 660 bulk bins	80m^2
Child Care Centre	Child Care Waste Room	General Waste: 2 x 660L bins Recycling: 2 x 660L bins	8m^2

Source: Elephants Foot

Ground Level Loading Dock:

A private waste collection contractor will be engaged to collect the general waste, paper/cardboard, and commingled recyclables per an agreed schedule.

On the day of compactor servicing, a private waste collection vehicle (hook lift) will enter the site from the laneway (accessible via Heritage Drive and Settlers Boulevard) and reverse in front of the compactor for loading onto the vehicle. Once the compactor is loaded, the vehicle exits the site in a forward direction and unloads the material at a licenced resource recovery facility. The compactor is then returned to resume operational use.

On the day of servicing for commingled recyclables, a rear-load vehicle enters the site from the laneway and parks in the designated loading bay to service the bins. Once the bins are decanted are returned to the storage area, the driver will exit the site in a forward direction onto the laneway

Child Care Centre:

A private waste collection contractor will be engaged to service the childcare waste and recycling bins per an agreed schedule. This report assumed that waste and recycling will be collected 3 x weekly.

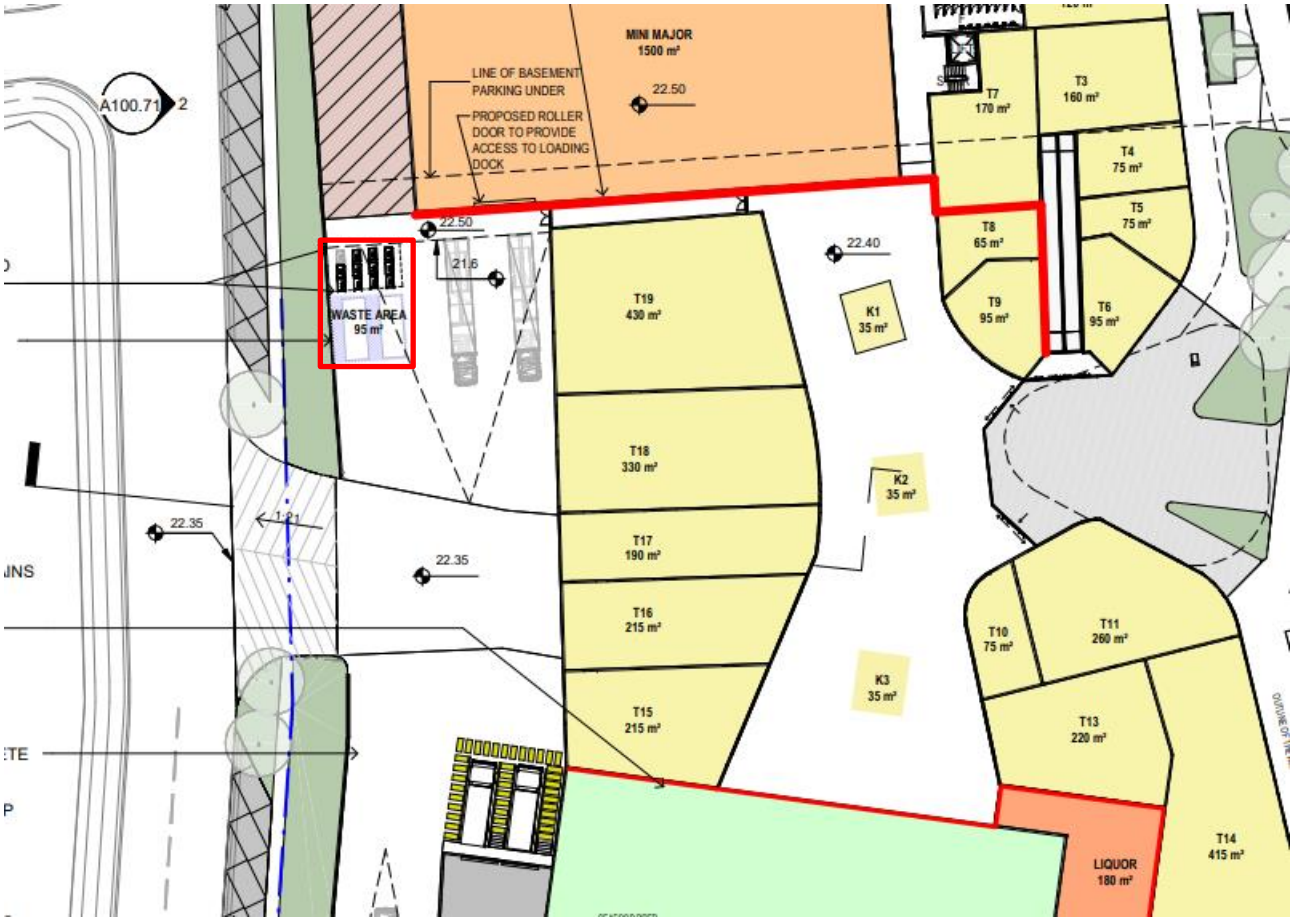
On the day of service, a private waste collection vehicle will pull up on Tigerhawk Drive adjacent to the childcare waste room. The bins will be collected directly from the childcare waste room via a collect and return arrangement.

Medical Waste:

It will be the responsibility of the medical centre operator to determine the types of medical waste that will be generated by the development, and to arrange for the appropriate bins and collection services for the relevant medical waste types.

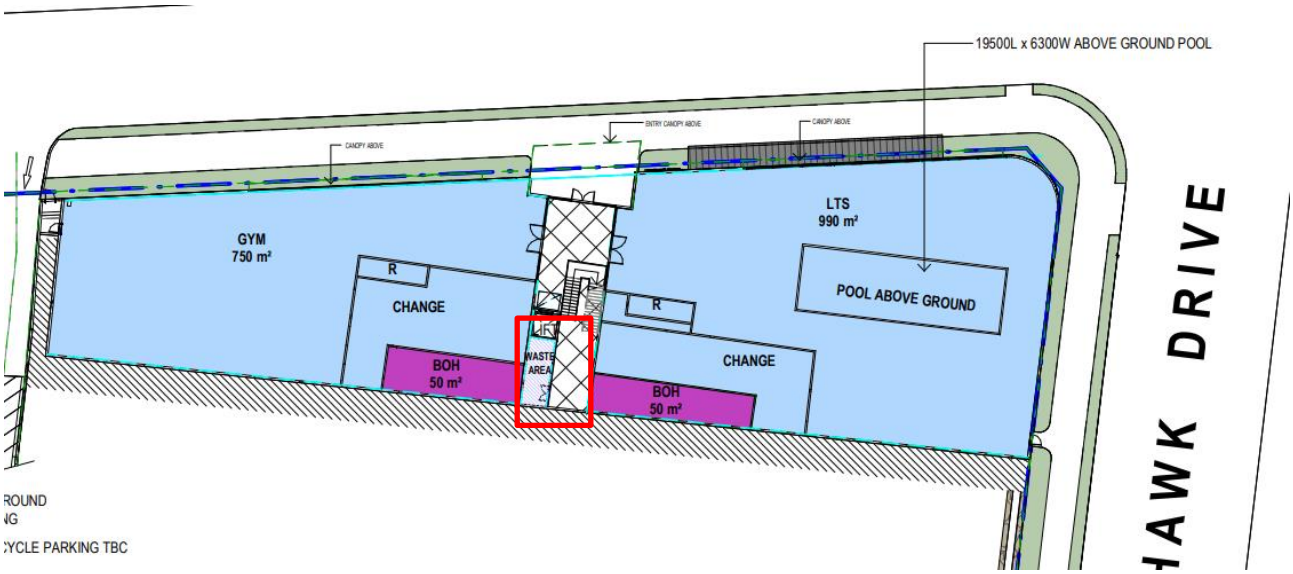
The medical centre operator will be responsible for appointing a medical waste collection contractor prior to the operation of the site to provide and service the appropriate medical waste bins.

Figure 14 Waste storage rooms



Picture 7 Ground Level Loading Dock Waste Area

Source: BN (annotated by Urbis in red)



Picture 8 Child Care Waste Storage Room

Source: BN (annotated by Urbis in red)

7.7. FLORA AND FAUNA

A comprehensive Flora and Fauna Impact Assessment was previously prepared for the greater site in 2007 by Ecotone Ecological Consultants. A supplementary Flora and Fauna Assessment (**FFA**) was prepared by EPS dated 08 December 2021 which focuses on the development site (refer to **Appendix R).**

The FFA concludes that the site is highly disturbed, and comprises of mowed grasslands and three isolated trees, including two remnant Lower Hunter Spotted Gum trees and one broad-leaved white Mahogany tree.

The site is considered likely primarily to provide habitat for common species of fauna that also have extensive and better habitat in the local remnant forests. No threatened species, populations or ecological communities were considered likely to rely on the habitats provided by the site. The single hollow-bearing tree observed on the site was isolated from nearby treed areas and is unlikely to provide significant habitat to fauna species. Intact treed areas to the east of the site are likely to provide preferred habitat for fauna species.

The following recommendations should be considered for implementation (extracted below):

- *"Appropriate erosion and sediment erosion control mechanisms should be implemented during construction, particularly to avoid impacts to the receiving waters of the Four Mile Creek floodplain and nearby drainage areas;*
- *Where possible, landscaping should preferably occur using species native to the local area, which could actually lead to a net gain in native vegetation on the development area when compared to the current habitat condition;*
- *Retention of existing paddock trees should be considered, where safe and appropriate; and*
- *Where removal of the hollow-bearing tree is required, an ecologist should be present during tree removal to monitor and manage any potential resident fauna."*

In summary, the site has been historically disturbed and the proposed development is unlikely to significantly impact any threatened species or ecological communities.

7.8. CRIME PREVENTION THROUGHT ENVIRONMENTAL DESIGN (CPTED)

A CPTED Report has been prepared by The Design Partnership and included in **Appendix L.** The CPTED Report provides an assessment and recommendations for the design produced for the development which can be implemented primarily during operation.

In terms of crime risk, an analysis of BOSCAR data for the suburb of Chisholm identifies low crime levels in the suburb. A hotspot for Steal from Vehicle has been identified close to the proposed shopping centre. The hotspot is within the new residential area south west of the proposed development. Although rates are low, it will be important to consider the risk of similar crime activities for the shopping centre.

The Design Partnership has undertaken an assessment of the CPTED principles, being surveillance; lighting/technical supervision; territorial reinforcement; environmental maintenance; activity and space management; access control; design/definition/designation.

The Design Partnership outlines the following recommendations, which could form part of conditions of consent:

- *"providing clarity between semi public and private spaces using landscaping, fencing, signage and materials.*
- *providing clear delineation between people and vehicles between the carpark and the movement areas, this includes good lighting to illuminate pedestrians.*
- *Clearly naming each building so it can be easily identified by emergency services or users of the facility.*
- *securing the basement carpark with a security door and secure the travelator to prevent unauthorised access after hours.*
- *low maintenance landscaping which does not inhibit sight lines e.g. landscaping is recommended to be limited to groundcovers, shrubs (no taller than 700mm) and taller trees with no significant branches below 2 metres.*

- *using appropriate and high-quality lighting designed by a lighting engineer.*
- *reconsider the design of the pedestrian through site link and the corten blades that could inhibit views of small children.*
- *establishing a Maintenance Plan and implementing it on a regular basis. This includes inspecting the grounds to identify if new CPTED issues have arisen and liaising with local police on a regular basis*
- *using anti-graffiti coatings, fast removal of graffiti and rubbish.*
- *maintaining good surveillance form retail and business premises to the carpark, entry points and footpaths by not obscuring windows with signage and shelving and designing landscape to maximise clear sightlines.*
- *registering CCTV with NSW Police."*

Subject to the implementation of the above recommendations, the proposed development will ensure that a high level of safety and security will be maintained, both through the physical built form and through its day-to-day operations management.

7.9. ACOUSTIC

A Noise Emission Assessment has been prepared by Acoustic Logic and included in **Appendix O** to assess noise emissions associated with the proposed development. A detailed assessment of the noise emission is outlined for the individual elements of the proposal within the Noise Emission Assessment.

The following recommendations have been outlined by Acoustic Logic in relation to the proposed development (extracted below):

Tavern:

- *"Façade glazing to be heavy glazing with acoustic seals to all opening windows and doors.*
- *Limit the area of façade opening (windows and doors) opening to the tavern façade during school hours.*
- *Install additional barriers to the boundary of terrace.*
- *Limit outdoor seating.*
- *Indoor capacity to be limits.*
- *Music inside the venue to be electronically limited.*
- *No music to be played in the outdoor seating areas.*
- *Signage to be displayed at venue instructing patrons to depart in a quiet and orderly manner.*
- *A separate, detailed assessment to be carried out prior to development approval of the tavern assessing noise emissions from patrons, music and plant proposed. It should consider noise emissions to residential receivers and the school (during school hours) so as not to exceed the noise levels recommended in the Noise Emission Assessment and make appropriate physical and management recommendations."*

Child care Centre Operation:

- *"A 1.5m high barrier is to be constructed along the northern, southern and western boundaries of the childcare centre as indicated on architectural drawings.*
- *Barriers are to be constructed of solid, imperforate materials with no gaps having a surface density exceeding 8 kg/m^2.*
- *Signs reminding staff and visitors to minimise noise at all times shall be installed at entry / exit points from the childcare centre.*
- *Management is to ensure children are supervised at all times to minimise noise generate by the children whenever practical and possible.*

- *Install a contact phone number at the front of the centre so that any complaints regarding centre operation can be made.*
- *The facility must not hold more than 112 children at any one time.*
- *Regular landscape maintenance which requires powered tools should be undertaken during daytime hours only (7am – 6pm).*
- *Internal cleaning activities should be undertaken with all façades (windows and doors) closed and may be undertaken at any times."*

Loading Dock:

- *"Loading dock is to be screened from the residences to the south with a minimum 4-metre-high barrier, and the barrier is to be constructed of solid, imperforate material with no gaps."*
- *Barriers are to be constructed of solid, imperforate material with no gaps having a surface density exceeding 8 kg/m^2.*

General:

- *"Further detailed assessment of noise emissions should be carried out the of major tenancies, gym, entertainment uses as well as plant and equipment. It is recommended that these further assessments are undertaken prior to Construction Certificate determination to inform detailed design and plant selection."*

Overall, it is considered that the proposed development is capable of achieving the noise emission criteria outlined above. Specifically, a further detailed noise assessment is to be undertaken for each separate use once operators, layouts and operational details are finalised.

7.10. STORMWATER MANAGAMENT

A Stormwater Management Plan Report and Civil Engineering Drawings have been prepared by Triaxial Consulting and included in **Appendix Q.**

Management of stormwater is to occur both during and after construction. During construction, implementation of water quality control as defined in the *NSW Department of Housing Publication "Soils and Construction*" (The Blue Book) is to be adopted to maximise the capture of sediments and minimise erosion of disturbed soils during the construction phase.

After construction, the inclusion of water quality improvement devices is needed to treat stormwater runoff to acceptable levels before discharging to the receiving drainage infrastructure.

The water quantity control will be managed by providing On-Site Detention (OSD) systems to reduce the rate of stormwater runoff in the post-development condition from the site to be equal or less than the rates for the pre-development existing condition. The OSD systems will be provided as a combination of below ground tanks and surface storage within the proposed carpark.

7.11. BUILDING CODE OF AUSTRALIA, ACCESS AND FIRE ENGINEERING

A Regulatory Compliance Report has been prepared by McKenzie Group and included in **Appendix G.** The proposed development can comply with the Building Code of Australia subject to further assessment and design development as part of the Construction Certificate stage.

An Access Report has been prepared by Vista Access Architects and included in **Appendix F.** The proposal achieves the spatial requirements to provide access for people with a disability and it is assumed that assessment of the detailed requirements such as assessment of internal fit-out, details of starts, ramps and other features will occur at Construction Certificate stage.

8. SECTION 4.15 ASSESSMENT

The proposed development has been assessed in accordance with the relevant matters for consideration listed in Section 4.15 of the EP&A Act 1979.

8.1. ENVIRONMENTAL PLANNING INSTRUMENTS

The proposed development has been assessed in accordance with the relevant State and local environmental planning instruments in **Section 6.**

This SEE and the supporting documentation demonstrates that the proposed development is generally consistent with the relevant environmental planning instruments and achieves the objectives of the relevant provisions. Where the proposal is not compliant with the relevant provisions, it has been demonstrated to be a superior outcome than a compliant scheme.

8.2. DRAFT ENVIRONMENTAL PLANNING INSTRUMENTS

No draft environmental planning instruments are relevant to this proposal.

8.3. DEVELOPMENT CONTROL PLAN

Maitland Development Control Plan 2011 (the DCP) provides detailed planning controls relevant to the site and the proposal. An assessment against the relevant controls is provided in **Appendix V.**

The assessment concludes the proposal complies with the relevant provisions within the DCP.

8.4. PLANNING AGREEMENT

No planning agreements are relevant to this proposal.

8.5. REGULATIONS

This application has been prepared in accordance with the relevant provisions of the *Environmental Planning and Assessment Regulations 2000*.

8.6. NATURAL AND BUILT ENVIRONMENT

A detailed assessment of the key planning considerations and potential issues associated with the proposed development have been discussed previously as outlined in **Section 7** of the SEE.

In summary as outlined below, the proposed development will result in negligible impacts on the natural and built environment:

- A Supplementary Flora and Fauna Assessment undertaken by EPS (**Appendix R**) provides assessment against the likely impacts of development and construction on flora and fauna and concludes that the proposed development is unlikely to significantly impact any threatened species or ecological communities.
- As demonstrated by the accompanying shadow diagrams within the Architectural drawings at **Appendix C** the proposed development will have no overshadowing impact on surrounding development or public domain.
- The centre will provide public areas of high amenity with good solar access and opportunities for passive recreation. In addition, the proposed development will provide activation and opportunities for high amenity seating areas with the food and drink premises along Heritage Drive.
- The civil plans and report undertaken by Triaxial Consulting (**Appendix Q**) addresses and demonstrates that Council's criteria for on-site stormwater detention, short term construction stormwater quality and long-term stormwater quality have been met through the conceptual stormwater management design.
- A Preliminary Construction Management Plan (CMP) by Richard Crookes Constructions (**Appendix I**) will ensure that all appropriate measures will be implemented during the construction phase to ensure that there are no adverse amenity impacts to surrounding land in terms of dust, soil erosion, air and noise.

- Recommendations within the Bushfire Assessment Report by Newcastle Bushfire Consulting (**Appendix K**) will ensure that risk of bushfire attack is reduced and that the performance requirements of the National Construction Code 2016 and objectives of Planning for Bushfire Protection can be met.
- The proposal does not have an impact on significant environmental features, protecting and preserving the amenity and biodiversity values contained within the area.
- Excavation works will be undertaken as per the Geotechnical Report included in **Appendix T**, ensuring there is minimal impact on soil stability.
- The proposed stormwater management solution has been designed to ensure the development does not increase the flood affectation of surrounding properties.
- The BCA and Access assessments confirm the proposal is capable of compliance with the relevant Australian Standards through Deemed-to-Satisfy provisions and performance solutions.
- The proposal does not lead to adverse impacts on road networks surrounding the site, as stated in the Traffic Impact Assessment. The surrounding street network has sufficient alignments to ensure that there are sufficient sight distances into and out of the site.
- The proposal is designed in accordance with the objectives and site-specific DCP controls. Given the orientation of the site, amenity, solar access and privacy has been carefully managed, with their being limited amenity impact to neighbouring properties.
- As demonstrated in the Architectural Plans at **Appendix C**, the proposed development will have a positive visual impact on the character of the surrounding release area. The contemporary built form will activate a large development site and will positively address and enhance the surrounding streetscape.

8.7. SOCIAL AND ECONOMIC IMPACTS

8.7.1. Social Impacts

Chisholm Shopping Village will have a positive social impact on the locality. The Thornton North Master Plan envisages the centre to be a cultural focal point for neighbourhood. Whilst this has begun to emerge through the development of public spaces (Whitewater Park) and local Primary and Secondary Schools the site still lacks the key focal point that will be delivered by this planned local shopping centre.

Chisholm Shopping Village delivers a sense of place and identity and is a crucial component to developing a vibrant and active local community focused around the existing school. Chisholm Shopping Village will provide a focal point for the community providing spaces for positive social interactions in the form of a safe and useable public domain within the site with a strong and legible ground plane that will encourage permeability into the site from the more heavily trafficked public domain areas along Tigerhawk Drive and Heritage Drive.

The public plaza will include areas for activity including a children's water splash and fountain playground and both formal and informal seating areas. The addition of a planned range of non-retail uses such as a medical centre, learn to swim centre, and child care centre will increase the community's opportunity for linked trips within the centre. These uses will add to the overall vitality of the centre and help support the retail shops and bring new services and greater choice to the market.

The location of this centre in proximity to dwellings within Chisholm and its connectivity to the surrounding pedestrian and cycle network enables easy access by foot or a short journey on local roads by private vehicle, this will benefit all future residents of Chisholm by reducing the need for private vehicle use.

8.7.2. Economic Impacts

Ethos Urban have prepared an Economic Impact Assessment (**EIA**) (**Appendix J**) that outlines the positive economic impacts of the proposal on the immediate and broader community and assess the potential retail impact.

In summary, the proposal will have the following economic benefits:

- The proposed development will serve the growing food and grocery needs of trade area. The resident population of the primary sector is estimated to reach 7,300 at 2026 and increase to a substantial 10,000

at 2031. There are currently no supermarkets or notable retail facilities in the primary sector, and there is the clear demand and need for a major supermarket in the local area.

- There is only one existing major supermarket in the secondary south sector – the Coles supermarket at Thornton Shopping Centre – as well as two smaller supermarkets in the secondary west sector. The proposed development will be anchored by a full-scale supermarket which would be able to offer local residents a full range of supermarket products and serve the daily/weekly food and grocery needs of the local population.
- The proposed development will improve shopping choice and convenience for local residents.
- The proposal will create a focal point for the community as the centre will provide a wide range of shops, services and community facilities including a medical centre, child care centre and learn to swim centre.
- The development would create a number of jobs, for the construction and related industries during the construction phase, as well as ongoing jobs when the centre is operational.

Floorspace Demand Assessment

The estimated level of retail floorspace demand generated by main trade area population over the forecast period to 2036 is detailed in Table 4.1 of the EIA. The retail floorspace demand generated by the main trade area population is forecast to increase by from 53,500 sq.m at 2021 to 67,400 sq.m by 2036.

Ethos Urban's analysis indicates:

> *"…that currently a neighbourhood centre type offer anchored by at least one supermarket is clearly supportable at the Subject Site, with the demand for retail floorspace to increase over time. By 2026, the amount of retail floorspace considered supportable is estimated at approximately 9,000 sq.m, including 5,700 sq.m of FLG floorspace. The level of supportable FLG floorspace would easily accommodate a full-line supermarket (including liquor), as well as potentially a smaller supermarket or large fresh produce store and a provision of supporting fresh food specialties."*

Note: FLG = Food, Liquor and Groceries

Estimated Impact

The EIA summaries the estimated impacts of the proposed developments as extracted below:

- *"Within the trade area the largest impact is expected to fall on Thornton Shopping Centre. In 2024, the centre is estimated to be impacted by $7.5 million of 13.2%. However, given the rapid growth occurring in the secondary south sector the centre is expected to achieve sales in 2024 only 5% below the current level, and by 2027 the turnover for the centre is projected to be 2% above its current sales level. Furthermore, the centre is currently trading strongly given the relatively limited competition in the immediate surrounding area, and therefore the estimated impact would not threaten the ongoing viability of the centre.*
- *Stockland Green Hills is expected is experience a significant initial impact though still achieve more sales in 2024 compared with 2021 due to the growth in the market. This level of impact takes into account that the centre includes both Coles and Woolworths supermarkets, and is likely capturing a significant proportion of the food and grocery spending of trade area residents, who would have an alternative choice for supermarket shopping once Chisholm Shopping Village opens.*
- *• Minor to moderate impacts are projected on other centres in the area which include a sizable food offer. However, the analysis demonstrates that all centres will achieve more sales in 2027 compared with current sales following the development of Chisholm Shopping Village, and most centres will achieve greater sales by 2024.*
- *Chisholm Shopping Village will not impact, or have a negligible impact, on centres in the region without a notable food offer."*

The EIA concludes that the estimated impacts from the proposed development are considered to be reasonable and would not threaten the viability or ongoing concern of any surrounding centres or supermarkets. The estimated impacts outlined below are considered acceptable particularly given the growing population and current undersupply of supermarket floorspace in the local area.

8.8. SUITABILITY OF THE SITE

The site is suitable for the proposed development of Chisholm Shopping Village for these reasons.

- The site is centrally located within the suburb of Chisholm within the former Thornton North URA and has been specifically identified for the development of a shopping centre within the approved master plan and subsequent re-zoning of the site to B1 with an overall FSR of 0.3:1
- The site is large (4.3ha) and capable of accommodating the Chisholm Shopping Village and the required ancillary development such as car parking, public open space areas and other land uses that are complimentary to its function and operation.
- The site is conveniently located adjacent to key community focal points such as schools, and public open space. The proposed layout allows the centre to become a vibrant focal point for the local community, fostering a sense of place and encouraging a high level of activity throughout the day and into the evening.
- The site is located within walking distance of the surrounding residential areas and connects to the existing pedestrian and cycle path network and as such accessible by various modes of transport.

8.9. SUBMISSIONS

It is acknowledged that submissions arising from the public notification of this application will need to be assessed by Council.

It should be noted that the previous DA had minimal negative submissions, as generally there is positive community sentiment around this proposal given the surrounding community have waited a long time for this local centre to be delivered.

8.10. PUBLIC INTEREST

The proposed development is considered in the public interest for the following reasons:

- The proposed development of Chisholm Shopping Village is consistent with the Thornton North Structure Plan and the Maitland Activity Centres and Employment Clusters Strategy 2010 which both identified the need for a neighbourhood shopping centre to serve the Chisholm release area,
- The submitted EIA undertaken by Ethos Urban identifies a range of economic benefits are likely to arise as a result of the subject development, which includes serving the growing food and grocery needs of trade area residents; improving shopping choice and convenience for local residents; creating a focal point for the community; and creating local employment opportunities.
- The proposed development generally respects the intent of Council's 2010 resolution to limit the overall floor space for retail/commercial uses to 12,500m^2.
- Chisholm Shopping Village will significantly benefit the community providing an important activated and pedestrian focused centre for retail, commercial and community uses with opportunities for future recreation and leisure activities which will improve overall lifestyle and contribute to health and well-being.
- Chisholm Shopping Village seeks to provide community facilities including a child care centre, learn to swim centre and medical centre to improve access to these community based facilities.

9. CONCLUSION

The proposed development has been assessed in accordance with Section 4.15 of the EP&A Act and is considered appropriate for the site and the locality:

- **The proposal is consistent with State and subregional strategic planning objectives** – The proposed development will provide retail and other services within an easily accessible local centre, which is entirely consistent with State and subregional strategic planning objectives.
- **The proposal is largely consistent with the applicable state and local planning controls** – The assessment provided in this report has indicates that the proposed development is in accordance with the key State and Local Planning Policy Framework. The proposed layout is consistent with the Precinct Plan and remains consistent with Council's 2010 resolution to limit the amount of retail/commercial floor space at the centre.
- **The proposal will offer a high standard of amenity and net community benefit** – The proposal represents a significant investment in the Maitland LGA and will ensure that the local community is provided new retail shops, services and public spaces that will contribute to the vitality of the community and provide greater choice to the market.

  Chisholm Shopping Village will deliver a sense of place and identity and is a crucial component to contributing to a vibrant and active local community focused precinct around the existing school. Chisholm Shopping Village will provide a focal point for the community providing spaces for positive social interactions in the form of a safe and useable public domain within the site with a strong and legible ground plane that will encourage permeability into the site from the more heavily trafficked public domain areas along Tigerhawk Drive and Heritage Drive.
- **The proposal will provide a low scale and sympathetic built form in the streetscape** – The proposed development will have a positive visual impact on the character of the surrounding release area. The contemporary built form will activate a large development site and will positively address and enhance the surrounding streetscape. The built form is appropriate and will not result in any overshadowing impacts to surrounding sites or public domain.
- **The proposal will have a positive economic impact** – The proposed development will serve the growing food and grocery needs of trade area and will improve shopping choice and convenience for residents.
- **The proposal is in the public interest** – Chisholm Shopping Village will significantly benefit the community providing an important activated and pedestrian focused centre for retail, commercial and community uses with opportunities for future recreation and leisure activities which will improve overall lifestyle and contribute to health and well-being. In addition, the proposal will provide community facilities including a child care centre, learn to swim centre and medical centre to improve access to these community based facilities. In addition, the community has been previously supportive of commercial uses in this location, and the delivery of a local centre in this location is long awaited.

The proposed development will not cause any unreasonable social, environmental or economic impacts, and is in the public interest. Having considered all relevant matters, we conclude that the proposed development is appropriate for the site and approval is recommended, subject to appropriate conditions of consent.

10. DISCLAIMER

This report is dated December 2021 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd **(Urbis)** opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Chisholm SC Pty Ltd AF Chisholm Sc Investment Trust **(Instructing Party)** for the purpose of Statement of Environmental Effects **(Purpose)** and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

In preparing this report, Urbis may rely on or refer to documents in a language other than English, which Urbis may arrange to be translated. Urbis is not responsible for the accuracy or completeness of such translations and disclaims any liability for any statement or opinion made in this report being inaccurate or incomplete arising from such translations.

Whilst Urbis has made all reasonable inquiries it believes necessary in preparing this report, it is not responsible for determining the completeness or accuracy of information provided to it. Urbis (including its officers and personnel) is not liable for any errors or omissions, including in information provided by the Instructing Party or another person or upon which Urbis relies, provided that such errors or omissions are not made by Urbis recklessly or in bad faith.

This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

APPENDIX A SURVEY PLAN

APPENDIX B QUANTITY SURVEYOR REPORT

APPENDIX C ARCHITECTURAL PLANS

APPENDIX D LANDSCAPE PLANS

APPENDIX E TRAFFIC IMPACT ASSESSMENT AND TURNING TEMPLATES

APPENDIX F ACCESS STRATEGY

APPENDIX G REGULATORY COMPLIANCE REPORT

APPENDIX H WASTE MANAGEMENT PLAN

APPENDIX I CONSTRUCTION MANAGEMENT PLAN

APPENDIX J ECONOMIC IMPACT ASSESSMENT

APPENDIX K BUSH FIRE ASSESSMENT

APPENDIX L CPTED REPORT

APPENDIX M SECTION J REPORT

APPENDIX N HUNTER WATER STAMPED PLANS

APPENDIX O ACOUSTIC ASSESSMENT

APPENDIX P NATIONAL QUALITY FRAMEWORK ASSESSMENT CHECKLIST

APPENDIX Q CIVIL ENGINEERING DOCUMENTATION

APPENDIX R SUPPLEMENTARY FLORA AND FAUNA ASSESSMENT

APPENDIX S PRELIMINARY SITE CONTAMINATION INVESTIGATION

APPENDIX T PRELIMINARY GEOTECHNICAL INVESTIGATIONS

APPENDIX U PRELIMINARY ENVRIONMENTAL SITE ASSESSMENT

APPENDIX V DCP COMPLIANCE TABLE

URBIS

LEGEND

- BOUNDARY LINE
- ADJACENT BOUNDARY
- EASEMENT
- FENCE LINE
- S — SEWERMAIN
- W — WATERMAIN
- OHP — OVERHEAD ELECTRICITY
- UGP — UNDERGROUND ELECTRICITY
- T — TELECOMMUNICATIONS LINE
- OPT — OPTIC FIBRE LINE
- GAS — GAS LINE
- MAJOR COUNTOUR LINE
- MINOR CONTOUR LINE
- TOP & TOE OF BANKS
- RETAINING WALLS
- BENCH MARK
- SIP — SEWER INSPECTION POINT
- SMH — SEWER MANHOLE
- SV — STOP VALVE
- HYD — HYDRANT
- WM — WATER METER
- GRATED PIT
- PP — POWER POLE
- LP — LIGHT POLE
- ET — ELECTRICAL TURRENT
- GAS METER
- TELECOMMUNICATIONS PIT
- TRAFFIC SIGNAL
- (5) DENOTES PHOTO LOCATION
- STREET SIGN
- TRS/0.6/8 — DENOTES TREE. HEIGHT/DIAMETER/SPREAD
- DENOTES WINDOW GROUND FLOOR (H 6.12, S 5.12) HOOD RL SILL RL
- DENOTES WINDOW UPPER FLOOR (H 16.12, S 15.12) HOOD RL SILL RL

NOTE:-

1. BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY, AND HAVE NOT BEEN SURVEYED.
2. SERVICES HAVE BEEN LOCATED ONLY WHERE VISIBLE, PRIOR TO EXCAVATION OR CONSTRUCTION ALL SERVICES ARE TO BE LOCATED BY RELEVANT AUTHORITY.
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4. APPROXIMATE SITE AREA IS AS SHOWN ON PLAN
5. DETAILS OF SURVEY ARE CORRECT TO THE DATE SHOWN. (14/10/2021)

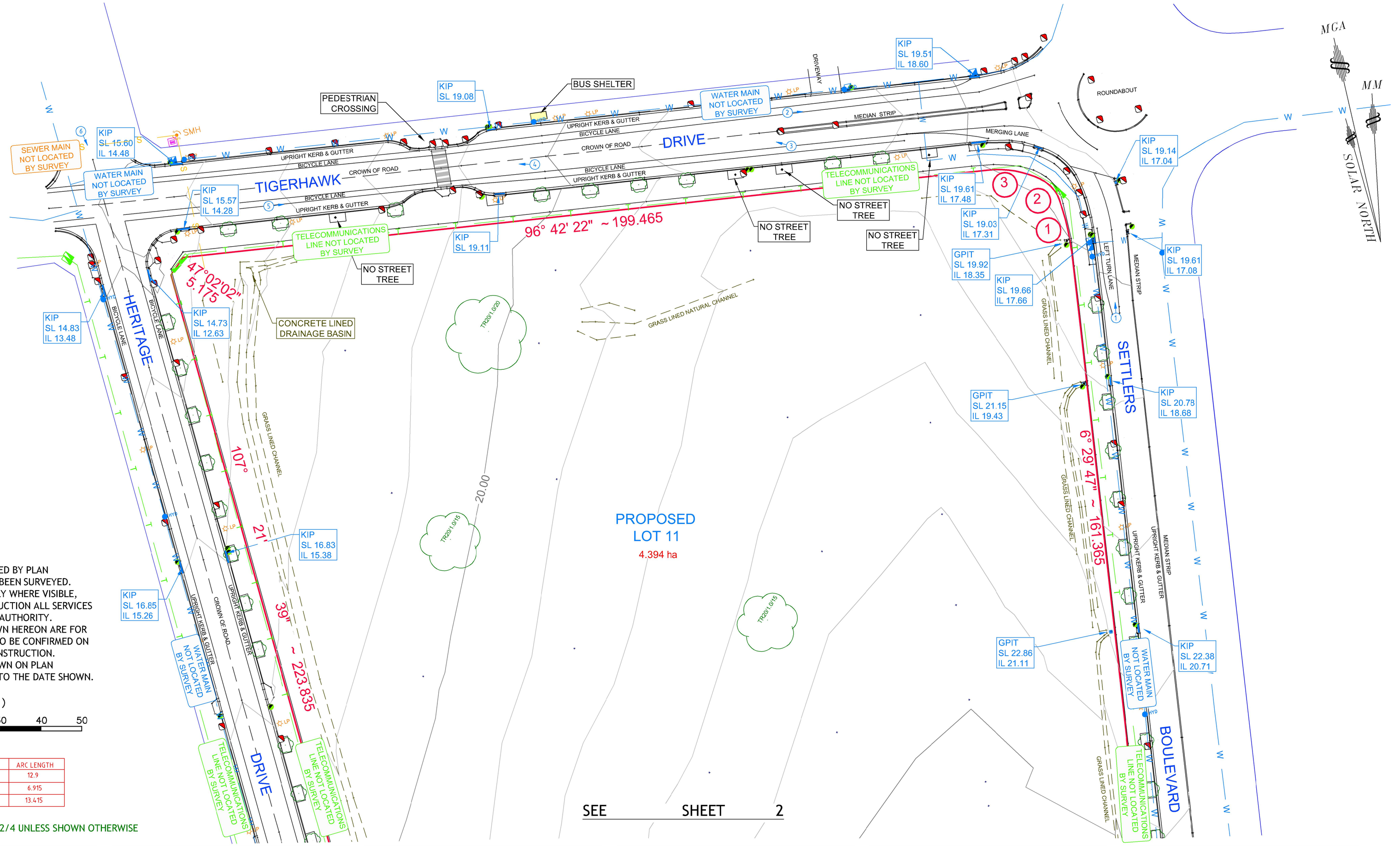
SCALE 1:500 (A1)

10 0 10 20 30 40 50

SHORT LINE TABLE

LINE	BEARING	DISTANCE	RADIUS	ARC LENGTH
1	179°16'07"	12.87	54.05	12.9
2	150°32'47"	6.745	9.05	6.915
3	112°41'00"	13.24	24.05	13.415

ALL STREET TREES ARE A NOMINAL 4/0.2/4 UNLESS SHOWN OTHERWISE



PHOTOGRAPH 1

PHOTOGRAPH 2

PHOTOGRAPH 3

PHOTOGRAPH 4

PHOTOGRAPH 5

PHOTOGRAPH 6

Ed.	Details of Revisions	Date
A	INITIAL ISSUE	21/10/21

Client / Council Development Consent Number

Scale: 1:100 (A1),1:200 (A3) | Datum: AHD
Origin: SSM171234 | Contour Int: 1.0
Surveyor: S.N. | Drawn: S.F.
Checked: S.C. | Approved: J.H.
Job Number: 6636 | Drawing File: 6636-DET

Registered Surveyor: .....

LAND DEVELOPMENT SOLUTIONS
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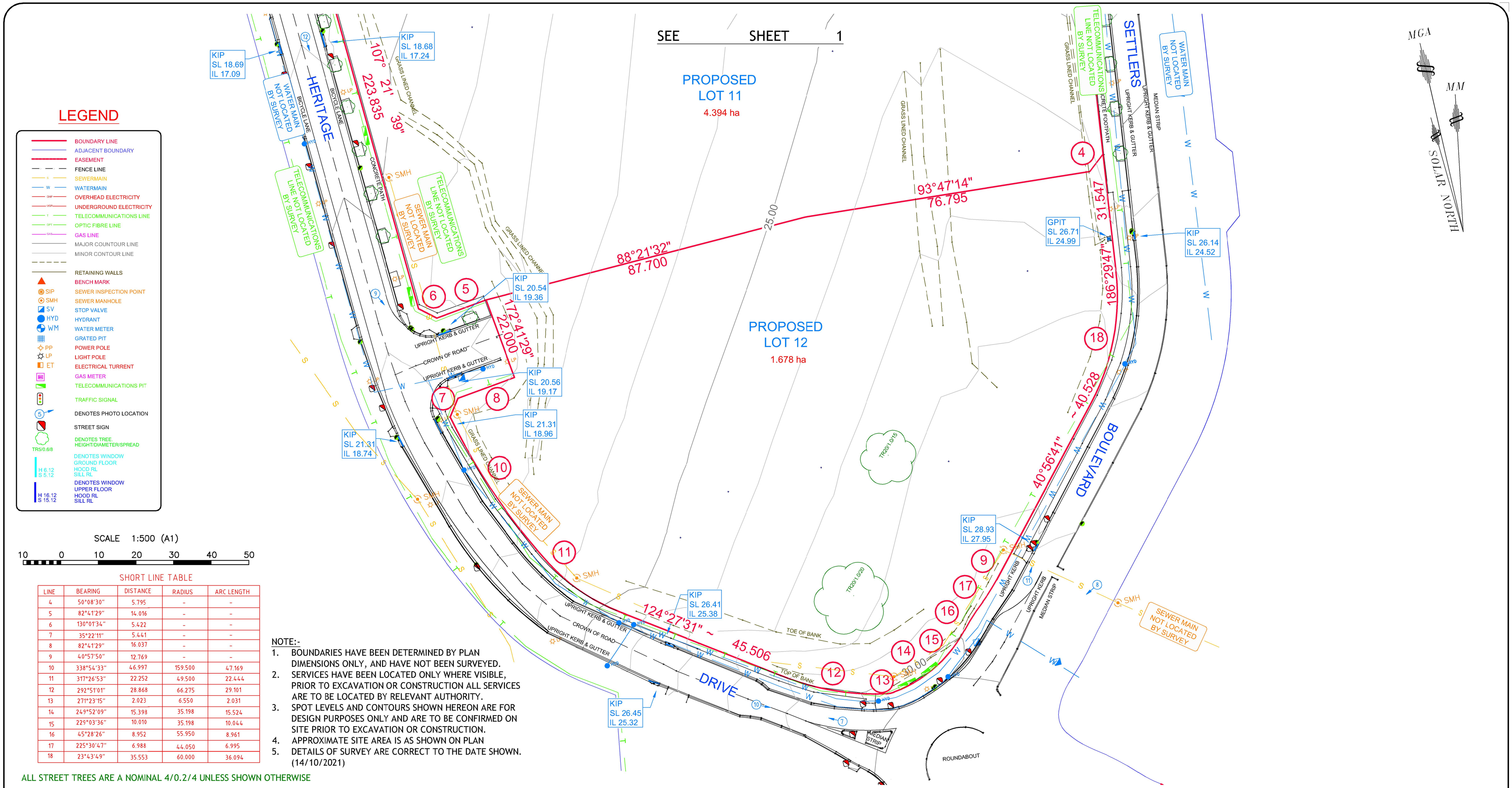
ABN: 42 110 897 928

DETAIL SURVEY OF LOT 11 & 12, UNREGISTERED D.P, BEING SUBDIVIDED LOT 1, D.P. 1224700, CHISHOLM

Drawing Number	Edition
1	A

Sheet. 1.. of.. 2



LEGEND

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SCALE 1:500 (A1)

10 0 10 20 30 40 50

SHORT LINE TABLE

LINE	BEARING	DISTANCE	RADIUS	ARC LENGTH
4	50°08'30"	5.795	-	-
5	82°41'29"	14.016	-	-
6	130°01'34"	5.422	-	-
7	35°22'11"	5.441	-	-
8	82°41'29"	16.037	-	-
9	40°57'50"	12.769	-	-
10	338°54'33"	46.997	159.500	47.169
11	317°26'53"	22.252	49.500	22.444
12	292°51'01"	28.868	66.275	29.101
13	271°23'15"	2.023	6.550	2.031
14	249°52'09"	15.398	35.198	15.524
15	229°03'36"	10.010	35.198	10.044
16	45°28'26"	8.952	55.950	8.961
17	225°30'47"	6.988	44.050	6.995
18	23°43'49"	35.553	60.000	36.094

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PHOTOGRAPH 7

PHOTOGRAPH 8

PHOTOGRAPH 9

PHOTOGRAPH 10

PHOTOGRAPH 11

PHOTOGRAPH 12

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DETAIL SURVEY OF
LOT 11 & 12, UNREGISTERED D.P,
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CHISHOLM

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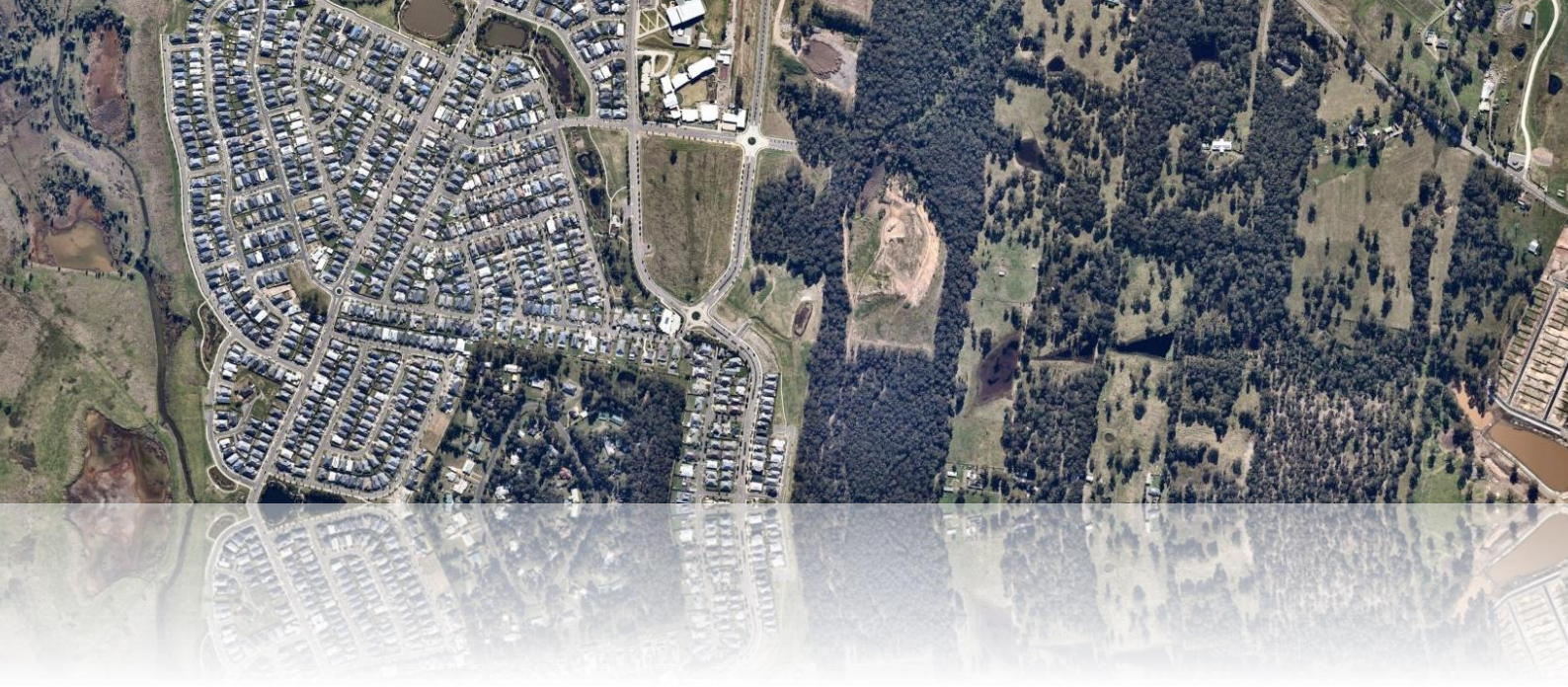
Sheet. 2.. of.. 2



TRAFFIC AND PARKING IMPACT ASSESSMENT OF THE PROPOSED SHOPPING CENTRE AT 20 HERITAGE DRIVE, CHISHOLM

Address: Shop 7, 720 Old Princes Highway Sutherland NSW 2232
Postal: P.O Box 66 Sutherland NSW 1499

Telephone: (02) 9521 7199
Web: www.mclarentraffic.com.au
Email: admin@mclarentraffic.com.au

Division of RAMTRANS Australia ABN: 45067491678 RPEQ: 19457

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

210550.01FB - 23 December 2021

Development Type: **Proposed Shopping Centre**

Site Address: **20 Heritage Drive, Chisholm**

Prepared for: **Revelop**

Document reference: **210550.01FB**

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1 INTRODUCTION

M^CLaren Traffic Engineering was commissioned by *Revelop* to provide a Traffic and Parking Impact Assessment of the Proposed Shopping Centre at 20 Heritage Drive, Chisholm as depicted in **Annexure A**.

1.1 Description and Scale of Development

The proposed development and subdivision has the following characteristics relevant to traffic and parking:

- A mixed-use development containing the following land uses:
  - A supermarket of 3,912m^2 gross floor area (GFA) (includes home delivery area, loading dock and direct to boot), with a 3,500m^2 gross leasable floor area (GLFA) (not including direct to boot, home delivery area and loading dock);
  - Liquor premises (retail) of 185m^2 GFA / GLFA;
  - A major retail premises of 1,500m^2 GFA / GLFA;
  - Various secondary retail premises of 3,695m^2 GFA / GLFA;
  - A tavern premises of 890m^2 GFA / GLFA;
  - Medical centre premises of 745m^2 GFA / GLFA;
  - A kiosk (food and drink premises) of 160m^2 GFA / GLFA;
  - A child care centre accommodating 112 children;
  - A gym premises of 8,00m^2 GFA;
  - A swim school of 1,040m^2 GFA;
  - Car wash area of 475m^2 GFA / GLFA.
- Associated at-grade car parking area accommodating 535 car parking spaces with vehicular access provided via a two-way driveway from Heritage Drive, entry only driveway from Tigerhawk Drive (left in only) and a two-way driveway restricted to left in / left out on Settlers Boulevard:
  - 10 x parent / pram car parking spaces;
  - 10 x disabled car parking spaces;
  - 515 standard car parking spaces.
- Six (6) pick-up parking space to facilitate the Woolworths direct to boot service;
- Associated basement parking area accommodating 126 car parking spaces with vehicular access via Heritage Drive:
  - 4 x disabled car parking spaces;
  - 5 x electric vehicle car parking spaces;
  - 117 x standard car parking spaces.

- An access road (referred to as the Link Road) is proposed between Heritage Drive and Settlers Boulevard, separating the mixed-use development and the residential subdivision and provides vehicular access to:
    - The proposed link road to the residential subdivision;
    - The loading and servicing area for the mixed-use development;
    - An additional 21 angled car parking spaces fronting of shopping centre.

It is noted that the following development scale has been approved by Maitland City Council under *DA 18-1526* on the subject site:

- A mixed-use development of 6,325m^2 gross floor area (GFA) containing the following land uses:
    - A supermarket of 3,800m^2 GFA;
    - Retail premises of 1,425m^2 GFA;
    - Food and drink premises of 1,000m^2 GFA;
    - Café premises of 100m^2 GFA;
    - Medical centre premises of 580m^2 GFA.
- Associated at-grade car parking are accommodating 434 car parking spaces.

1.2 State Environmental Planning Policy (Infrastructure) 2007

The proposed development does qualify as a traffic generating development with relevant size and/or capacity under *Clause 104* of the *SEPP (Infrastructure) 2007*. Accordingly, formal referral to Transport for New South Wales (TfNSW) is necessary in conjunction with assessment of the application by Maitland Council officers.

1.3 Site Description

The subject development involves the development of a currently vacant lot which is currently zoned *B1: Neighbourhood Centre* and *R1: General Residential* under the *Maitland Local Environmental Plan 2011*. The site is surrounded by existing roads on all frontages, with Heritage Drive to the west, Tigerhawk Drive to the north and Settlers Boulevard to the west.

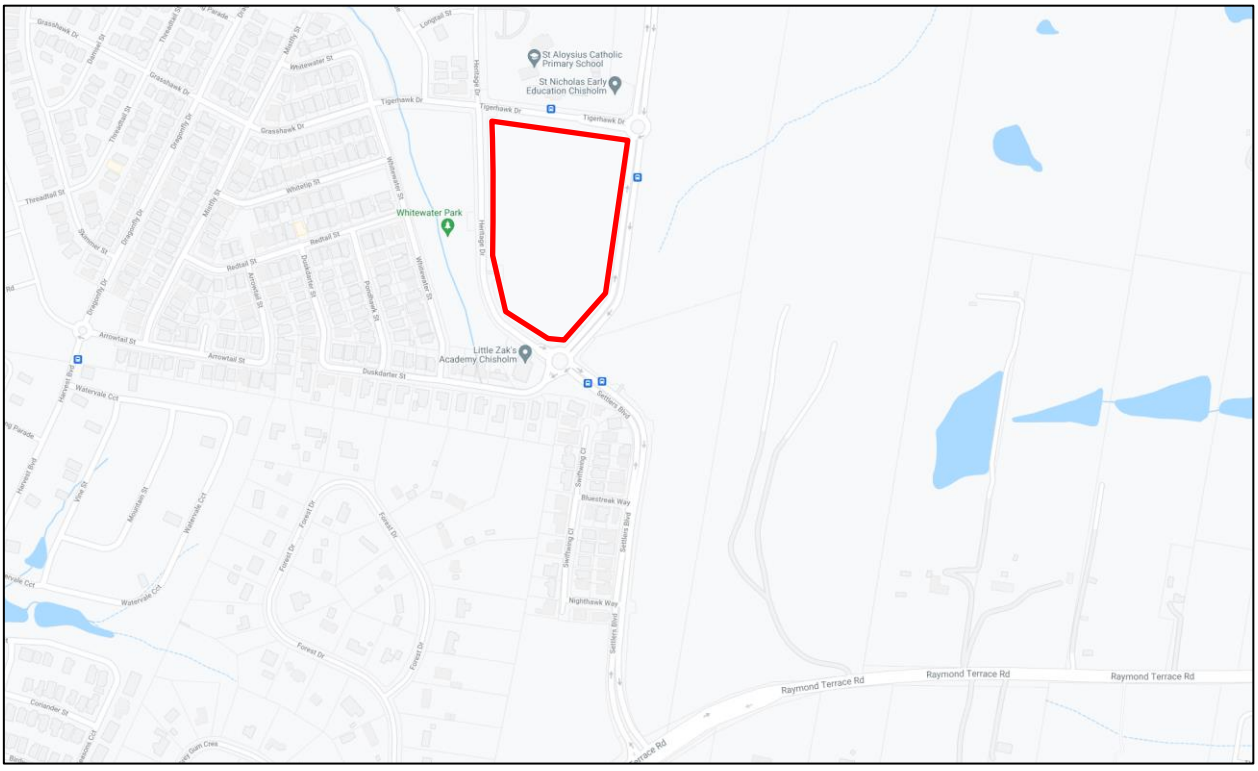
The site is generally surrounded by residential subdivision developments to the west and south with St Aloysius Catholic Primary School located directly to the north of the site and vacant land and bushland to the east. Raymond Terrace Road, facilitating traffic flow eastbound and westbound is located approximately 620m to the south of the site.

1.4 Site Context

The location of the site is shown on an aerial photo and a street map in **Figure 1** and **Figure 2** respectively.

Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The road network servicing the site has characteristics as described in the following sub-sections.

2.1.1 Heritage Drive

- Unclassified LOCAL Road;
- Approximately 12m wide two-way carriageway (one lane in each direction) and a line-marked kerbside parking lane on both sides of the road;
- Signposted 50km/h speed limit;
- Unrestricted kerbside parking permitted along both sides of the road within a line-marked kerbside parking lane;
- Provision of a shared path within the verge on both sides of the road.

2.1.2 Settlers Boulevard

- Unclassified LOCAL Road;
- Approximately 19m wide two-way carriageway (one lane in each direction), a line-marked bicycle lane and a line-marked kerbside parking lane on both sides of the road, divided by a central landscaped median of approximately 3m width;
- Signposted 50km/h speed limit, with 40km/h school zone restrictions;
- Unrestricted kerbside parking permitted along both sides of the road within a line-marked kerbside parking lane.
- Provision of a shared path within the verge on both sides of the road.

2.1.3 Tigerhawk Drive

- Unclassified LOCAL Road;
- Approximately 16m wide two-way carriageway (one lane in each direction), a line-marked bicycle lane and a line-marked kerbside parking lane on both sides of the road;
- Signposted 50km/h speed limit, with 40km/h school zone restrictions;
- Unrestricted kerbside parking permitted along both sides of the road within a line-marked kerbside parking lane.

2.1.4 Raymond Terrace Road

- TfNSW Classified STATE ARTERIAL Road (No. 104);
- Approximately 10m to 27m wide two-way carriageway within near vicinity of the site facilitating one (1) to two (2) lanes in each direction;
    - Carriageway typically accommodates one (1) lane in each direction;

- Widens to two (2) lanes plus auxiliary turn lanes in each direction within close proximity to Settlers Boulevard.

- Signposted 80km/h speed limit;
- Line-marked bicycle lane on both sides of the road within close proximity to Settlers Boulevard;
- No provision of kerbside parking facilities on either side of the road.

2.2 Existing Traffic Management

- Roundabout controlled intersection of Heritage Drive / Settlers Boulevard / Duskdater Street;
- Roundabout controlled intersection of Settlers Boulevard / Tigerhawk Drive;
- Give-way sign controlled intersection of Heritage Drive / Tigerhawk Drive;
- Signal controlled intersection of Settlers Boulevard / Raymond Terrace Drive;
- Existing junction of Heritage Drive / Proposed Access Lane (to be constructed);
- Existing junction of Settlers Drive / Greenling Drive (to be constructed);
- Indented blistered pedestrian crossing on Tigerhawk Drive along the northern boundary of the site.

2.3 Existing Traffic Environment

Intersection traffic surveys were conducted by The *Transport Planning Partnership (TTPP)* within a Traffic Report dated 27 June 2018 (referred to as the *TTPA Report*), prepared for the same site. Data was collected at key intersections within the vicinity of the site between 7:00am to 9:00am, and between 3:00pm to 6:00pm on Thursday 22 March 2018, and between 10:00am to 1:00pm on Saturday 24 March 2018 representing a typical operating weekday and weekend. The survey results are shown in **Annexure B** for reference, with the intersections surveyed listed as follows:

- Settlers Boulevard / Raymond Terrace Road;
- Harvest Boulevard / Raymond Terrace Road;
- Heritage Drive / Settlers Boulevard / Duskdarter Street;
- Heritage Drive / Tigerhawk Drive;
- Dragonfly Drive / Grasshawk Drive.

It should be noted that due to the NSW lockdown, it has not been possible to undertake updated traffic surveys.

2.3.1 Existing Road Performance

The performance of the surrounding intersections under the existing traffic conditions has been assessed using SIDRA INTERSECTION 9.0, **Table 1** summarises the resultant intersection performance data, with full SIDRA results reproduced in **Annexure C**.

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3][4]	Control Type	Worst Movement
EXISTING PERFORMANCE						
Settlers Boulevard / Raymond Terrace	AM	0.46	21.9	**B**	Signals	N/A
	PM	0.35	15.9	**B**		N/A
	Weekend	0.26	15.8	**B**		N/A
Harvest Boulevard / Raymond Terrace	AM	0.40	10.1	**A**	Signals	N/A
	PM	0.48	10.8	**A**		N/A
	Weekend	0.35	9.9	**A**		N/A
Settlers Boulevard / Heritage Drive / Duskdarter Street	AM	0.25	5.2 (Worst: 11.1)	**A** (Worst: B)	Roundabout	RT from Settlers Boulevard (E)
	PM	0.12	4.3 (Worst: 10.2)	**A** (Worst: B)		
	Weekend	0.08	4.5 (Worst: 9.8)	**A** (Worst: A)		
Heritage Drive / Tigerhawk Drive	AM	0.23	3.9 (Worst: 8.6)	**N/A** (Worst: A)	Priority	RT from Tigerhawk Drive (W)
	PM	0.10	3.8 (Worst: 6.8)	**N/A** (Worst: A)		
	Weekend	0.10	4.2 (Worst: 6.1)	**N/A** (Worst: A)		
Grasshawk Drive / Dragonfly Drive	AM	0.04	4.4 (Worst: 6.0)	**N/A** (Worst: A)	Priority	RT from Grasshawk Drive (E)
	PM	0.06	4.8 (Worst: 5.9)	**N/A** (Worst: A)		
	Weekend	0.05	4.8 (Worst: 5.7)	**N/A** (Worst: A)		

NOTES:
(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
(4) No overall Level of Service is provided for Give Way, Priority and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown above, the relevant intersections are currently performing at a high level of efficiency, with a Level of Service (LoS) “A” or “B” conditions in both the AM, PM & weekend peak hour periods. The level of service “A” and “B” performance is characterised by low approach delays and spare capacity.

Whilst all assessed intersections are operating at an acceptable LoS, the surrounding area is subject to significant traffic growth as a result of being located within the Thornton North Urban Release Area. Further details in relation to the Thornton North Urban Release Area is outlined in **Section 2.5**.

2.4 Public Transport

The subject site has access to a number of existing bus stops including one (1) on Tigerhawk Drive along the northern boundary of the site, two (2) on Settlers Boulevard (ID: 232282 and ID: 232225) along the eastern boundary of the site and two (2) on Settlers Boulevard (ID: 2322215 and ID: 2322118) located approximately 100m to the south of the site. All of the aforementioned bus stops service existing route 189 (Stockland Green Hills to Thornton via Chisholm) provided by Hunter Valley Buses.

There are no train stations within an accessible distance from the subject site. The location of the site subject to the surrounding public transport network is shown in **Figure 3**.

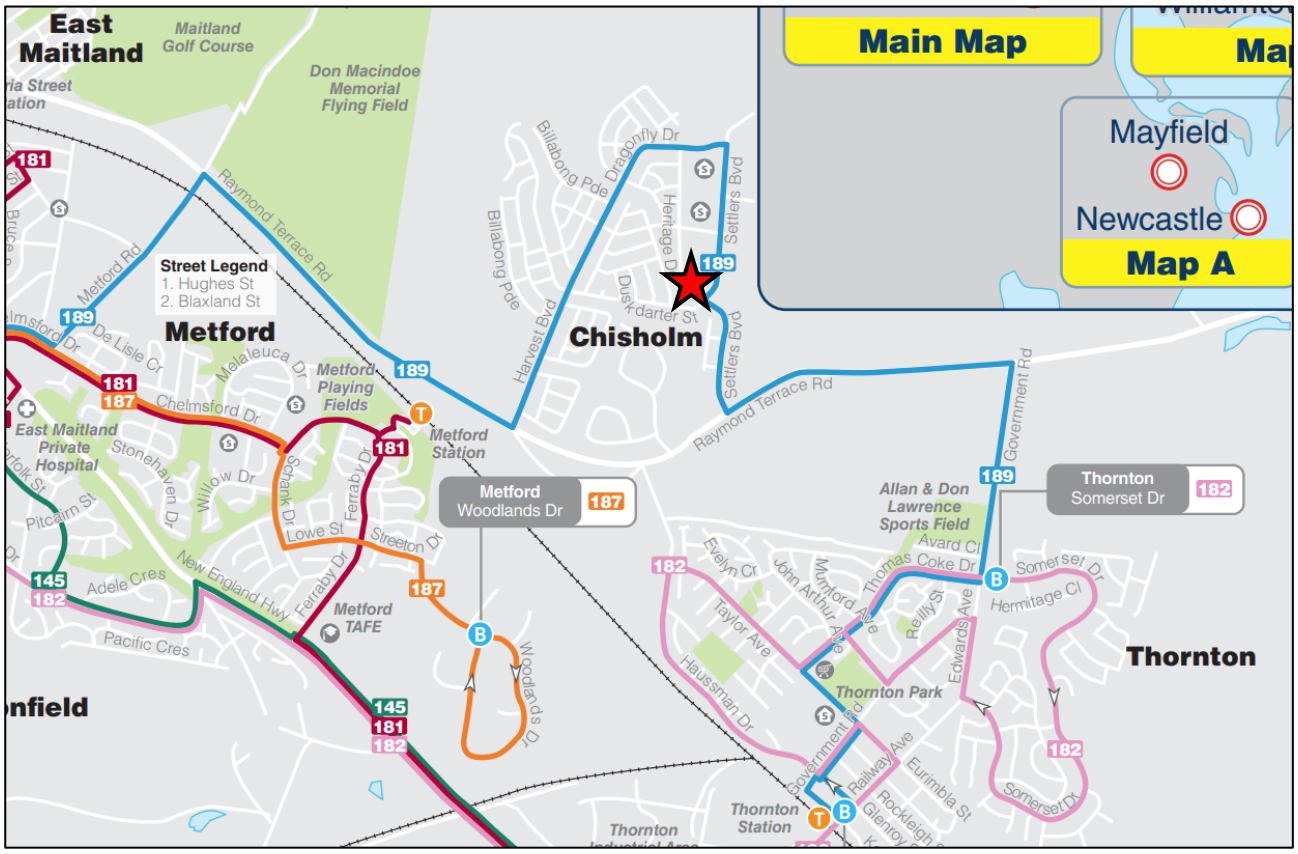


FIGURE 3: PUBLIC TRANSPORT NETWORK MAP

2.5 Future Road and Infrastructure Upgrades

As mentioned previously the subject site is located within the Thornton North Urban Release area and is subject to ongoing change within the subdivision as a result of the creation of additional housing and local infrastructure.

Section 7 of the Maitland Council Development Control Plan (MDCP) Part F – Urban Release Areas outlines that the Thornton North Urban Release area comprises a total area of 900 hectares of land with an residential yield of approximately 5,000 lots. The extent of the Thornton North Urban Release area is shown in **Figure 4** below, extracted from *MDCP Part F*.

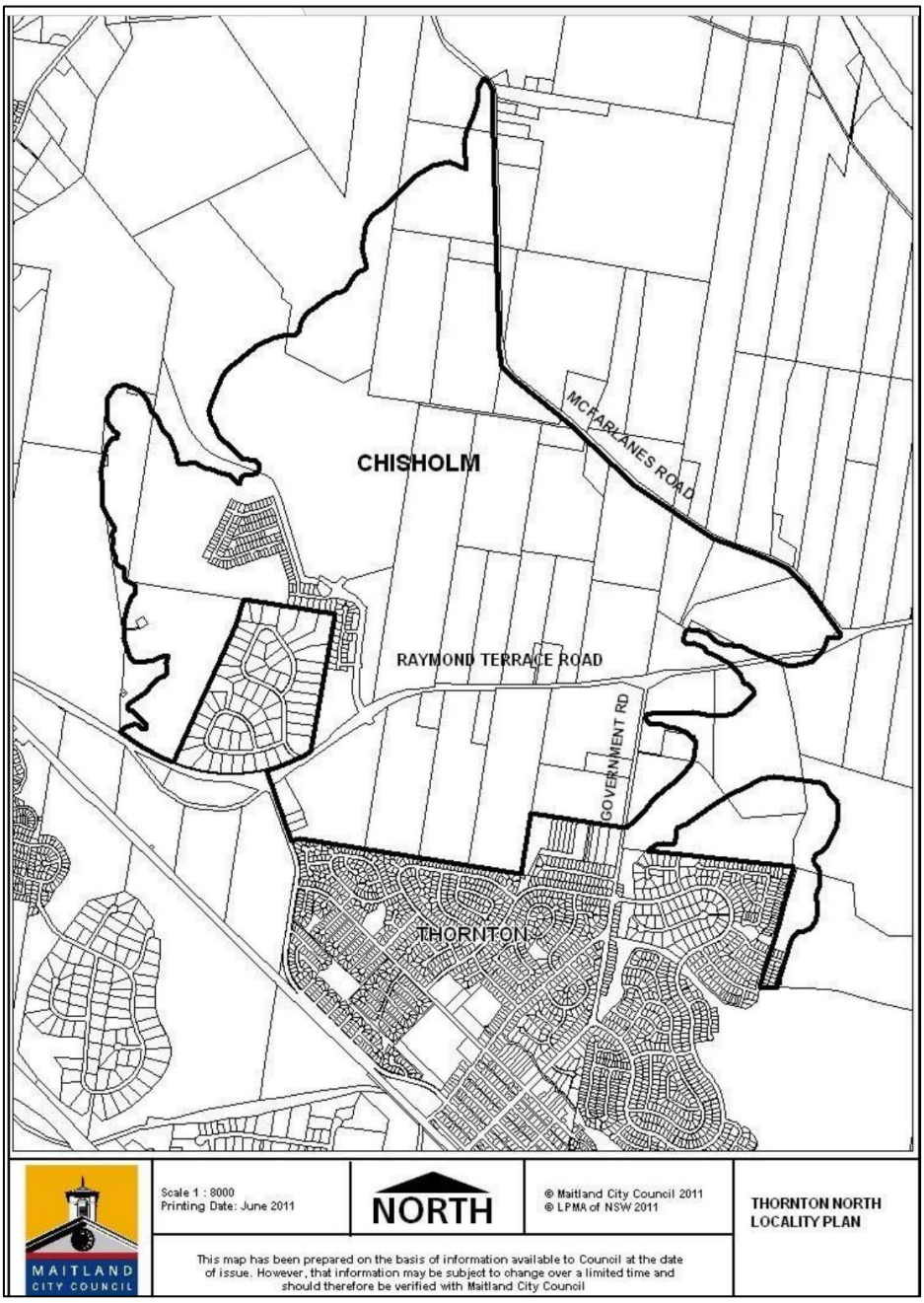


FIGURE 4: THORNTON NORTH LOCALITY PLAN – FIGURE 28 OF MDCP PART F

To support the growth within the Thornton North Urban Release Area the *Thornton North Section 94 Contributions Plan 2008* was developed, which outlines the following infrastructure upgrades as shown in **Figure 5**.

Thornton North Road & Traffic Facilities						
Facilities		**Location**	**Description**	**Est. Capital Cost**	**Est. Land Cost**	**Total Cost**
Road Upgrades	TN36	Raymond Terrace Road	Harvest Boulevard to Haussman Drive	$5,992,357	$767,604	$6,759,961
	TN37		Haussman Drive to Settlers Boulevard	$10,896,727	$303,002	$11,199,729
	TN38		Settlers Boulevard to Government Road	$6,969,829	$1,212,007	$8,181,836
	TN39		Government Road to McFarlanes Road	$6,984,612	$686,804	$7,671,416
	TN40	Haussman Drive	Raymond Terrace Road to Railway Avenue	$14,503,670	$3,313,871	$17,817,541
	TN41	Thornton Road	Railway Avenue to Glenwood Drive	$7,151,104	$59,828	$7,210,932
	TN42	McFarlanes Road	Raymond Terrace Road to TN49	$6,349,640	$579,568	$6,929,208
	TN43	Government Road	Raymond Terrace Road to Somerset Drive	$1,674,814	$246,651	$1,921,465
Intersections	TN44	Raymond Terrace Road / Harvest Boulevard		$1,216,758	$0	$1,216,758
	TN45	Raymond Terrace Road / Haussman Drive		$2,020,919	$0	$2,020,919
	TN46	Raymond Terrace Road / Settlers Boulevard		$1,246,019	$0	$1,246,019
	TN47	Raymond Terrace Road / Government Road		$2,140,733	$0	$2,140,733
	TN48	Raymond Terrace Road / McFarlanes Road		$1,432,678	$0	$1,432,678
	TN49	McFarlanes Road / Settlers Boulevard		$1,179,791	$0	$1,179,791
	TN50	Haussman Drive / Taylor Avenue		$1,981,514	$4,944	$1,986,458
	TN51	Railway Avenue / Glenroy Street		$3,794,138	$2,197,475	$5,991,613
	TN52	Huntingdale Drive / Thornton Drive		$1,137,841	$0	$1,137,841
	TN53	Thornton Road / Glenwood Drive		$3,678,586	$498,199	$4,176,785
	TN54	Government Road / Thorncliffe Avenue / Darlaston Avenue		$641,324	$0	$641,324
	TN55	Government Road / Hillgate Drive		$641,324	$0	$641,324
New Roads	TN56	Settlers Boulevard (additional 4.0m wide median)		$1,354,847	$754,000	$2,108,847
	TN57	Fringe Road (additional 6.0m reserve, 1.5m for shared way and 2.5m parking lane)		$2,583,849	$120,000	$2,703,849
TOTAL				**$85,573,074**	**$10,743,953**	**$96,317,027**

FIGURE 5: THORNTON NORTH SECTION 94 CONTRIBUTIONS PLAN – ROAD INFRASTRUCTURE

The planned road infrastructure shown above, was supported by the *Thornton North Master Plan Traffic Impact Assessment Volume 3* prepared by *Parsons Brinckerhoff* dated August 2003 (**PB Report**). From Council's website, a number of road infrastructure upgrades have been completed as shown in **Figure 6** below.

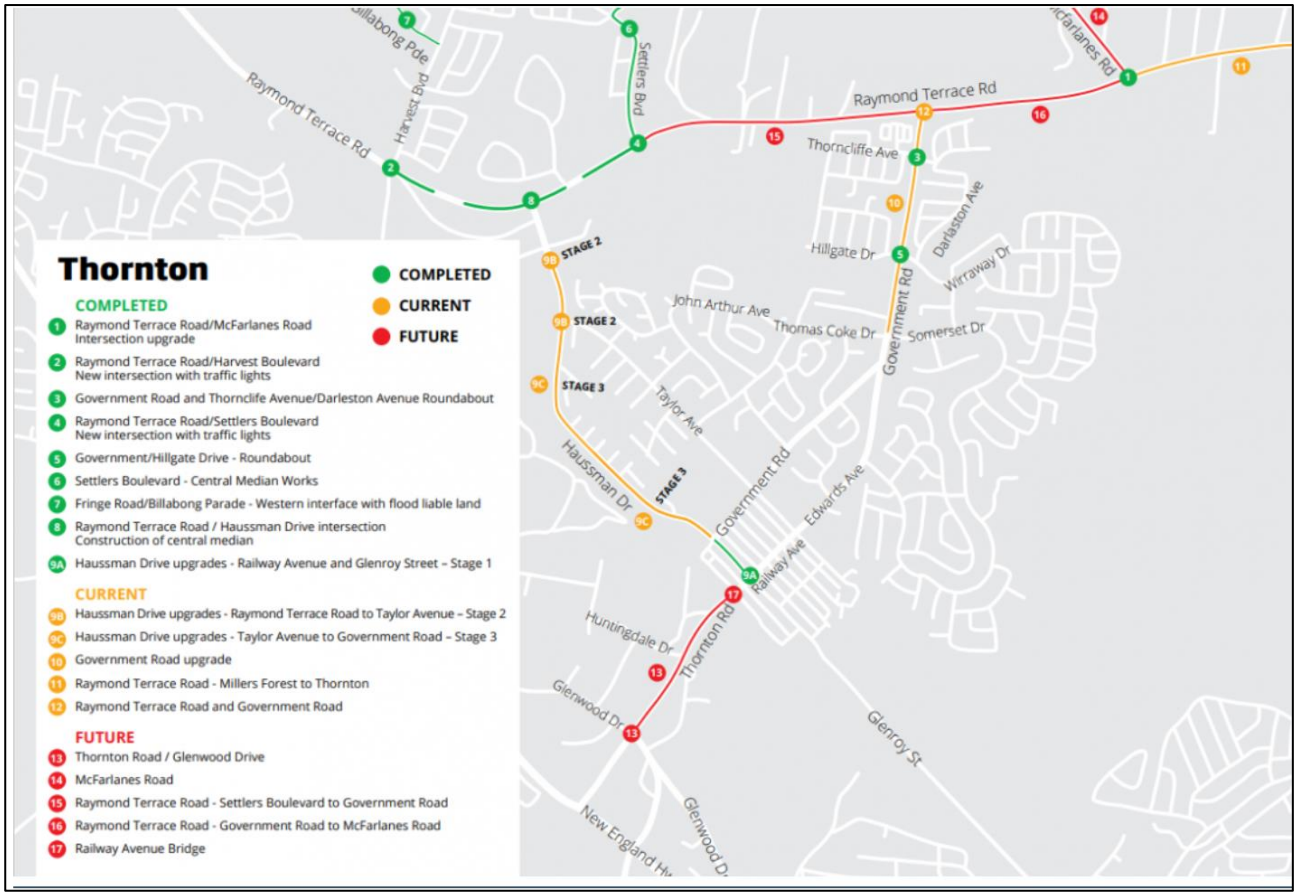


FIGURE 6: THORNTON ROAD NETWORK UPGRADE PROGRESS – MAITLAND COUNCIL

Critical intersections of Settlers Boulevard / Raymond Terrance Road and Raymond Terrace Road / Harvest Boulevard have been fully constructed to support the growth within the area. The **PB Report** does not assess non-residential uses such as the shopping centre developments and schools. As such consideration needs to be provided to the ultimate development scenario when all residential developments have been constructed and occupied in addition to the traffic generated by the proposed development.

2.6 Thornton North Urban Release Area Ultimate Development Scenario

Reference is made to the *TTPA Report* which adopted the following with consideration to additional residential development yield yet to be constructed at the time of the traffic surveys (2018):

- Additional 720 residential lots within the Waterford County Precinct, generally to be located along the eastern side of the Waterford County estate, east of Settlers Boulevard;

- Additional 2,500 residential lots within the North Thorton Urban Release Area to be located east of Waterford County Precinct.

To provide site context, the *Figure 32 from Section 7 of the Maitland Council Development Control Plan (MDCP) Part F – Urban Release Areas* is reproduced in **Figure 7** below.

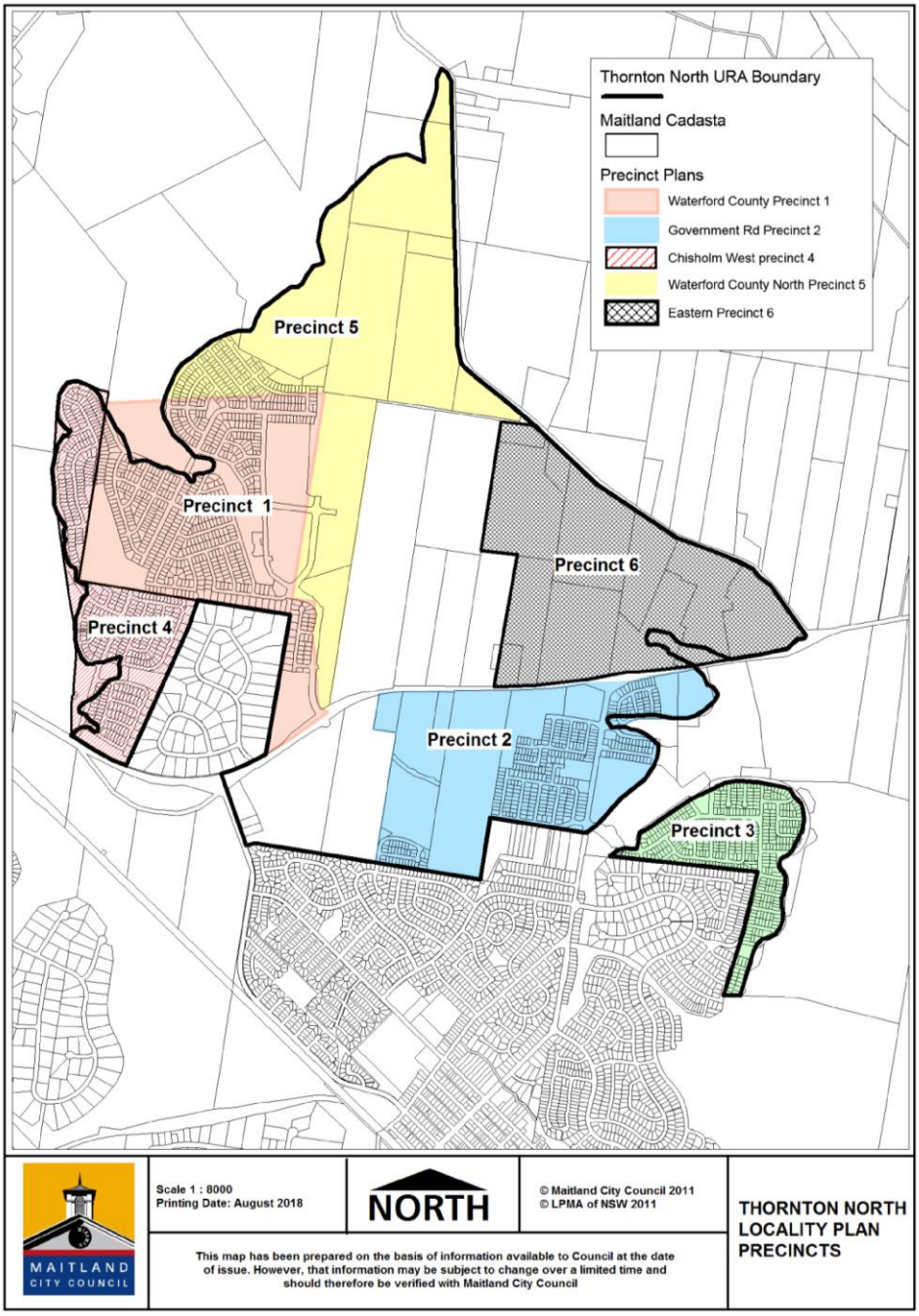


FIGURE 7: THORNTON NORTH PRECINCT PLAN – COUNCIL DCP

With reference to **Figure 7** above, Precincts 1, 4 and 5 are assumed to provide an additional residential yield of 720 residential dwellings (with the majority being within Precinct 5) and Precincts 2, 3 and 6 are assumed to provide an additional residential yield of 2,500 lots.

The general road hierarchy for the Thornton North Urban Release area is shown in **Figure 8** below which shows the following road connections:

- Precincts 2 and 3 will have access to Raymond Terrace Road via Government Road and Hillgate Drive (left in / left out);

- Precinct 6 will have access to Raymond Terrace Road via a forth leg connection to Government Road. In addition, a connection to M^{C}farlanes Road will be made to Precinct 6 with a local road connection to Waterford County Precinct 1 and 5.

- Precincts 1 and 4 will have a local road connection to Raymond Terrace Road via the extension of Harvest Boulevard which has been constructed.

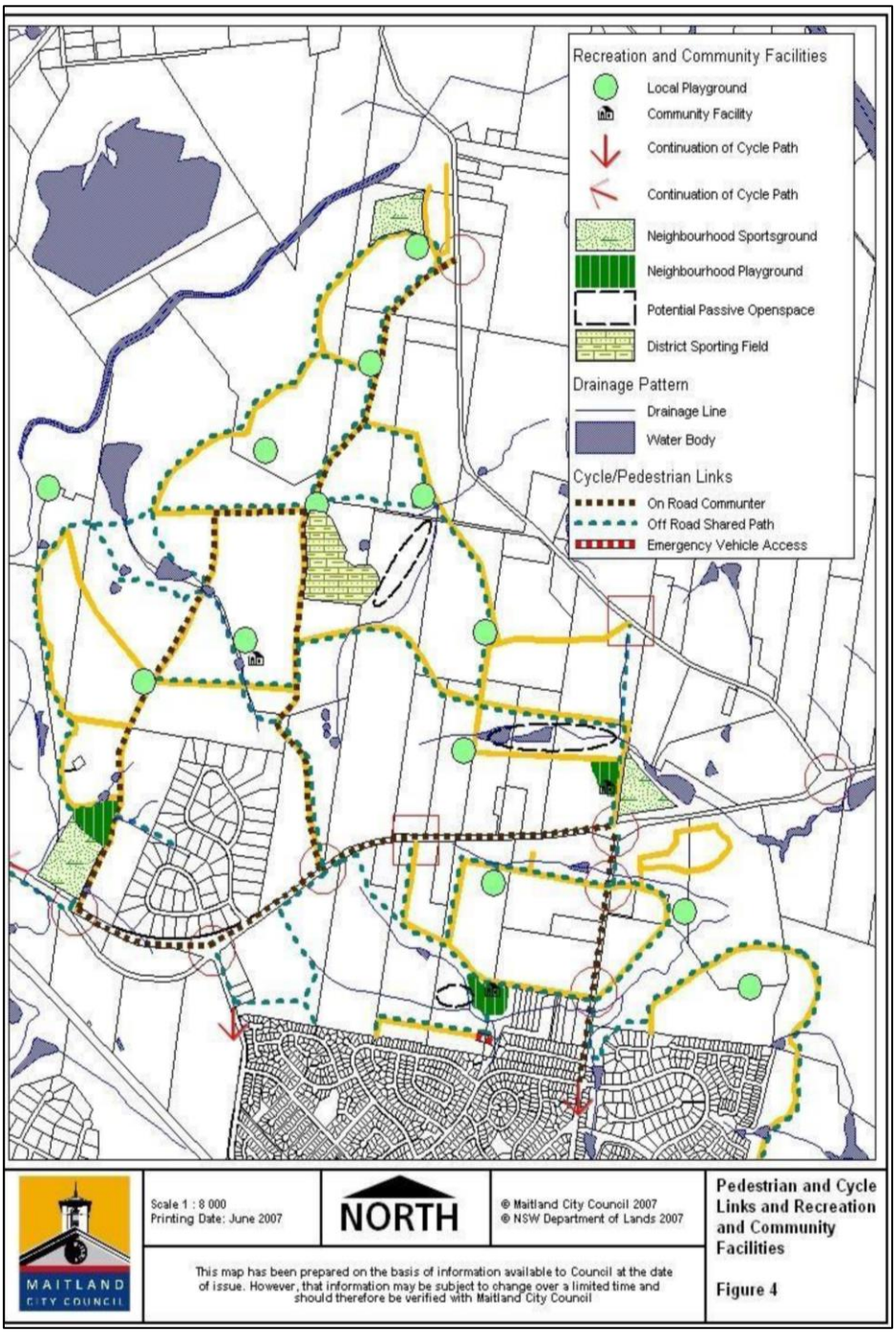


FIGURE 8: ROAD HIERARCHY, PEDESTRIAN AND CYCLE LINKS – COUNCIL DCP

In view of the above, the traffic conditions within close proximity to the site will change as a result of additional residential developments. The **PB Report** does not provide clear directional distributions of the external traffic generated by the Thornton North Urban

Release Area. Upon review of *Table 5.2* of the **PB Report**, the following distribution can be derived:

Inbound:

- 65% from the south;
- 30% from the west;
- 5% from the north and east.

Outbound:

- 60% to the south;
- 25% to the west;
- 15% to the north and east.

Based upon the above, the remaining development yield within the Thornton North Urban Release area is expected to generate vehicle trips as shown in **Table 2** below.

It should be noted that the peak hour residential traffic generation rate on the weekend has been estimated based upon the comparison of the traffic volumes from the weekday to the weekend survey. The observed traffic volumes into and out of the subdivision on the weekend is roughly 64% of that of the weekday. As such, the traffic generation on the weekend will be 64% of the PM peak hour traffic generation rate.

TABLE 2: ESTIMATED TRAFFIC GENERATION – THORNTON NORTH URBAN RELEASE AREA

Land Use	Precinct	Scale	Time Period	Traffic Generation Rate	Traffic Generation [(1)(2)]
Residential	1, 4 & 5	720 lots	AM Peak	0.71 per dwelling	511 (102 in, 409 out
			PM Peak	0.78 per dwelling	562 (450 in, 112 out)
			Weekend	0.5 per dwelling	360 (180 in, 180 out)
	2,3,6	2,500 lots	AM Peak	0.71 per dwelling	1,775 (355 in, 1,420 out)
			PM Peak	0.78 per dwelling	1,950 (1,560 in, 390 out)
			Weekend	0.5 per dwelling	1,250 (625 in, 625 out)
TOTAL	**-**	**-**	**AM Peak**	**-**	**2,286**
			PM Peak		**2,512**
			Weekend		**1,610**

Note: (1) 20% inbound, 80% outbound in AM peak hour and 80% inbound, 20% outbound in PM peak hour.
(2) 50% inbound, 50% outbound in weekend peak hour period

As shown above, the Thornton North Urban Release Area is anticipated to generate 2,286 vehicle trips in the AM peak hour period, 2,512 vehicle trips during the PM peak hour periods and 1,610 vehicle trips during the weekend peak hour period.

The additional vehicle trips noted above have been added to the traffic surveys undertaken in 2018 to provide a base case scenario of the ultimate development yield as a result of the Thornton North Urban Release Area. It is assumed that 80% of the traffic generated by Precincts 1,4 & 5 will utilise the intersection of Raymond Terrace Road / Settlers Boulevard and 20% will utilise the intersection of Raymond Terrace Road / Harvest Boulevard for a conservative assessment.

The resulting intersection performance of critical intersections is summarised in **Table 3**, with detailed SIDRA outputs provided in **Annexure C** for reference.

TABLE 3: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0) – ULTIMATE RESIDENTIAL YIELD

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3][4]	Control Type	Worst Movement
THORNTON NORTH URBAN RELEASE AREA ULTIMATE DEVELOPMENT YIELD						
Settlers Boulevard / Raymond Terrace	AM	0.67	24.1	**B**	Signals	N/A
	PM	0.64	15.1	**B**		N/A
	Weekend	0.43	16.7	**B**		N/A
Harvest Boulevard / Raymond Terrace	AM	0.53	12.3	**A**	Signals	N/A
	PM	0.80	16.2	**B**		N/A
	Weekend	0.50	11.4	**A**		N/A
Settlers Boulevard / Heritage Drive / Duskdarter Street	AM	0.30	5.8 (Worst: 11.1)	**A** (Worst: B)	Roundabout	RT from Settlers Boulevard (E)
	PM	0.29	6.7 (Worst: 11.7)	**A** (Worst: B)		RT from Duskdarter Street (W)
	Weekend	0.15	5.7 (Worst: 10.4)	**A** (Worst: B)		
Heritage Drive / Tigerhawk Drive	AM	0.23	3.9 (Worst: 8.6)	**N/A** (Worst: A)	Priority	RT from Tigerhawk Drive (W)
	PM	0.10	3.8 (Worst: 6.8)	**N/A** (Worst: A)		
	Weekend	0.10	4.2 (Worst: 6.1)	**N/A** (Worst: A)		
Grasshawk Drive / Dragonfly Drive	AM	0.01	2.5 (Worst: 6.6)	**N/A** (Worst: A)	Priority	RT from Grasshawk Drive (E)
	PM	0.06	2.7 (Worst: 6.6)	**N/A** (Worst: A)		
	Weekend	0.05	3.1 (Worst: 6.1)	**N/A** (Worst: A)		

NOTES:
(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
(4) No overall Level of Service is provided for Give Way, Priority and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown above, with consideration to the full development yield of the Thornton North Urban Release area the relevant intersections are forecast to operate at a high level of efficiency, with a Level of Service (LoS) “A” or “B” conditions in both the AM, PM and weekend peak hour periods. The level of service “A” and “B” performance is characterised by low approach delays and spare capacity.

It should be noted that the above assessment would include the traffic generated from the residential subdivision proposed as part of this development application.

3 PARKING ASSESSMENT

3.1 Council Parking Requirement

Reference is made to the *Maitland Development Control Plan 2011 – Part C – Design Guidelines* which designates the following parking rates applicable to the proposed development:

C.11 – Vehicular Access & Car Parking

2. General Requirements

2.2 Calculation of Parking Requirements

b) Mixed Uses

For developments incorporating different categories of uses, a separate calculation will be made for each component and then added together to provide the total parking requirement. Any departure from this method will only be considered where it is demonstrated that the peak demand for each land use component of the development is staggered. In this regard the applicant should submit a parking profile showing the cumulative parking demand by time-of-day.

c) Calculation of Numbers

Where the calculation results in a fraction of a space, the total number of parking spaces required will be the next highest whole number.

Appendix A Car Parking Requirements for Specific Land Uses

Childcare Centre

1 space per 4 children in attendance or there part of.

Drive In Take Away Food Outlets

(premises which cater for customers being able to park on-site, get take away service, seating provided for on-site consumption and the addition of a drive through facility)

1 space per 8m^2 GFA plus

1 space per 3 seats

An exclusive area for queuing of cars for a drive through facility is required (queue length of 5 to 12 cars measured from pick up point). There should also be a minimum of four car parking spaces for cars queued from the ordering point. Provision should also be made for car/trailer combinations at strategic locations

Dwelling Houses

Minimum of 1 space

Registered Clubs/ Pubs

(including sexual entertainment establishments)

Outside the Maitland CBD.

1 space per 10m² of public or licensed floor area (bar, lounge, dining room, games room) shall be provided.

Gymnasium

7.5 spaces per 100m² GFA.

Restaurants, take-away food and drink premises

1 space per 6.5m² service area or

1 space per 3 seats

WHICHEVER IS GREATER

A food outlet which provides no seating will also be assessed as a "shop".

Shops

(Shops greater than 1000m² include supermarkets, department stores, regional shopping complexes etc)

Shops less than 1000m² – 1 space per 25m2 GFA.

Shops greater than 1000m² – 1 space per 16m2 GFA

Business Premises and Office Premises

1 space per 40m² GFA

It is noted that the Maitland DCP does not provide car parking rates for medical centre uses and as such, reference is made to the *RTA Guide to Traffic Generating Developments 2002* as adopted by TfNSW which designates the following parking rates applicable to this use:

5.12.2 Extended hours medical centres

4 per 100 m² gross floor area

Further, neither Council's DCP nor the TfNSW Guide provide car parking rates for swim school developments. As such, a first principles assessment of the parking demands has been conducted, assuming a rate of two (2) car parking spaces per child on-site at any one

time. This accounts for the cross over of consecutive classes (i.e. two class are on-site at any one time).

It is noted that the residential subdivision requires the provision of minimum one (1) car parking space per residential dwelling proposed as part of the development. The quantum of residential dwellings is not known at this stage, with the car parking required by the residential subdivision to be deduced at a later stage. It is expected that all parking for the residential component will be capable of being provided on each individual lot.

Table 4 presents the parking requirements of the proposal according to applicable car parking rates as extracted from Council's DCP and the TfNSW Guide.

TABLE 4: COUNCIL DCP PARKING RATES

Land Use	Scale	Document	Rate	Spaces Required
Supermarket	3,912m^2 GFA	DCP	1 per 16m^2 GFA	349.8
Liquor	185m^2 GFA	DCP		
Major Retail	1,500m^2 GFA	DCP		
Shops	3,695m^2 GFA	DCP	1 per 25m^2 GFA	147.8
Tavern	890m^2 GFA	DCP	1 per 10m^2 LFA	89
Medical Centre	745m^2 GFA	TfNSW	4 per 100m^2 GFA	29.8
Food and Drink Premises	160m^2 GFA	DCP	1 per 25m^2 GFA	6.4
Child Care Centre	112 children	DCP	1 per 4 children	28
Gymnasium	8,00m^2 GFA	DCP	7.5 per 100m^2 GFA	60
Swim School	1,040m^2 GFA 20 children per class	First Principles	2 per child	40
Car Wash	475m^2 GFA	DCP	1 space per 40m^2	11.9
TOTAL	**-**	**-**	**-**	**762.7 (763)**

As shown, strict application of the DCP requires the provision of **763** car parking spaces. The proposed plans detail the provision of **682** car parking spaces including the **21** spaces along the New Link Road, resulting in a numerical shortfall of **81** parking spaces from Council's DCP requirements.

It should be noted that Council's DCP parking rates are generally applicable to standalone developments and do not consider cross utilisation of car parking of different uses or consideration to different peak parking periods. As such, the parking required by the proposed development will been assessed against the *RTA Guide to Traffic Generating Developments 2002* which considers cross utilisation of retail uses.

As per Council's DCP, for mixed use developments any variation to the above provision of parking must demonstrate via a parking demand profile which shows the cumulative peak parking periods of the various uses throughout the day are staggered and do not overlap.

Considering this, it is evident that some land uses will not overlap with one another, particularly the following:

- The child care centre will not operate on weekends;
- Gymnasiums and swim schools do not operate at their peaks on weekends;
- Taverns peak parking periods occur in the afternoon.

Considering this, a parking demand profile has been provided with reference to the following data and documents:

- *RTA Land Use Data – Shopping Centres 1991 by Arup Transportation Planning*:
    - Only sites with no access to public transport have been relied upon (total 10 sites).
- *M^CLaren Traffic Engineering* personal experience with Taverns / Pubs which includes detailed regressions analysis including patron counts for up to 10 different taverns / pubs.
- *Trip Generation and Parking Demand Surveys of Gymnasiums Data and Analysis Report* prepared by *People Trans* dated 27 November 2014:
    - Includes data for four (4) Gymnasiums.

Using the above data, the typical parking profile for a shopping centre, gymnasium and taverns has been developed for a weekday and weekend period. Using Council's parking requirements as outlined in **Table 4**, the parking demand of the proposed development is shown in **Figure 9** and **Figure 10** below.

It should be noted that the shopping centre profile has included the parking requirements for the supermarket, liquor, major retail, shops, medical centre, food and drink premises, fast food premises and car wash.

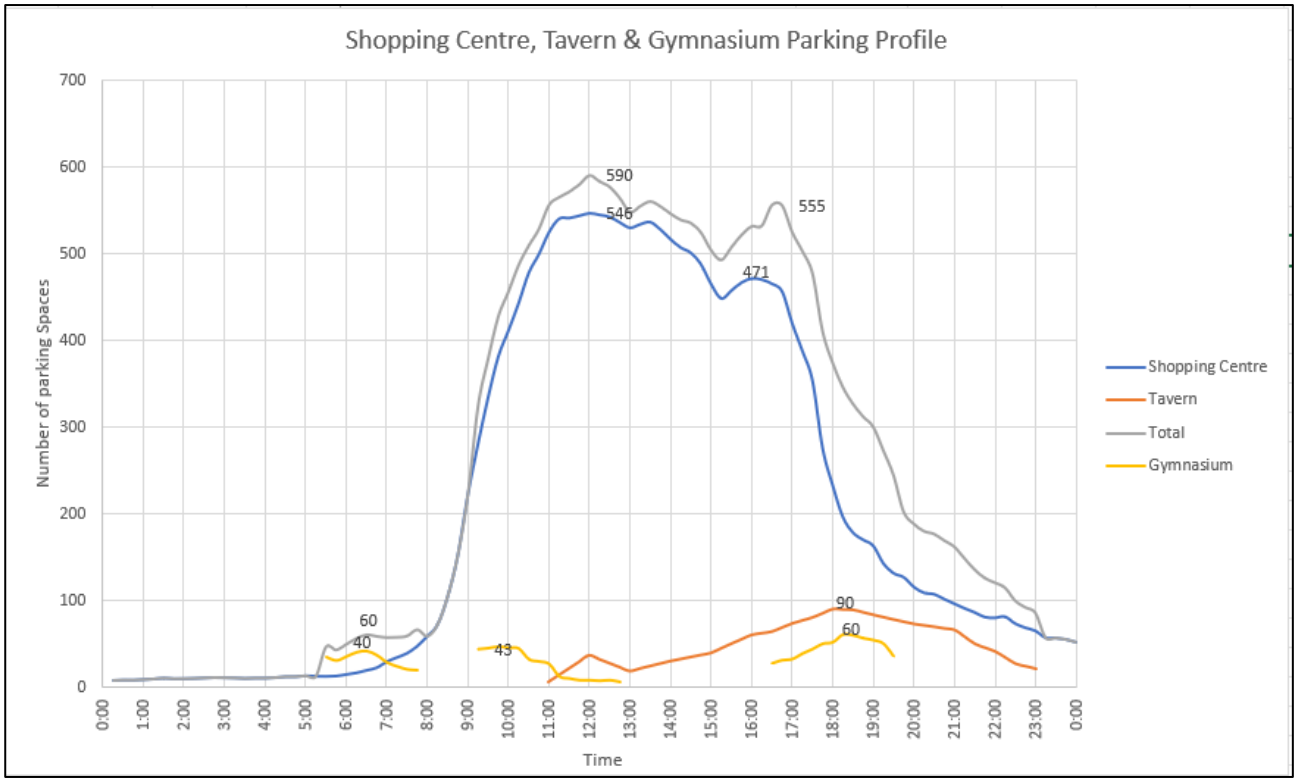


FIGURE 9: WEEKDAY PARKING PROFILE – COUNCIL DCP

As shown above, the shopping centre, tavern and gymnasium portion of the development is expected to demand **590** car parking spaces during weekdays, although this does not consider the parking demand generated by the swim school or child care centre. Including the parking demand of the swim school and child care centre results in a total anticipated parking demand of **658** (590 + 28 + 40). A further reduction could be applied as the peak parking demand occurs at 12pm, when parents are not at the child care centre. Hence, a further reduction of 14 spaces (half of 28, being staff vehicles) can be applied, resulting in the parking demand of **644** car parking spaces. The proposed development provides **682** car parking spaces, including the parking along the New Link Road, resulting in a surplus of **38** car parking spaces over the expected peak parking demand.

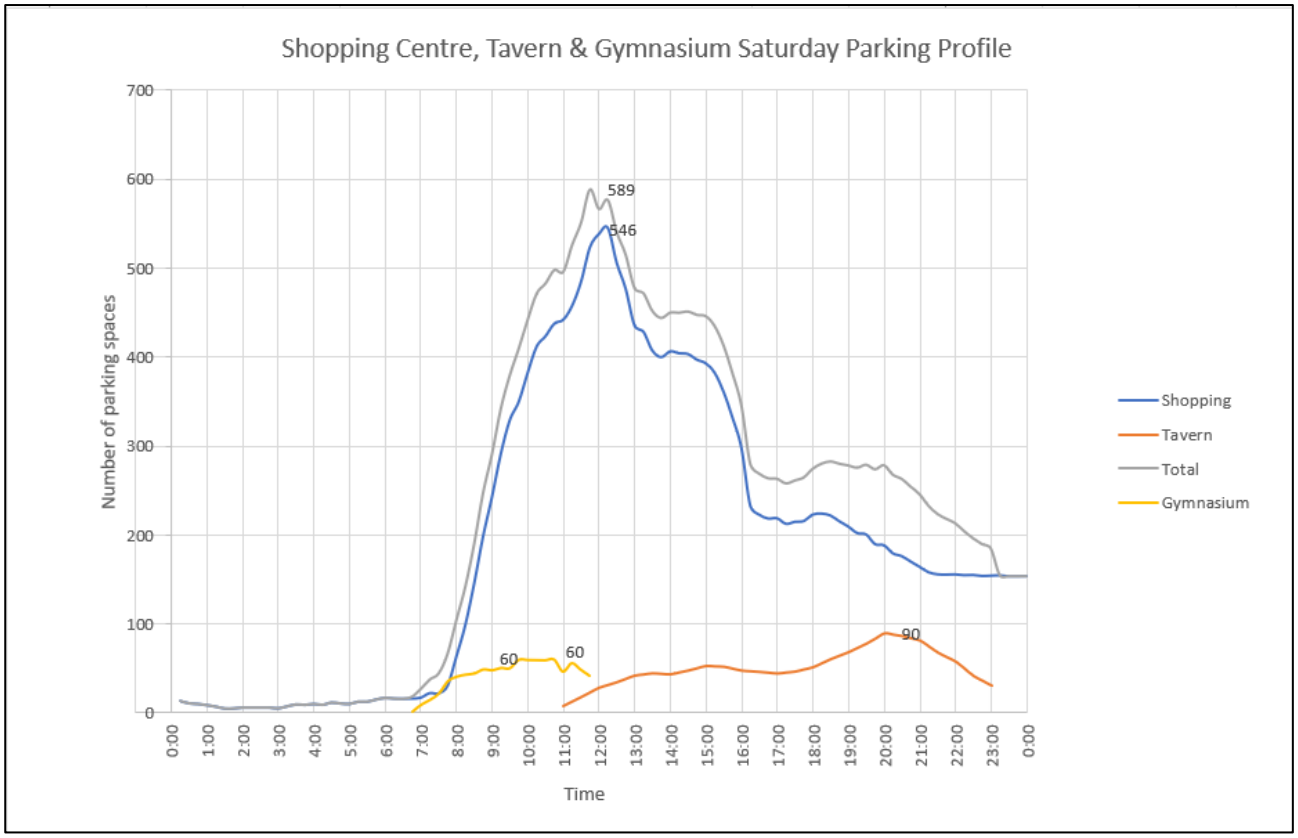


FIGURE 10: WEEKEND PARKING PROFILE – COUNCIL DCP

As shown above, the shopping centre, tavern and gymnasium portion of the development is expected to demand **589** car parking space on weekends, although this does not consider the parking generated by the swim school if it operates on weekends. Including the parking demand associated with the swim school, the proposed development will result in an anticipated parking demand of **629** (589 + 40) car parking spaces. The proposed development provides **682** car parking spaces, including the parking along the New Link Road, resulting in a surplus of **53** car parking spaces over the expected peak parking demand.

It is evident from the above, that the peak parking demand periods of the various uses of the site do not directly overlap, such that a reduction in parking based upon the peak operating periods of the site can be supported. Not only this, but there is also potential to further reduce the car parking demand of the site from Council's DCP parking requirements.

As noted previously, Council's DCP parking rates are generally applicable to standalone developments and do not consider cross utilisation of car parking between similar uses. To consider this, the parking required by the proposed development will be assessed against the *RTA Guide to Traffic Generating Developments 2002* which considers parking demand for shopping centres based upon various retail categories.

3.2 TfNSW Parking Requirement

Due to the large nature of the proposed mixed-use development, reference is made to the *RTA Guide to Traffic Generating Developments 2002* and more recent supplements as adopted by TfNSW, which contains car parking rates based upon surveys undertaken of similar sized developments and takes into consideration the cross utilisation of car parking between various land uses within shopping centres. The applicable shopping centre car parking model is extracted below:

> ***5.7.1 Shopping centres.***
>
> *Peak Parking = 24 A(S) + 40 A(F) + 42 A(SM) + 45 A(SS) + 9 A(OM)*
>
> *Demand (per 1,000m2).*
>
> *where:*
>
> *A(S): Slow Trade GLFA, includes major Department stores such as David Jones and Grace Brothers, furniture, electrical and utility goods stores.*
>
> *A(F): Faster Trade GLFA, includes discount department stores such as K-Mart and Target, together with larger specialist stores such as Fosseys.*
>
> *A(SM): Supermarket GLFA, includes stores such as Franklins and large fruit markets.*
>
> *A(SS): Speciality Shops and Secondary retail GLFA, includes speciality shops and take-away stores such as McDonalds. These stores are grouped since they tend not be primary attractors to the centre.*
>
> *A(OM): Offices, medical GLFA.*
>
> ***5.9.2 Gymnasiums.***
>
> *Metropolitan sub-regional areas.*
>
> *minimum provision: 4.5 spaces per 100m^2 GFA.*
>
> *Desirable provision: 7.5 spaces per 100m^2 GFA.*
>
> ***5.12.3 Child care centres***
>
> *One space for every four children in attendance*

Further, it is noted that the TfNSW Guide does not provide car parking rates for tavern developments and as such, the appropriate DCP rates have been applied. Similarly, neither Council's DCP nor the TfNSW Guide provide car parking rates for swim school developments. As such, a first principles assessment of the parking demands has been conducted, assuming a rate of two (2) car parking spaces per child on-site at any one time.

This accounts for the crossover of consecutive classes (i.e. two class are on-site at any one time).

Table 5 presents the parking requirements of the proposal according to applicable car parking rates as extracted from the TfNSW Guide.

TABLE 5: TFNSW / DCP PARKING RATES

Land Use	Document	Type	Scale	Rate	Spaces Required
Supermarket	TfNSW	A(SM)	3,500m^2 GLFA	4.2 per 100m^2 GLFA	147
Liquor	TfNSW	A(SM)	185m^2 GLFA	4.2 per 100m^2 GLFA	7.8
Major Retail	TfNSW	A(F)	1,500m^2 GLFA	4.0 per 100m^2 GLFA	60
Shops	TfNSW	A(SS)	3,695m^2 GLFA	4.5 per 100m^2 GLFA	166.3
Tavern	DCP	-	890m^2 GFA	1 per 10m^2 LFA	89
Medical Centre	TfNSW	A(OM)	745m^2 GLFA	0.9 per 100m^2 GFA	6.7
Food and Drink Premises	TfNSW	A(SS)	160m^2 GLFA	4.5 per 100m^2 GLFA	7.2
Child Care Centre	DCP / TFNSW	-	112 children	1 per 4 children	28
Gymnasium	TfNSW	-	800m^2 GFA	7.5 per 100m^2 GFA	60
Swim School	First Principles	-	1,040m^2 GFA 20 children	2 per child	40
Car Wash	TfNSW	A(OM)	475m^2 GLFA	0.9 per 100m^2 GFA	4.3
TOTAL	**-**	**-**	**-**	**-**	**616.3 (617)**

As shown, strict application of the TfNSW Guide requires the provision of **617** car parking spaces. The proposed plans detail the provision of **682** car parking spaces including the parking along the New Link Road, resulting in a numerical surplus of **65** parking spaces.

Similar to **Section 3.1**, the above parking requirements do not consider the different peak parking demands of the various land uses. The methodology for the parking profile as outlined in **Section 3.1** has been reproduced using the parking requirements shown in

Table 5 above, with the results shown in **Figure 11** & **Figure 12**

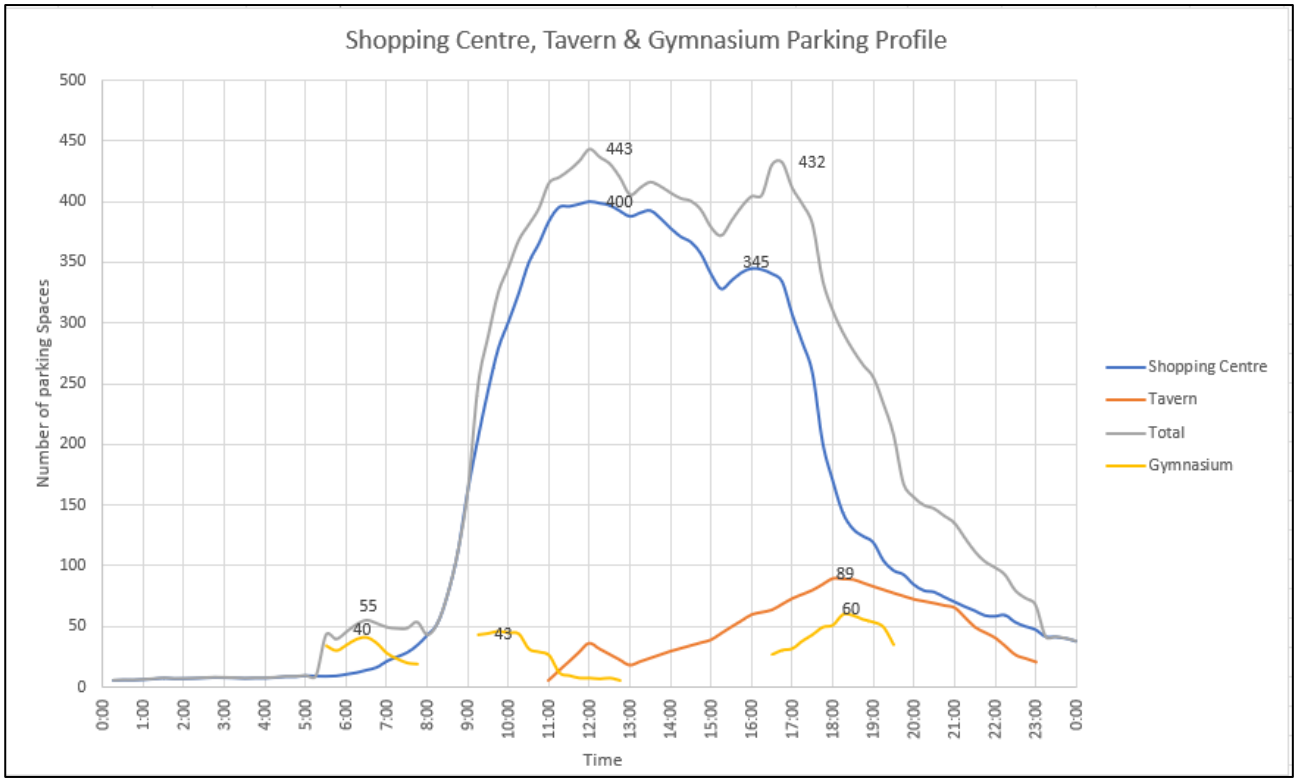


FIGURE 11: WEEKDAY PARKING PROFILE – TFNSW DATA

As shown above, the shopping centre, tavern and gymnasium portion of the development is expected to demand **443** car parking spaces during weekdays, although this does not consider the parking demand generated by the swim school or child care centre. Including the parking demand of the swim school and child care centre results in a total anticipated parking demand of **511** (443 + 28 + 40). A further reduction could be applied as the peak parking demand occurs at 12pm, when parents are not at the child care centre. Hence, a further reduction of 14 spaces (half of 28, being staff vehicles) can be applied, resulting in the parking demand of **497** car parking spaces. The proposed development provides **682** car parking spaces including the parking along the New Link Road, resulting in a surplus of **185** car parking spaces, meeting the anticipated parking demand of the site on weekdays.

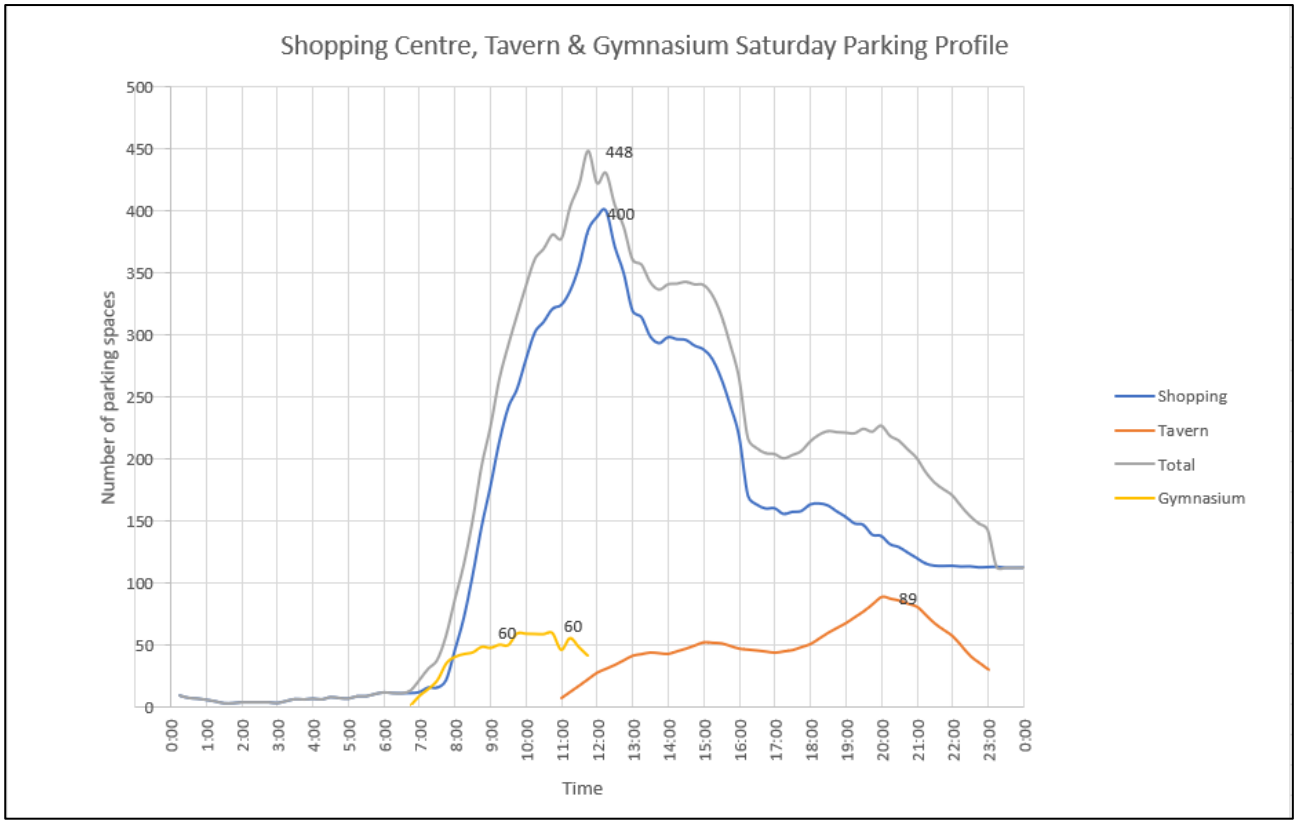


FIGURE 12: WEEKEND PARKING PROFILE – TFNSW DATA

As shown above, the shopping centre, tavern and gymnasium portion of the development is expected to demand **448** car parking space on weekends, although this does not consider the parking generated by the swim school if it operates on weekends. Including the parking demand associated with the swim school, the proposed development will result in an anticipated parking demand of **488** (448 + 40) car parking spaces. The proposed development provides **682** car parking spaces, including the parking along the New Link Road, resulting in a surplus of **194** car parking spaces.

In view of the above, the provision of **661** on-site car parking spaces in addition to the **21** on-street spaces provided along the New Link Road exceeds the anticipated parking demand of the proposed development.

3.3 Disabled Parking

The Maitland Council DCP (Part C – Design Guidelines) makes reference to the Building Code of Australia (BCA) for the provision of disabled car parking, in addition to adopting an enhanced disabled car parking provision for particular land uses. The council requires the following provision of disabled car parking spaces for large retail complexes:

> ***Large Retail complexes > 100 spaces***
>
> *Three spaces per one hundred car parking spaces*

Reference is made to *Table D3.5* of the *Building Code of Australia* (BCA) as part of the *National Construction Code 2019* (NCC) which categorises the proposed uses as a building class with an associated disabled car parking rate as extracted below:

> ***Class 5** – 1 space for every 100 carparking spaces or part thereof.*
>
> *Uses: Medical Centre*
>
> ***Class 6** – 1 space for every 50 carparking spaces or part thereof.*
>
> *Uses: Supermarket, Retail Premises, Tavern, Fast Food Premises, Gymnasium, Swim School*
>
> ***Class 9b** – 1 space for every 100 carparking spaces or part thereof.*
>
> *Uses: Child Care Centre*

The Class 6 disabled car parking rate of one (1) disabled space per 50 car parking spaces has been applied to the whole development, which therefore requires the provision of **14** (661/50) disabled car parking spaces.

The proposed car parking layout details the provision of **14** disabled car parking spaces as per with *AS2890.6:2009*, complying with BCA requirements. Consideration should be made to relocating one (1) disabled car parking space to be near the entrance of the gymnasium and child care centre.

3.4 Bicycle & Motorcycle Parking Requirements

The Maitland Council DCP 2011 states the following with respect to the provision of bicycle facilities:

> *Provision is to be made for cyclists via the installation of bicycle parking facilities in accordance with Australian Standard AS 2890.3:1993 – Bicycle Parking Facilities and AUSTROADS Guide to Traffic Engineering, Part 14.*

AS2890.3:1993 does not outline any provision of bicycle facilities for developments, as such reference is made to *AUSTROADS Guide to Traffic Engineering Practice – Part 14* which outlines the following bicycle provision:

Swimming Pool

Visitors – 2 per 20m^2 of pool area

Hotel

Staff – 1 per 25m^2 bar floor area & 1 per 100m^2 lounge area

Visitor – 1 per 25m^2 bar floor area & 1 per 100m^2 lounge area

Consulting Rooms

Staff – 1 per 8 practitioners

Visitor – 1 per 4 practitioners

Drive-In Shopping Centre

Staff – 1 per 300m^2 sales floor

Visitor – 1 per 500m^2 sales floor

Take-away

Staff - 1 per 100m^2 GFA

Visitor – 1 per 50m^2 GFA

Shop

Staff – 1 per 300m^2 sales floor

Visitor – 1 per 500m^2 sales floor over 1,000m^2

Based upon the above, the recommended bicycle provision based upon *AUSTROADS Guide to Traffic Engineering Practice – Part 14* is shown in **Table 6** below. It should be noted that the assessment has been undertaken based upon GLFA.

TABLE 6: AUSTROADS BICYCLE PARKING REQUIREMENTS

Land Use	Scale	Rate	Spaces Required
Supermarket	3,500m^2 GLFA	Staff – 1 per 300m^2 sales floor	11.7
		Visitor – 1 per 500m^2 sales floor	7
Liquor	185m^2 GLFA	Staff – 1 per 300m^2 sales floor	0.6
		Visitor – 1 per 500m^2 sales floor	0.4
Major Retail	1,500m^2 GLFA	Staff – 1 per 300m^2 sales floor	5
		Visitor – 1 per 500m^2 sales floor	3
Shops	3,695m^2 GLFA	Staff – 1 per 300m^2 sales floor	12.3
		Visitor – 1 per 500m^2 sales floor over 1,000m^2	5.4
Tavern	890m^2 GFA	Staff – 1 per 25m^2 bar floor area & 1 per 100m^2 lounge area	8.9
		Visitor – 1 per 25m^2 bar floor area & 1 per 100m^2 lounge area	8.9
Medical Centre(1)	745m^2 GLFA	Staff – 1 per 8 practitioners	1
		Visitor – 1 per 4 practitioners	2
Food and Drink Premises	160m^2 GLFA	Staff – 1 per 300m^2 sales floor	0.5
		Visitor – 1 per 500m^2 sales floor over 1,000m^2	0
Child Care Centre	112 children	N/A	N/A
Gymnasium	8,00m^2 GFA	N/A	N/A
Swim School	1,040m^2 GFA 115m^2 pool	Visitors – 2 per 20m^2 of pool area	11.5
Car Wash	475m^2 GLFA	N/A	N/A
TOTAL	**-**	**Staff**	**40**
		Visitor	**38**

Note: 1 – assumed 8 practitioners

As shown above, the proposed development requires the provision of **78** bicycle spaces, split 40 staff and 38 visitors. It is recommended that bicycle parking be provided throughout the development. There is sufficient room on-site to provide these facilities and it can be a condition of consent.

Council's DCP does not require the provision of motorcycle parking. No motorcycle has been provided, satisfying Council requirements.

3.5 Servicing & Loading

The Maitland City Council DCP Part C – Section 4 does not outline the provision of loading facilities for the proposed development, but states that the number and dimensions of the on-site loading bays must be designed having regard to the nature and scale of the proposed development.

Considering the above, it is expected that a variety of loading facilities will be required for the proposed development considering the various proposed uses and number of tenancies proposed. The largest servicing vehicle expected to travel to and from the site is a 20m length Articulated Vehicle. In addition to this it is expected that smaller loading facilities will be required to service the development, including the following vehicles:

- B99 delivery Van;
- 6.4m length Small Rigid Vehicle;
- 8.8m length Medium Rigid Vehicle;
- 12.5m length Heavy Rigid Vehicle.

It is expected that deliveries to and from the site will be undertaken from the loading dock, via the New Link Road for the shopping centre. Smaller delivery vehicles, such as B99 delivery vans may undertake loading from the on-site car park for the child care centre, swim school and gymnasium. Typically swim schools and gymnasiums do not require ongoing loading facilities after the initial fit out, whilst child care centres typically operate with deliveries conducted by B99 delivery vans.

The capacity of the loading dock from the New Link Road can accommodate parking for three (3) x 20m length Articulated Vehicle spaces (two on the western side and one on the eastern side).

To ensure the loading dock is managed by on-site tenants, it is recommended that a loading dock management plan be prepared as part of the conditions of consent. Swept path testing has been undertaken into and out of all the critical loading spaces and is reproduced in **Annexure D** for reference.

The haulage route to and from the loading dock will consist of entry via Heritage Drive or Settlers Boulevard via the New Link Road and egress onto Settlers Boulevard and undertaking a U-turn at the roundabout intersection of Tigerhawk Drive / Settlers Boulevard. Swept path testing has been undertaken for the haulage route and is reproduced in **Annexure D** for reference.

3.6 Car Park Design & Compliance

The car parking layout of the mixed-use development as depicted in **Annexure A,** has been assessed to achieve the relevant clauses and objectives of *AS2890.1:2004*, *AS2890.2:2002* and *AS2890.6:2009*. Swept path testing has been undertaken and are reproduced within **Annexure D** for reference. The design of the on-site conditions achieves the following:

The proposed car parking and vehicular access design achieves the following:

- Separated entry and exit driveways, with minimum widths of 3.6m, facilitating access to Settlers Boulevard:
    - Restricted to left in / left out.
- 6.4m width exit driveway and 4.4m width entry driveway facilitating access to / from Heritage Drive:
- 5.7m entry only driveway from Tigerhawk Drive;
- 18.6m width two-way driveway facilitating access to the New Link Road;
- Pedestrian sight triangle of 2m by 2.5m at the property boundary at all relevant driveways;
- Minimum 6.6m width parking aisles with 2.6m wide visitor spaces (User Class 3A);
- Compliant ramp grades not exceeding 20% and no grade change greater than 12.5%;
- Minimum 5.4m length, 2.6m width spaces for parents / visitors;
- Minimum 5.4m length, 2.4m width disabled spaces with adjacent associated 5.4m length, 2.4m width shared space;
- Minimum 0.3m clearance to high objects from trafficable areas;
- Minimum headroom of 2.2m for general circulation and 2.5m headroom clearance provided over disabled and adaptable parking areas.

Whilst the plans have been assessed to comply with the relevant standards, it is usual and expected that a design certificate be required at the Construction Certificate stage to account for any changes following the development application.

3.7 Subdivision Design & Compliance

Reference is made to *Maitland City Council Engineering Standards – Road Design* and *Maitland Council Development Control Plan 2011 Part C – Design Guideline* which provides the following design requirements for subdivisions as shown in **Figure 13** & **Figure 14** below:

Road Type	Max. No. Lots	ReserveWidth (m)	Carriageway or kerb –kerb (m)
Access Place	10	17	8
Local - Minor	20	17	8
Local - Secondary	50	17	8
Local - Primary	100	17	8
Collector	200	17	8
Distributor - Secondary	400	20	11
Distributor - Primary	800	22	11
Arterial or Sub-Arterial	> 800	24	13
Rural Residential (1c)	per above	20	7.5
Rural Residential (1d)	per above	20	per categories above
Rural – Minor	50	20	8
Industrial	10	20	11
Industrial	> 10	22	13

FIGURE 13: MAITLAND COUNCIL DCP PART C

ROAD TYPE	MAX NO. LOTS	RESERVE WIDTH (m) [a]	CARRIAGEWAY / KERB–KERB (m) [b]	ON-ROAD BICYCLE FACILITY	FOOTWAY VERGE (m) [c]	KERB [d]	FOOTPATH (1.5m WIDE) [e]	DESIGN ESA [f]
Local – Place [l]	10	17	8	Mixed	4.5	Rolled	As Required	1×10^5
Local – Access [l]	20	17	8	Mixed	4.5	Rolled	One side	1×10^5
Local – Secondary [l]	50	17	8	Mixed	4.5	Rolled	One side	2×10^5
Local - Primary [l]	100	17	8	Mixed	4.5	Rolled	One side	5×10^5
Collector - Secondary [l]	200	17	8	Mixed (Parking)	4.5	Upright	One side	1×10^6
Collector - Primary [lv]	300	20	11	Mixed (Parking) [p]	4.5	Upright	One side	1.5×10^6
Distributor –Secondary [v]	400	23	14	Mixed (Parking) [p]	4.5	Upright	Both sides	2×10^6
Distributor - Primary [m v]	500	24	15 [q]	1.5m Lane	4.5	Upright	Both sides	5×10^6
Sub-Arterial [n]	3500	24.4	15.4 [r]	1.7m Lane [s]	4.5	Upright	Both sides	1×10^7 min
Industrial - Secondary	10 [g]	22	13	Mixed	4.5	Upright	As Required	5×10^6
Industrial - Primary	> 10	22	13	Mixed	4.5	Upright	As Required	1×10^7
School Bus/Public Route [o]			9min / 12min					$2/5 \times 10^6$ min
Business / School Precinct			15.4	1.7m Lane	5.5 min [h]	Upright		1×10^7 min

FIGURE 14: MAITLAND CITY COUNCIL ENGINEERING STANDARDS – ROAD DESIGN

As shown above, residential subdivisions local roads require a road reserve of 17m. The New Link Road providing access between Settlers Boulevard and Heritage Drive is not outlined within Council's Road hierarchy, but would operate similar to a low scale industrial road as a result of the proposed loading dock for the shopping centre. As such, the minimum design for an industrial road is a 20m to 22m road reserve.

Council's pre-DA comments for the subject development dated 12 August 2021 provided a recommendation to match the existing stub road near Heritage Drive, being a 4.5m wide verge, 12m wide carriageway and a 5.5m verge, resulting in a road reserve of 22m.

The proposed plans detail the New Link road with a 22m wide road reserve, designed in accordance with Council's pre-DA comments.

3.8 Pedestrian & Cycleway Considerations

Reference is made to *Section 7 of the Maitland Council Development Control Plan (MDCP) Part F – Urban Release Areas – Chisholm Neighbour Centre*, which outlines the objective of the development is to provide pedestrian and cycle routes that connect the neighbourhood centre to the surrounding residential neighbourhood and local features such as the primary school; open spaces and community uses.

Figure 8 outlines the Council indicative cycleway links from the centre to the surrounding residential areas and community facilities. Tigerhawk Drive and Settlers Boulevard along the site frontage provides existing on-road and off road cycling facilities, whilst Heritage Drive provides an existing off-road shared path.

The New Link Road based upon Council's Road Design (**Figure 14**) outlines the provision of a mixed on-road bicycles facilities. Hence, no dedicated on-road bicycle lanes are required along the New Link Road. Consideration should be made to continuing the shared path along the New Link Road on both sides of the road between Heritage Drive and Settlers Boulevard. Based upon the above the development achieves the objectives of Council's DCP by providing connectivity to the greater bicycle network.

The area of influence for the proposed development for pedestrian connectivity relates to the ability for the centre to provide safe pedestrian access to and from the site from the surrounding road network, particularly along the site frontages. Council requires the following with respect to pedestrian / cycle refuges:

> *The intersection of Tigerhawk and Heritage Drives shall be upgraded to cater for pedestrian safety, bus and heavy vehicles and traffic movements. Traffic lights are envisaged for this intersection*
>
> *Pedestrian/cycle refuges, or greater, shall be provided on public roads including a central connection across Heritage Drive to the Riparian Corridor.*

Existing pedestrian facilities within close proximity to the site are outlined below:

- Tigerhawk Drive is provided with an existing signalised pedestrian crossing which provides direct pedestrian connectivity to the north;
- The roundabout intersection of Heritage Drive / Duskdarter Street / Settlers Boulevard provides pedestrian refuge facilities on the approach to all legs;

- The roundabout intersection of Tigerhawk Drive / Settlers Boulevard provides pedestrian refuge facilities on the approach to all legs.

Based upon the existing facilities, the proposed development has existing pedestrian connectivity directly to the north, east and south of the site. There are currently no existing pedestrian facilities that enables access to the west, across Heritage Drive. As part of this report investigation will be made into pedestrian infrastructure across Heritage Drive and also if the intersection of Heritage Drive / Tigerhawk Drive is required to be upgraded to a signalised intersection which is envisaged by Council for this intersection. It is relevant to note that the upgrade of Heritage Drive / Tigerhawk Drive is not part of the Section 94 Contributions as outlined in **Figure 5**. The detailed assessment is outlined in **Section 4.4**.

3.9 Provision of bus & Taxi facilities

Reference is made to *Section 7* of the *Maitland Council Development Control Plan (MDCP) Part F – Urban Release Areas – Chisholm Neighbour Centre* which outlines the following for bus and taxi facilities:

> *There are no specific requirements as provision of public facilities and services is already controlled by other provisions in the Maitland Local Environmental Plan 2011 and the Maitland Development Control Plan 2011.*

Notwithstanding the above, Council's DCP outlines locations of bus setdown facilities as part of the principle Plan for the shopping centre. The council plan is shown in **Figure 15** below.

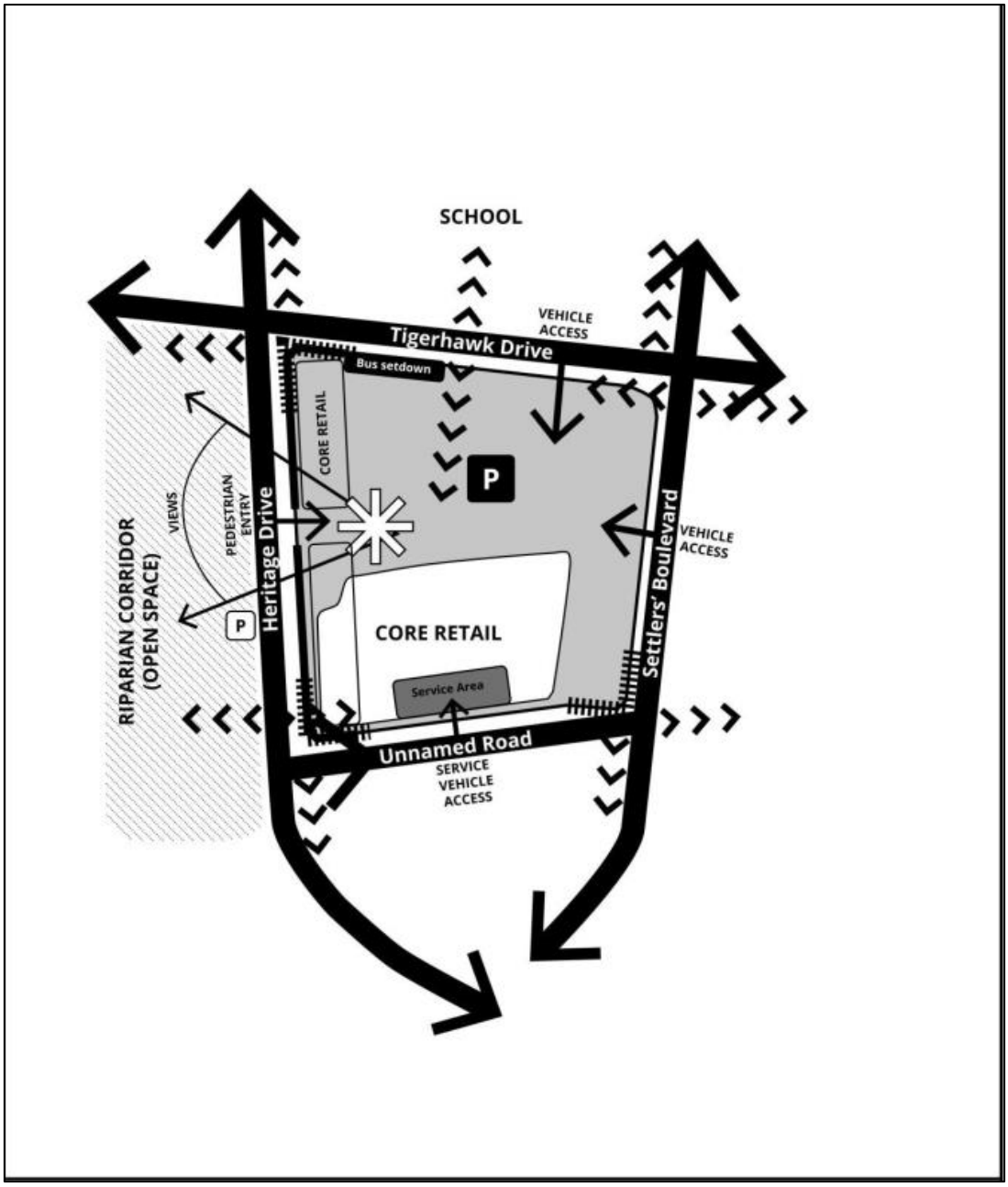


FIGURE 15: MAITLAND COUNCIL DCP – CHISHOLM CENTRE PRINCIPLE PLAN

As part of the proposed development considering the above, it is anticipated that bus and taxi facilities will be provided along Tigerhawk Drive fronting the proposed development site. Any bus and taxi facilities should be located after the proposed entry only driveway from Tigerhawk Drive. It is expected that public bus and taxi facilities will also utilise the school frontage for drop-off and pick-up outside of school hours and on weekends.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation

Traffic generation rates for the relevant land uses are provided in the *RTA Guide to Traffic Generating Developments (2002)* as adopted by Transport for New South Wales (TfNSW) and recent supplements and are as follows:

3.6.1 Shopping centres.

Thursday:
V(P) = 20 A(S) + 51 A(F) + 155 A(SM) + 46 A(SS) + 22 A(OM)

Friday:
V(P)= 11 A(S) + 23 A(F) + 138 A(SM) + 56 A(SS) + 5 A(OM)

Saturday:
PVT= 38 A(S) + 13 A(F) + 147 A(SM) + 107 A(SS)

(vehicle trips per 1000m2)

where:

A(S): Slow Trade GLFA, includes major Department stores such as David Jones and Grace Brothers, furniture, electrical and utility goods stores.

A(F): Faster Trade GLFA, includes discount department stores such as K-Mart and Target, together with larger specialist stores such as Fosseys.

A(SM): Supermarket GLFA, includes stores such as Franklins and large fruit markets.

A(SS): Speciality Shops and Secondary retail GLFA, includes speciality shops and take-away stores such as McDonalds. These stores are grouped since they tend not be primary attractors to the centre.

A(OM): Offices, medical GLFA.

3.7.3 Clubs.

evening peak period traffic generation of 10 veh/hr/100 m2 licensed floor area

3.8.2 Gymnasiums.

Metropolitan Sub Regional Areas.

Evening Peak Hour Vehicle Trips = 9 trips per 100m2 GFA.

3.11.3 Child care centres

Long-day care

7.00-9.00am	*0.8 peak vehicle trips per child*
4.00-6.00pm	*0.7 peak vehicle trips per child*

It is noted that that the TfNSW Guide does not provide traffic generation rates for swim school developments and as such, a first principles assessment has been conducted. This is based on a traffic generation rate of two (2) trips per child on-site at any one time (i.e. one trip inbound and one trip outbound within a single hour) based upon the occurrence of one swimming lesson per hour.

Further, it is assumed that the shopping centre exhibits a traffic generation in the AM peak hour period of 50% of the PM peak hour (consistent with **Figure 11**) and the tavern is closed during the AM peak hour period. The traffic generation of the gymnasium in the AM peak hour period will be 70% (6.3 trips per 100m^2 GFA) of the PM peak hour traffic generation, which is based upon the **Figure 11**.

To consider shared vehicle trips between the shopping centre, gymnasium, child care centre and swim school, a conservative 10% discount will be applied to the gymnasium, child care centre and swim school traffic generation to account for multi-purpose trips which are not included within the shopping centre model.

The resulting traffic generation in the weekday AM and PM peak hour period and midday weekend peak hour period is summarised **Table 7**, **Table 8** and **Table 9**.

TABLE 7: ESTIMATED WEEKDAY PM PEAK HOUR TRAFFIC GENERATION OF SHOPPING CENTRE

Land Use	Scale	Rate	Vehicle Trips	Directional Split(1)
PM Peak Hour Period				
Supermarket	3,500m^2 GLFA	155 A(SM) per 1000m^2	543	271 in, 272 out
Liquor	185m^2 GLFA	155 A(SM) per 1000m^2	29	14 in, 15 out
Major Retail	1,500m^2 GLFA	51 A(F) per 1000m^2	77	38 in, 39 out
Shops	3,695m^2 GLFA	46 A(SS) per 1000m^2	170	85 in, 85 out
Tavern	890m^2 GFA	10 per 100m^2 LFA	89	45 in, 44 out
Medical Centre	745m^2 GLFA	22 A(OM) per 1000m^2	16	8 in, 8 out
Food and Drink Premises	160m^2 GLFA	46 A(SS) per 1000m^2	7	3 in, 4 out
Child Care Centre(2)	112 children	0.7 trips per child	78	39 in, 39 out
Gymnasium(2)	800m^2 GFA	9 per 100m^2 GFA	65	32 in, 33 out
Swim School(2)	1,040m^2 GLFA 20 children	2 trips per child	36	18 in, 18 out
Car Wash	475m^2 GLFA	22 A(OM) per 1000m^2	11	5 in, 6 out
TOTAL	**-**	**-**	**1,121**	**558 in, 563 out**

Note: 1 – Directional split is 50% inbound and 50% outbound

2 – 10% discount due to shared vehicle trips

TABLE 8: ESTIMATED WEEKDAY AM PEAK HOUR TRAFFIC GENERATION OF SHOPPING CENTRE

Land Use	Scale	Rate	Vehicle Trips	Directional Split(1)
AM Peak Hour Period				
Supermarket	3,500m^2 GLFA	77.5 A(SM) per 1000m^2	272	136 in, 136 out
Liquor	185m^2 GLFA	77.5 A(SM) per 1000m^2	14	7 in, 7 out
Major Retail	1,500m^2 GLFA	25.5 A(F) per 1000m^2	39	20 in, 19 out
Shops	3,695m^2 GLFA	23 A(SS) per 1000m^2	85	43 in, 42 out
Tavern	890m^2 GFA	Closed	0	0 in, 0 out
Medical Centre	745m^2 GLFA	11 A(OM) per 1000m^2	8	4 in, 4 out
Food and Drink Premises	160m^2 GLFA	23 A(SS) per 1000m^2	4	2 in, 2 out
Child Care Centre(2)	112 children	0.8 trips per child	90	45 in, 45 out
Gymnasium(2)	800m^2 GFA	6.3 per 100m^2 GFA	45	23 in, 22 out
Swim School(2)	1,040m^2 GLFA 20 children	2 trips per child	36	18 in, 18 out
Car Wash	475m^2 GLFA	11 A(OM) per 1000m^2	5	3 in, 2 out
TOTAL	**-**	**-**	**598**	**301 in, 297 out**

Note: 1 – Directional split is 50% inbound and 50% outbound

2 – 10% discount due to shared vehicle trips

TABLE 9: ESTIMATED WEEKEND MIDDAY PEAK HOUR TRAFFIC GENERATION OF SHOPPING CENTRE

Land Use	Scale	Rate	Vehicle Trips	Directional Split(1)
Weekend Midday Peak Hour Period				
Supermarket	3,500m^2 GLFA	147 A(SM) per 1000m^2	514	257 in, 257 out
Liquor	185m^2 GLFA	147 A(SM) per 1000m^2	27	14 in, 13 out
Major Retail	1,500m^2 GLFA	13 A(F) per 1000m^2	20	10 in, 10 out
Shops	3,695m^2 GLFA	107 A(SS) per 1000m^2	396	198 in, 198 out
Tavern	890m^2 GFA	10 per 100m^2 LFA	89	45 in, 44 out
Medical Centre	745m^2 GLFA	2 per 100m^2 GFA(2)	15	8 in, 7 out
Food and Drink Premises	160m^2 GLFA	107 A(SS) per 1000m^2	17	9 in, 8 out
Child Care Centre(3)	112 children	N/A	N/A	0 in, 0 out
Gymnasium(3)	800m^2 GFA	9 per 100m^2 GFA	65	33 in, 32 out
Swim School(3)	1,040m^2 GLFA 20 children	2 trips per child	36	18 in, 18 out
Car Wash	475m^2 GLFA	2 per 100m^2	10	5 in, 5 out
TOTAL	**-**	**-**	**1,189**	**597 in, 592 out**

Note: 1 – Directional split is 50% inbound and 50% outbound

2 – Based upon an office rate within the TfNSW Guide

3 – 10% discount due to shared vehicle trips

As shown above, the proposed development is anticipated to generate 598, 1,121 and 1,189 two-way vehicle trips during the AM (301, 297 out), PM (558 in, 563 out) and midday weekday (597 in, 592 out) respectively.

Furthermore, shopping centres typically have a degree of linked trips which can potentially reduce the overall trip generation of the development. A linked trip is a trip taken as a side-track from another trip. For example, a resident travelling to the centre on the way home from work. The *RTA Guide to Traffic Generating Developments 2002* suggests an average of 20%, although no discount will be applied as a result of linked trips. This is a direct result of the adoption of the residential traffic generation rate as shown in **Table 2**, which does not consider internal trips to the subdivision, such as those trips made to local shopping centres. As such, no discount as a result of linked trips will be made to the estimated traffic generation as outlined in **Table 7**, **Table 8** and **Table 9**

4.2 Traffic Assignment

Reference is made to the *Chisholm Plaza Economic Impact Assessment* dated November 2021, prepared by *Ethos Urban* which outlines that there will be four areas catchment areas as shown in **Figure 16**.

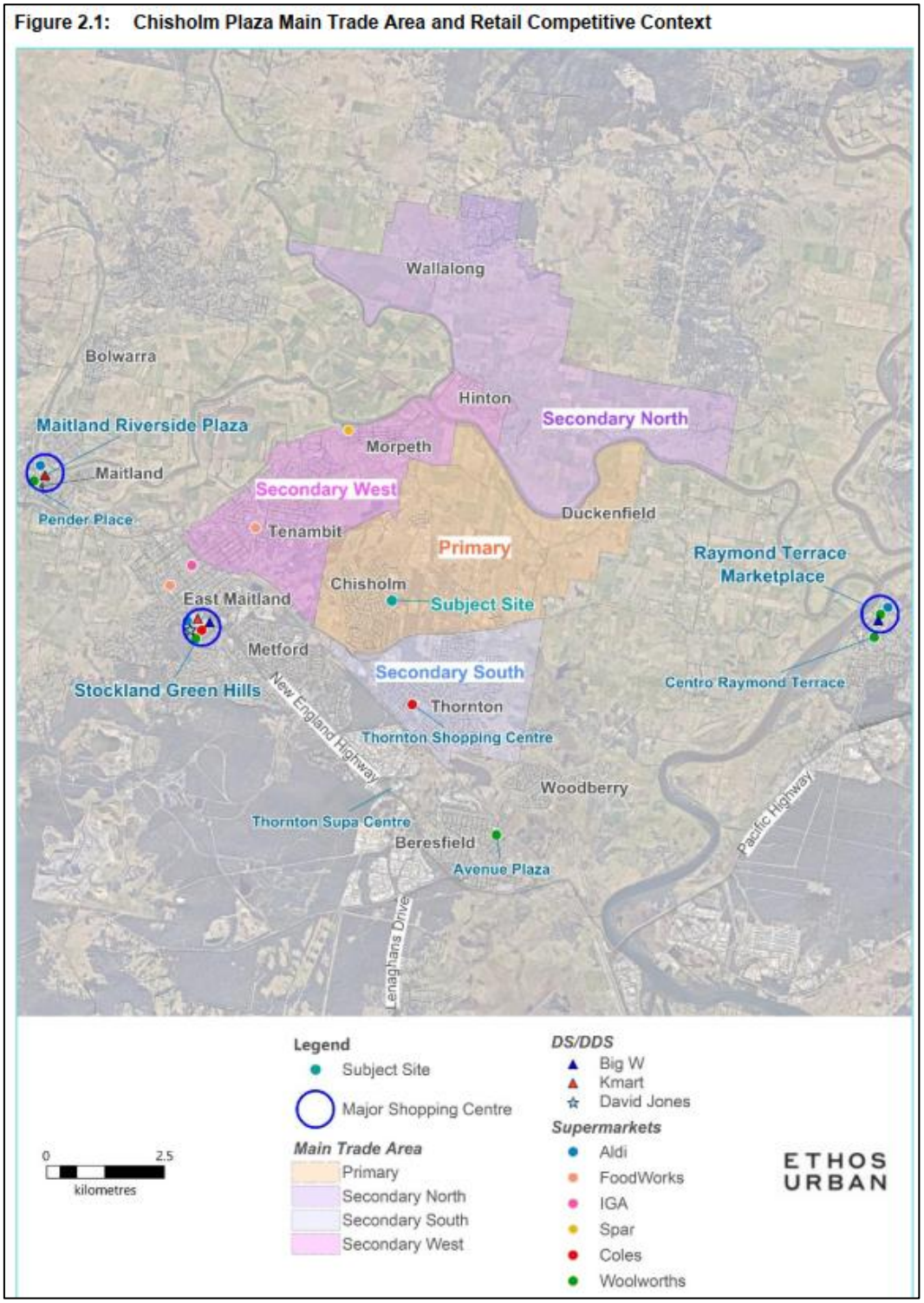


FIGURE 16: FIGURE 2.1 OF *CHISHOLM PLAZA ECONOMIC IMPACT ASSESSMENT* DATED NOVEMBER 2021, PREPARED BY *ETHOS URBAN*

Considering the anticipated population density of the four (4) areas shown in **Figure 16** above and the proximity of the areas to alternative shopping areas, the following trip distribution has been assumed:

- 75% to and from the primary trade area being the Thornton North Urban Release Area:
    - 25% from Precinct 6 (**Figure 7**), with a 50/50 split travelling to and from the site via Raymond Terrace Road and the local subdivision connection
    - 25% from Precinct 5 (**Figure 7**), with a 75/25 split travelling to and from the site from the north and south respectively.
    - 25% from Precinct 1 & 4 (**Figure 7**), with 100% travelling via Grasshawk Drive and onto Heritage Drive or Tigerhawk Drive.
- 25% to and from the site from Thornton (Secondary south) and Tenambit (secondary west):
    - Thornton:
        - 50% to / from the site via Government Road;
        - 50% to and from the site via Haussman Drive.
    - Tenambit:
        - 100% to and from the site via Raymond Terrace Road.

A high-level distribution of traffic to the site is shown in **Figure 17**, with outbound traffic being the same but in reverse direction.

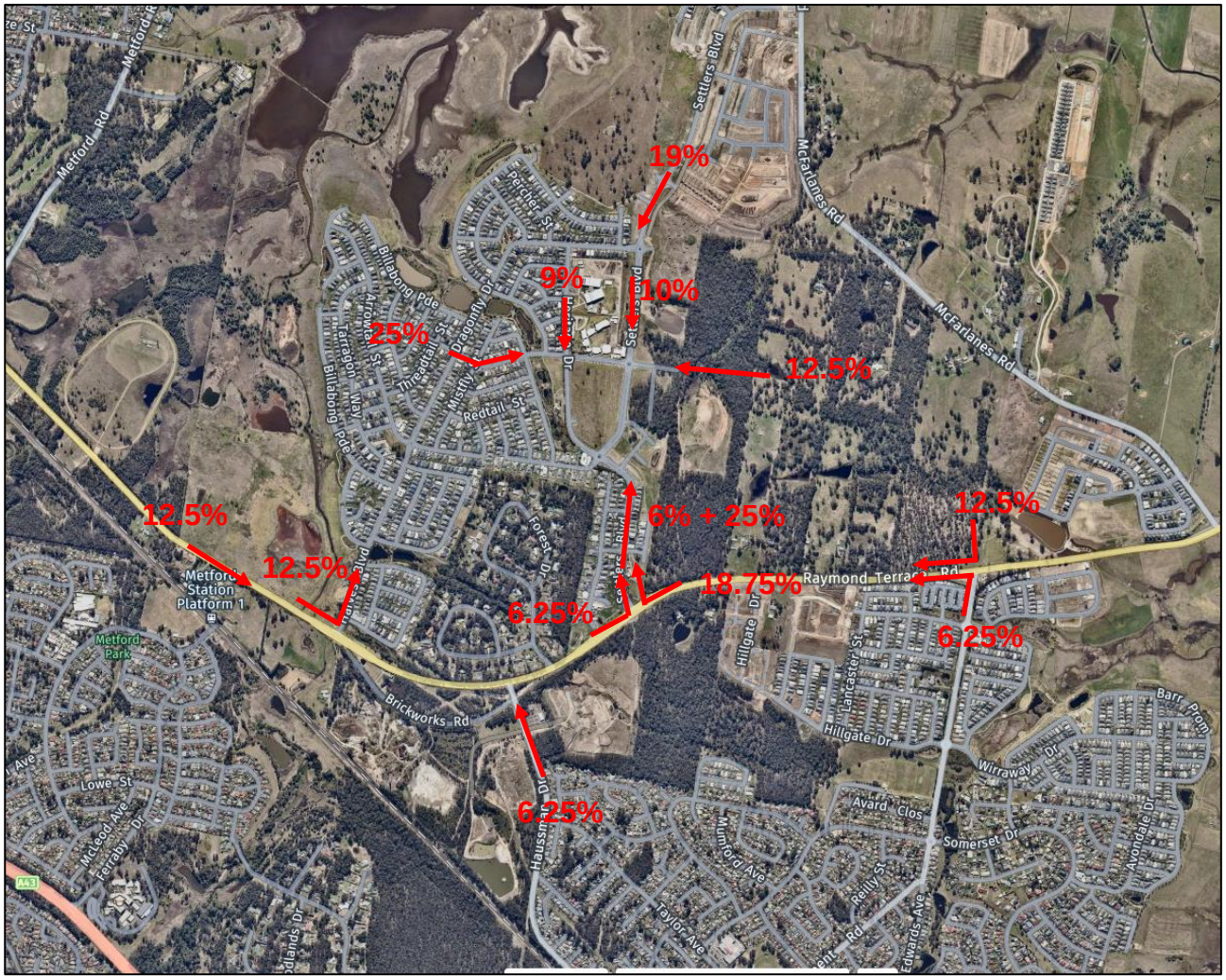


FIGURE 17: ADOPTED INBOUND TRIP DISTRIBUTION

Based upon the above, the following distribution of traffic into and out of the site will occur:

- 22.5% of traffic entering the site via the Tigerhawk Drive access and departing the site via Settlers Boulevard;
- 31% of traffic entering the site via Settlers Boulevard and departing the site via Heritage Drive / Settlers Boulevard via a U-turn at the roundabout of Tigerhawk Drive / Settlers Boulevard;
- 46.5% of traffic entering the site via Heritage Drive, with 9% leaving the site via Settlers Boulevard and 37.5% departing the site via Heritage Drive.

4.3 Traffic Impact

The traffic generation outlined in **Section 4.1** & **4.2** above has been added to the existing traffic volumes recorded. SIDRA INTERSECTION 9.0 was used to assess the intersections performance. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 10**, with detailed SIDRA outputs provided in **Annexure C** for reference.

TABLE 10: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 9.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3][4]	Control Type	Worst Movement
THORNTON NORTH URBAN RELEASE AREA ULTIMATE DEVELOPMENT YIELD						
Settlers Boulevard / Raymond Terrace	AM	0.67	24.1	**B**	Signals	N/A
	PM	0.64	15.1	**B**		N/A
	Weekend	0.43	16.7	**B**		N/A
Harvest Boulevard / Raymond Terrace	AM	0.53	12.3	**A**	Signals	N/A
	PM	0.80	16.2	**B**		N/A
	Weekend	0.50	11.4	**A**		N/A
Settlers Boulevard / Heritage Drive / Duskdarter Street	AM	0.30	5.8 (Worst: 11.1)	**A** (Worst: B)	Roundabout	RT from Settlers Boulevard (E)
	PM	0.29	6.7 (Worst: 11.7)	**A** (Worst: B)		RT from Duskdarter Street (W)
	Weekend	0.15	5.7 (Worst: 10.4)	**A** (Worst: B)		
Heritage Drive / Tigerhawk Drive	AM	0.23	3.9 (Worst: 8.6)	**N/A** (Worst: A)	Priority	RT from Tigerhawk Drive (W)
	PM	0.10	3.8 (Worst: 6.8)	**N/A** (Worst: A)		
	Weekend	0.10	4.2 (Worst: 6.1)	**N/A** (Worst: A)		
Grasshawk Drive / Dragonfly Drive	AM	0.01	2.5 (Worst: 6.6)	**N/A** (Worst: A)	Priority	RT from Grasshawk Drive (E)
	PM	0.06	2.7 (Worst: 6.6)	**N/A** (Worst: A)		
	Weekend	0.05	3.1 (Worst: 6.1)	**N/A** (Worst: A)		
THORNTON NORTH URBAN RELEASE AREA ULTIMATE DEVELOPMENT YIELD + DEVELOPMENT						
Settlers Boulevard / Raymond Terrace	AM	0.73	25.2	**B**	Signals	N/A
	PM	0.75	19.2	**B**		N/A
	Weekend	0.56	20.7	**B**		N/A
Harvest Boulevard / Raymond Terrace	AM	0.53	13.0	**A**	Signals	N/A
	PM	0.82	17.9	**B**		N/A
	Weekend	0.55	13.0	**A**		N/A
Settlers Boulevard / Heritage Drive / Duskdarter Street	AM	0.36	6.3 (Worst: 11.4)	**A** (Worst: B)	Roundabout	RT from Duskdarter Street (W)
	PM	0.39	7.2 (Worst: 13.0)	**A** (Worst: B)		RT from Duskdarter Street (W)
	Weekend	0.26	6.4 (Worst: 11.3)	**A** (Worst: B)		
Heritage Drive / Tigerhawk Drive	AM	0.44	5.3 (Worst: 11.1)	**N/A** (Worst: B)	Priority	RT from Tigerhawk Drive (W)
	PM	0.41	5.7 (Worst: 9.2)	**N/A** (Worst: A)		
	Weekend	0.41	5.7 (Worst: 8.2)	**N/A** (Worst: A)		
Grasshawk Drive / Dragonfly Drive	AM	0.10	4.2 (Worst: 7.6)	**N/A** (Worst: A)	Priority	RT from Grasshawk Drive (E)
	PM	0.22	5.2 (Worst: 9.4)	**N/A** (Worst: A)		
	Weekend	0.20	5.5 (Worst: 8.4)	**N/A** (Worst: A)		

Notes: Refer to **Table 3**

As shown, the assessed signalised intersections operate at a Level of Service “A” and “B” condition, with roundabout intersections and priority controlled intersection operating with a worst turn movement of Level of Service “B” condition. This indicates acceptable delays, with spare capacity. The proposed development is therefore fully supportable on traffic flow efficiency grounds.

4.4 Midblock Assessment & Pedestrian Assessment & Signalised Intersection

As mentioned in **Section 3.8**, an investigation will be made into if Tigerhawk Drive / Hertiage Drive is required to be upgraded to a signalised intersection and if the midblock of Heritage Drive requires the provision of pedestrian facilities to the west of the site.

A summary of the midblock two-way traffic flows surrounding the site are provided in **Table 11** below for each of assessment.

TABLE 11: MIDBLOCK TRAFFIC FLOWS

Site Road Frontage	Location	Direction	Traffic Flow		
			Thursday AM Peak	Thursday PM Peak	Weekend Peak
Heritage Drive	South of Tigerhawk Drive	Northbound	350	379	359
		Southbound	458	417	393
		Two-way	808	796	752
	North of Tigerhawk Drive	Northbound	196	66	51
		Southbound	229	139	80
		Two-way	425	205	131
	South of site driveway	Northbound	241	169	130
		Southbound	367	252	205
		Two-way	608	421	335
Tigerhawk Drive	East of Heritage Drive	Eastbound	92	22	9
		Westbound	65	30	3
		Two-way	157	52	12
	West of Heritage Drive	Eastbound	278	289	323
		Westbound	176	316	312
		Two-way	454	605	635

4.4.1 Tigerhawk Drive / Heritage Drive

Reference is made to *TfNSW Traffic Signal Design: Section 2 – Warrants* which outlines the following with respect to when a signalised intersection should be installed:

a) Traffic Demand

For each of four one-hour periods of an average day:

(i) The major road flow exceeds 600 vehicles / hour in each direction; and

(ii) The minor road flow exceeds 200 vehicles / hour in one direction

b) Continuous Traffic:

For each of four one-hour periods of an average day

(i) The major road flow exceeds 900 vehicles / hour in each direction;

(ii) The minor rod flow exceeds 100 vehicles / hour in one direction; and

c) Pedestrian safety:

For each of four one-hour periods of an average day

(i) The pedestrian flow crossing the major road exceeds 150 persons/hour; and

(ii) The major road flow exceeds 600 vehicles / hour in each direction or, where there is a central median of at least 1.2m wide, 10000 vehicles / hour in each direction

With reference to the above the approach traffic flows of all legs do not exceed 600 vehicles per hour in any one peak hour period at the intersection of Tigerhawk Drive / Heritage Drive. Hence, based upon this, the forecast traffic flows at the intersection of Tigerhawk Drive / Heritage Drive do not warrant an upgrade to a signalised intersection.

4.4.2 Heritage Drive – Midblock Assessment

Reference is made to *Section 4.3.4* of the *RTA Guide to Traffic Generating Developments 2002* which outlines typical threshold limits for consideration to pedestrian safety. A limit of 300 vehicles per hour is required for aged pedestrians to safely cross the average street.

The forecast traffic flow within Heritage Drive is forecast to exceed 300 vehicle trips in a single one hour peak hour period, with a forecast traffic flow in the range of 752 to 800 two-way vehicle trips to the north of the site driveway and a forecast traffic flow of 335 to 608 two-way vehicle trips to the south of the site driveway.

Considering the above, it is recommended that a pedestrian refuge be provided and located within Heritage Drive to safely accommodate pedestrians travelling to and from the site from the west. It is recommended that the refuge be located to the south of the site driveway, due to the lower traffic flows, but also as this provides a direct link to the shopping centre.

5 CONCLUSION

In view of the foregoing, the subject Proposed Shopping Centre proposal at 20 Heritage Drive, Chisholm (as depicted in **Annexure A**) is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

- The proposal includes the provision of **661** on-site car parking spaces and an additional **21** car parking spaces located along the New Link Road, which front the site. Council's DCP requires the provision of **763** car parking spaces, resulting in a shortfall of **102** spaces when not considering the parking located on the New Link Road.
- With consideration to parking profiles for gymnasiums, shopping centres and taverns / pubs, the proposed development would operationally demand up to **644** car parking spaces based upon Council's DCP.
- Adopting the TfNSW parking rates for shopping centres and gymnasiums, the proposed development requires the provision of **617** car parking spaces. The proposed development provides **661** on-site car parking spaces resulting in a surplus of **44** car parking spaces**.**
- With consideration to parking profiles for gymnasiums, shopping centres and taverns / pubs, the proposed development would operationally demand **497** car parking spaces based upon TfNSW parking rates.
- In view of the above, the provision of **661** on-site car parking spaces accommodates the anticipated parking demand of the site. The TfNSW parking rates are the more appropriate rates for the subject site, as they consider parking demands associated with multiple land uses (i.e. shopping centres) rather than assessing each component of the site in isolation, which reflects the parking rates within the Council DCP.
- Council's DCP requires the provision of **40** staff and **33** visitor bicycle parking spaces. It is recommended this form part of a condition of consent, as there is sufficient room on-site to provide these end of trip facilities. Council's DCP does not require the provision of motorcycle parking facilities.
- The parking areas of the site have been assessed against the relevant sections of *AS2890.1:2004*, *AS2890.2:2018* and *AS2890.6:2009* and have been found to satisfy the objectives of each standard with any required changes outlined in **Annexure D**, which also shows relevant swept path testing.

- The traffic generation of the proposed development has been estimated to be some 598, 1,121 and 1,189 two-way vehicle trips during the AM (301, 297 out), PM (558 in, 563 out) and midday weekday (597 in, 592 out) respectively. The impacts of the traffic generation have been modelled using SIDRA INTERSECTION 9.0, indicating that there will be no detrimental impact to the performance of the assessed intersections as a result of the generated traffic.
- A signalised intersection warrant assessment has been undertaken for the intersection of Heritage Drive / Tigerhawk Drive and indicates that a signalised intersection does not meet the TfNSW warrants.
- To provide pedestrian connectivity to the west of the site and to ensure the safety of pedestrians crossing Heritage Drive, it is recommended that as part of the proposed development a pedestrian refuge be provided to the south of the proposed driveway on Heritage Drive. Discussions should be held with Council as to the preferred location of the refuge.

ANNEXURE A: PROPOSED PLANS
(3 SHEETS)

DEVELOPMENT APPLICATION

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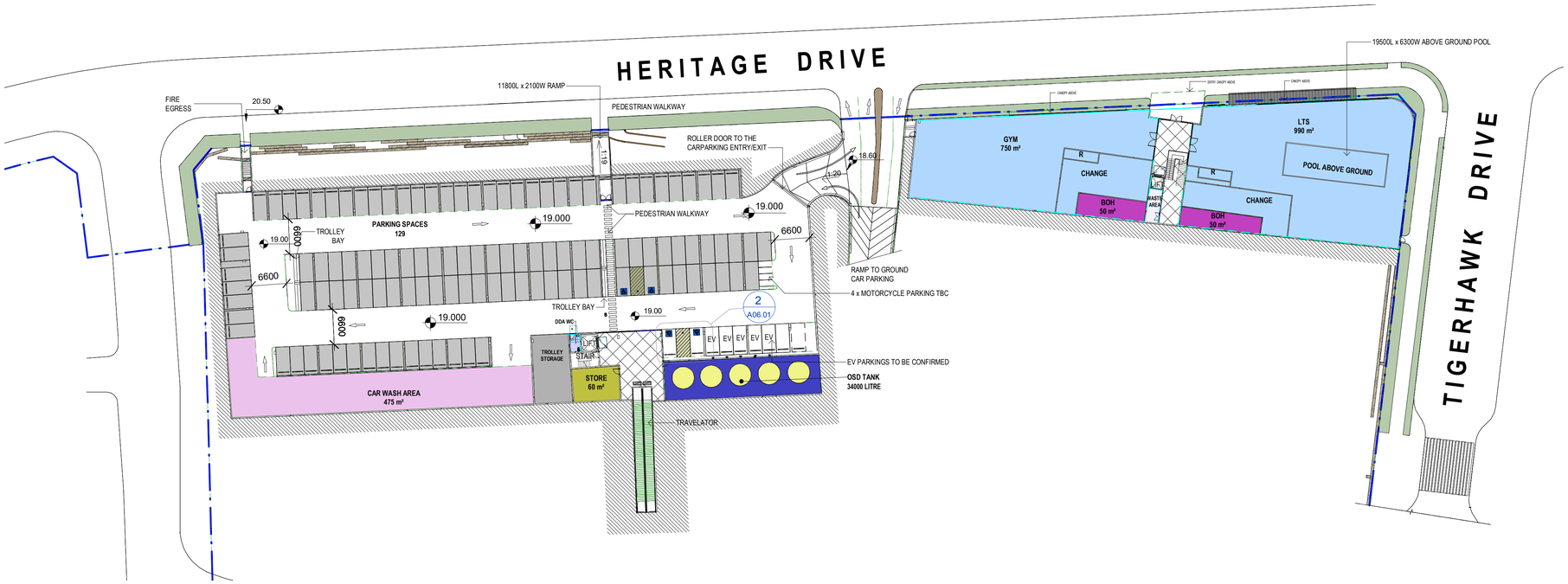
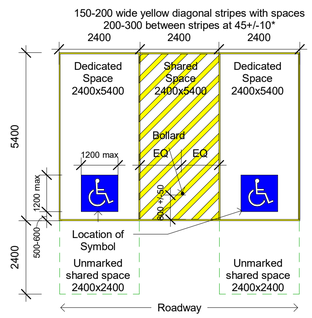


1 PROPOSED BASEMENT FLOOR PLAN
1 : 500



2 TYP. ACCESSIBLE PARKING BAY DETAIL
1 : 100

REVELOP

CHISHOLM SHOPPING CENTRE
HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
A	03-11-21	FOR REVIEW
B	13.12.21	DA ISSUE

PROPOSED BASEMENT FLOOR PLAN AND MEZZANINE FLOOR PLAN

A06.01 DA - B
1:500 @ A1
1:1000 @ A3

82 Alexander Street
Crows Nest, NSW 2065
ABN 43 092 960 499

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DEVELOPMENT APPLICATION

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HERITAGE DRIVE

SETTLERS BLVD.

TIGERHAWK DRIVE

SCHOOL

PEDESTRIAN ENTRY

PEDESTRIAN WALKWAY

LOT 1

PARKING SPACES

OUTLINE OF DROPDOWN CURTAINS AND FIRE COMPARTMENTS SHOWN RED TYP

OUTLINE OF THE AWNING ABOVE LOADING DOCK AND WASTE AREA

TILT UP CONCRETE WALL WITH ALUMINIUM BATTENS ON TOP

OUTLINE OF DROPDOWN CURTAINS AND FIRE COMPARTMENTS SHOWN RED TYP

TILT UP CONCRETE WALL WITH ALUMINIUM BATTENS ON TOP

PARKING SPACES

6M AWNING ABOVE

BICYCLE RACK TO THE MEDICAL CENTRE ENTRY

OUTLINE OF THE EASTERN OSD TANK BELOW

OUTLINE OF THE EASTERN OSD TANK BELOW

TERRACE

TAVERN 890 m²

MINI MAJOR 1500 m²

LINE OF BASEMENT PARKING UNDER

PROPOSED ROLLER DOOR TO PROVIDE ACCESS TO LOADING DOCK

WASTE AREA 95 m²

T1 125 m²
T2 120 m²
T3 160 m²
T4 75 m²
T5 75 m²
T6 95 m²
T7 170 m²
T8 65 m²
T9 95 m²
T10 75 m²
T11 260 m²
T13 220 m²
T14 415 m²
T15 215 m²
T16 215 m²
T17 190 m²
T18 330 m²
T19 430 m²
T20 200 m²
T21 60 m²
DTB 130 m²
LIQUOR 180 m²
K1 35 m²
K2 35 m²
K3 35 m²

KIDS WATER SPLASH / FOUNTAIN PLAYGROUND

CMO
PARENTS ROOM
FAMILY
DDA WC
WC

SUPERMARKET
TRADING AREA = 2470 SQM
NON-TRADE AREA (INCL. LOADING DOCK) = 1050 SQM
PLANT/AC AT MEZZANINE = 180 SQM
DTB STAGING AREA = 130 SQM
BWS TRADING = 180 SQM
HOME DELIVERY = 200 SQM
TOTAL BUILDING AREA (EXCL. PLANT) = 4030 SQM

HOME DELIVERY
SEAFOOD PREP, COOLROOM AND FRZ
LOADING DOCK
TEAM DINING AMENITIES
DELI PREP AND COOLROOM
CHILLED COOLROOM
MEAT COOLROOM
FULL PRODUCTION BAKERY
FROZEN FOOD FRZ
PRODUCE PREP AND COOLROOM
OFFICE

MEDICAL CENTRE 425 m²
ENTRY 95 m²
MEDICAL CENTRE 320 m²

CANOPY ABOVE

PLAY ROOM 1
PLAY ROOM 2
OUTDOOR PLAY
PLAYROOM 3
PLAY ROOM 4
PLAY ROOM 5
PLAYROOM 6
OUTLINE OF THE AWNING ABOVE

DOUBLE BAY TROLLEY COLLECTION
SINGLE TROLLEY BAY
DOUBLE TROLLEY BAY COLLECTION
SHADE SAIL ABOVE

PARKING SPACES 535

PICK UP AREA

FUTURE PAD SITES

RL 20.420 m
RL 22.510 m
RL 21.50

A100.71 2
A10.04 1
D A11.03
1 A06.04
B A11.02
1 A10.05
2 A06.01
A A11.01
C A11.02
1 A100.71
3 A100.71

REVELOP	CHISHOLM SHOPPING CENTRE HERITAGE DRIVE CHISHOLM, NSW 2322 , AUSTRALIA	PROPOSED GROUND FLOOR PLAN

ISSUE	DATE	DESCRIPTION
A	03-11-21	FOR REVIEW
B	13.12.21	DA ISSUE

A06.02 DA - B

1:500 @ A1
1:1000 @ A3

82 Alexander Street
Crows Nest, NSW 2065
ABN 43 092 960 499

T +61 2 9437 0511
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DEVELOPMENT APPLICATION

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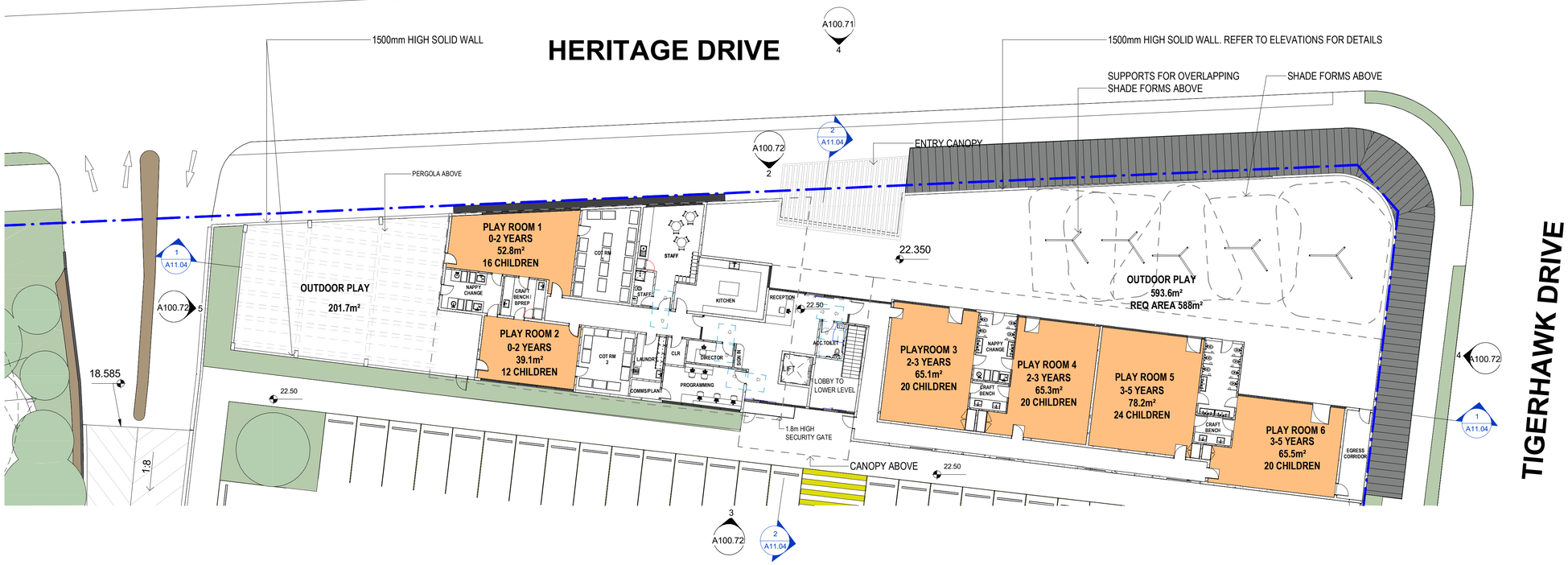
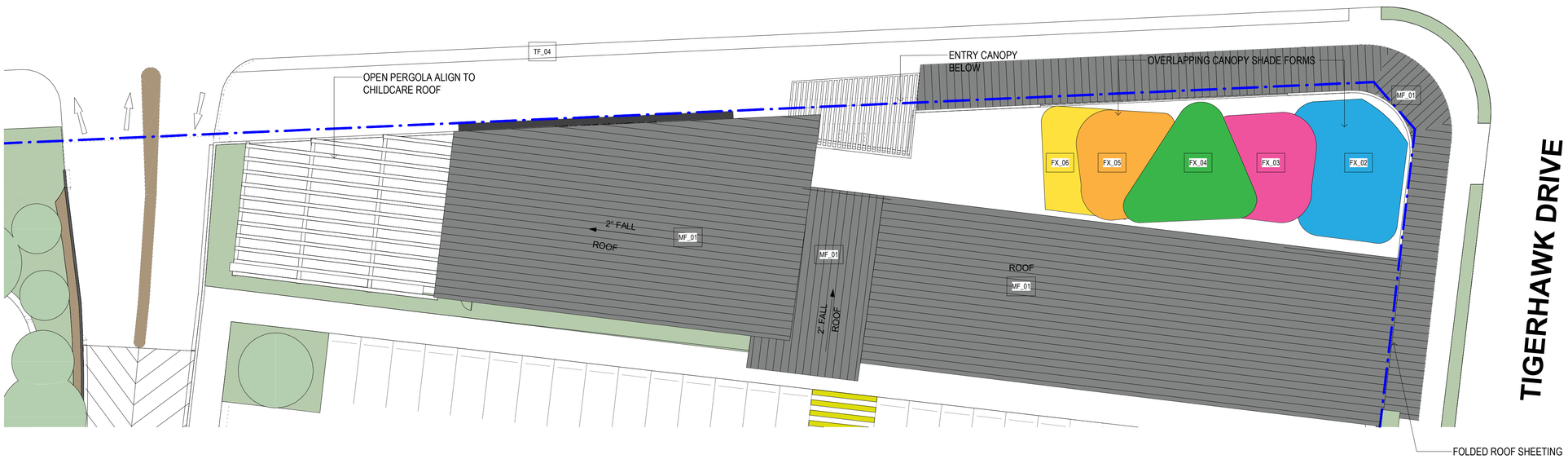


1 PROPOSED CHILDCARE GROUND FLOOR PLAN
1 : 200



2 PROPOSED CHILDCARE ROOF PLAN
1 : 200

ROOM	AGE GROUP	NO. OF CHILDREN	RM AREA UNEMCUMBERED	MIN 3.25M² PER CHILD	REQUIRED STAFF
PLAYROOM 01	0-2	16	52.8	3.3	4
PLAYROOM 02	0-2	12	39.1	3.25	3
PLAYROOM 03	2-3	20	65.1	3.25	4
PLAYROOM 04	2-3	20	65.3	3.26	4
PLAYROOM 05	3-5	24	78.2	3.25	2.4
PLAYROOM 06	3-5	20	65.5	3.27	2

ADDITIONAL STAFF	
RECEPTION + ADMIN	2
DIRECTOR	1
TOTAL STAFF	22.4

UNENCUMBERED INDOOR SPACE	
3.25m² PER CHILD	364
SPACE PROVIDED	366

OUTDOOR SPACE	
7m² PER CHILD	789
SPACE PROVIDED	795.3

JUNIOR TOILET	
DOCS (1 PER 15)	7
NO PROVIDED	11

NAPPY CHANGE	
1/10 CHILD < 3	4.8
NO PROVIDED	6

NOTE:

- *BCA STATES THAT IF THE CENTRE ACCOMMODATES CHILDREN UNDER THE AGE OF 3 THEY MUST INCLUDE A DEDICATED BENCH TYPE BABY BATH*
- *UNENCUMBERED SPACE EXCLUDES WALLS, COLUMNS, CRAFT BENCHES AND STORES)*

REVELOP

CHISHOLM SHOPPING CENTRE
HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
A	13.12.21	DA ISSUE

PROPOSED CHILDCARE PLAN

A06.04 DA - A
1:200 @ A1
1:400 @ A3

82 Alexander Street
Crows Nest, NSW 2065
ABN 43 092 960 499

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ANNEXURE B: TRAFFIC SURVEY DATA
(15 SHEETS)

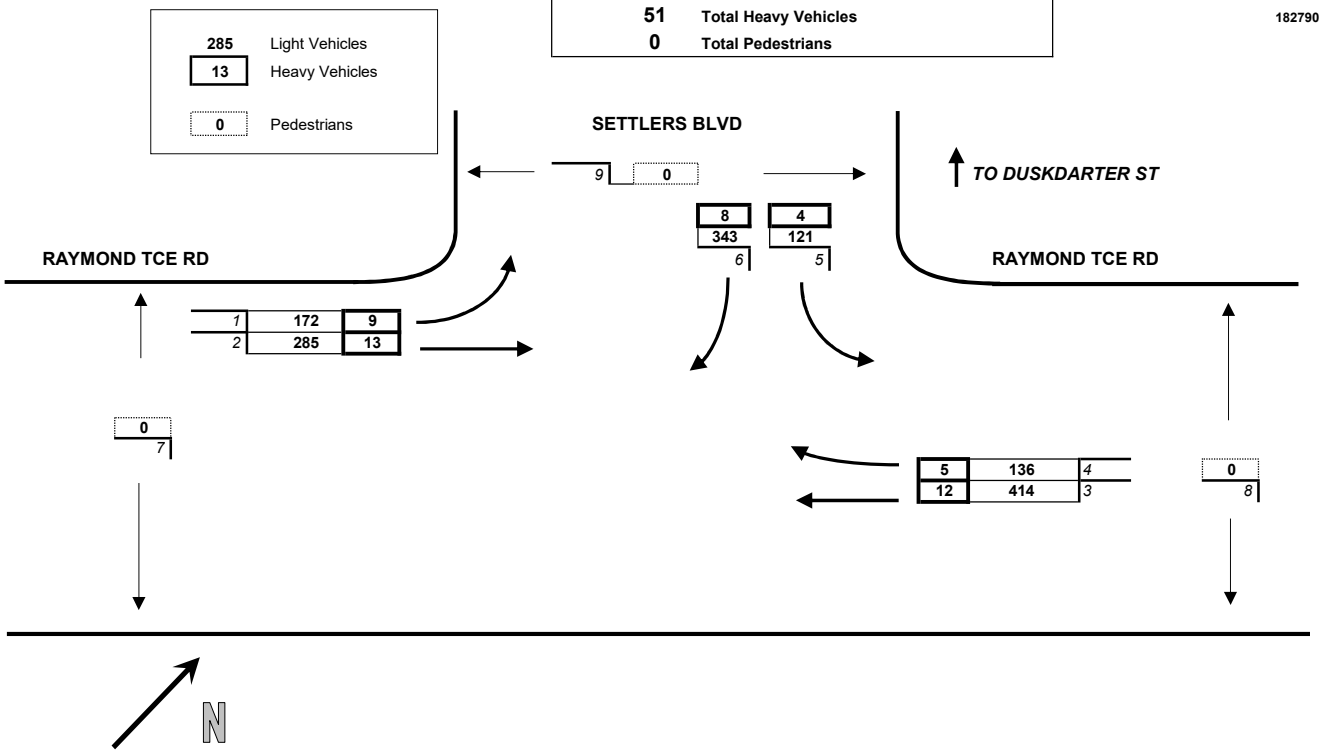
22/3/2018 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

9:00 <<< HOUR ENDING **Thursday**

Summary:

RAYMOND TCE RD / SETTLERS BLVD	
1471	Total Light Vehicles
51	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182790



22/3/2018 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
07:15	17	46	40	6	12	36	157		0	0	0
07:30	25	50	81	9	14	45	224		0	0	0
07:45	9	78	79	9	23	53	251		0	0	0
08:00	23	61	97	14	13	46	254	886	0	0	1 <
08:15	43	73	104	28	20	61	329	1058	0	0	0 <
08:30	46	71	113	44	32	111	417	1251	0	0	0 <
08:45	48	65	96	53 <	46	106	414	1414	0	0	0 <
09:00	35 <	76 <	101 <	11	23 <	65 <	311	1471 <	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
07:15	4	1	1	1	1	0	8	
07:30	1	0	1	1	0	4	7	
07:45	1	0	3	2	1	5	12	
08:00	2	3	0	1	2	0	8	35
08:15	4	1	2	1	1	1 <	10	37
08:30	1	4	1	1	1	2	10	40
08:45	2 <	2	2	3 <	2 <	5	16	44
09:00	2 <	6 <	7 <	0	0	0	15	51 <

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
07:15	21	47	41	7	13	36	165	
07:30	26	50	82	10	14	49	231	
07:45	10	78	82	11	24	58	263	
08:00	25	64	97	15	15	46	262	921
08:15	47	74	106	29	21	62	339	1095
08:30	47	75	114	45	33	113	427	1291
08:45	50	67	98	56 <	48	111	430	1458
09:00	37 <	82 <	108 <	11	23 <	65 <	326	1522 <

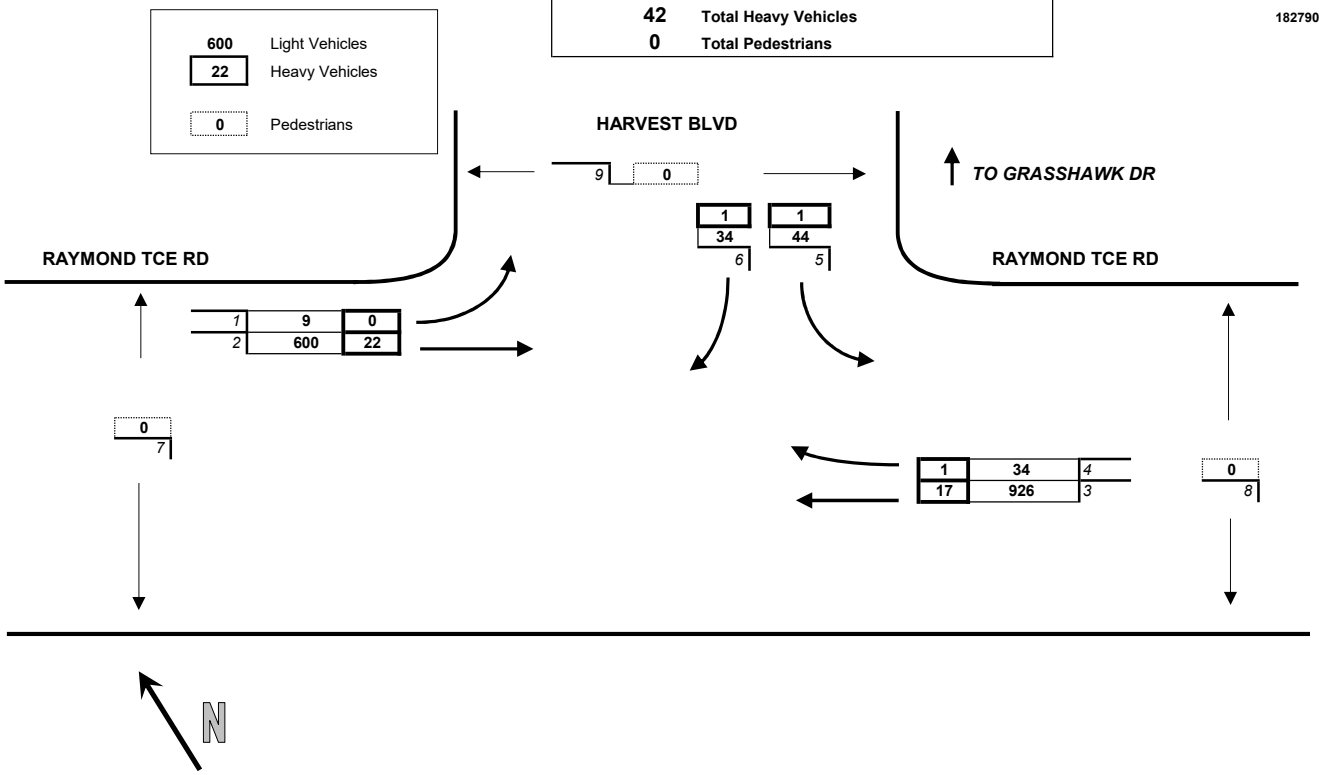
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - RAYMOND TCE RD / HARVEST BLVD, CHISHOLM

9:00 <<< HOUR ENDING **Thursday**

Quality Surveys
182790

Summary: RAYMOND TCE RD / HARVEST BLVD	
1647	Total Light Vehicles
42	Total Heavy Vehicles
0	Total Pedestrians



22/3/2018 - RAYMOND TCE RD / HARVEST BLVD, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
07:15	3	91	82	2	10	3	191	
07:30	1	99	119	10	7	3	239	
07:45	0	119	158	5	15	5	302	
08:00	4	123	177	4	8	9	325	1057
08:15	0	127	208	8	13	9	365	1231
08:30	3	171	262	7	10 <	11	464	1456
08:45	1	145	240	9	13	8 <	416	1570
09:00	5 <	157 <	216 <	10 <	8	6	402	1647 <

Pedestrians

	7	8	9
07:15	0	0	0
07:30	0	0	0
07:45	0	0	0
08:00	0	1 <	0
08:15	0	0 <	0
08:30	0	0 <	0
08:45	0	0 <	0
09:00	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
07:15	0	4	3	0	0	0	7	
07:30	0	3	7	1	0	0	11	
07:45	0	4	7	0	0	0	11	
08:00	0	4	2 <	0 <	1 <	0	7	36
08:15	0	2	2	0 <	0 <	0	4	33
08:30	0	5	2	1 <	0 <	0	8	30
08:45	0	6	4	0 <	0 <	1 <	11	30
09:00	0	9 <	9	0 <	1 <	0 <	19	42 <

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
07:15	3	95	85	2	10	3	198	
07:30	1	102	126	11	7	3	250	
07:45	0	123	165	5	15	5	313	
08:00	4	127	179	4	9	9	332	1093
08:15	0	129	210	8	13	9	369	1264
08:30	3	176	264	8	10 <	11	472	1486
08:45	1	151	244	9	13	9 <	427	1600
09:00	5 <	166 <	225 <	10 <	9	6	421	1689 <

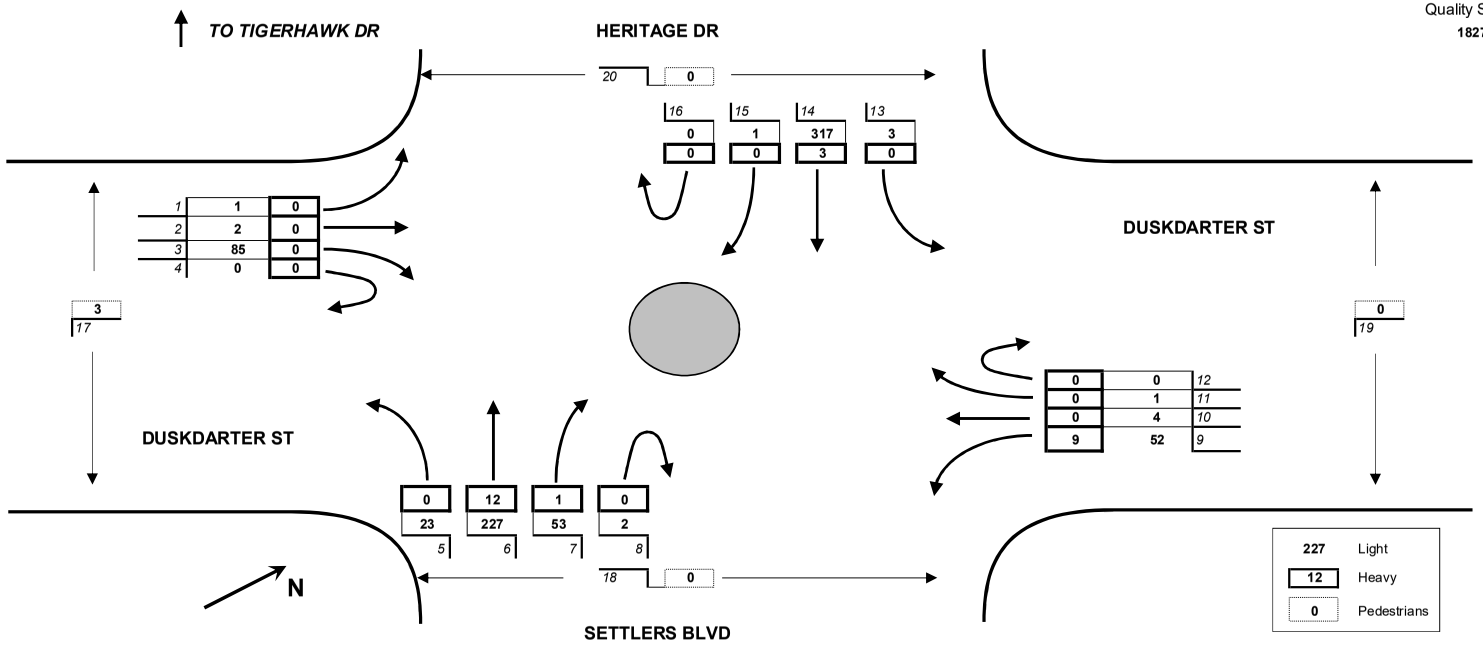
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - HERITAGE DR / DUSKDARTER ST, CHISHOLM

9:00 <<< HOUR ENDING **Thursday**

Summary:	HERITAGE DR / DUSKDARTER ST
771	Total Light Vehicles
25	Total Heavy Vehicles
3	Total Pedestrians

Quality Surveys
182790



22/3/2018 - HERITAGE DR / DUSKDARTER ST, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR	Pedestrians 17	18	19	20
07:15	0	1	4	0	2	23	2	0	2	0	0	0	0	39	0	0	73		1	0	1	1
07:30	0	0	17	0	5	24	3	0	1	0	0	0	0	37	0	0	87		3	0	0	0
07:45	0	0	22	0	3	10	1	2	1	0	0	0	0	52	0	0	91		3	0	0	0
08:00	0	0	20	0	3	29	3	3	4	0	0	0	0	34	0	0	96	347	3	0	0 <	0 <
08:15	0	0	21	0	3	56	8	1 <	5	0	0	0	0	50	0	0	144	418	2 <	0	0	0
08:30	0	0	26	0	5	62	22	0 <	20	1	1 <	0	1	109	0	0	247	578	1	0	0	0
08:45	1 <	2 <	29 <	0	7	73	21 <	1	17	3 <	0 <	0	2 <	93	1 <	0	250	737	0	0	0	0
09:00	0 <	0 <	9	0	8 <	36 <	2	0	10 <	0 <	0 <	0	0 <	65 <	0 <	0	130	771 <	0	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR
07:15	0	0	0	0	0	4	0	0	1	0	0	0	0	1	0	0	6	
07:30	0	0	0	0	0	1	0	2	0	0	0	0	0	1	0	0	4	
07:45	0	0	0	0	0	3	0	1	3	0	0	0	0	0	0	0	7	
08:00	0	0	1 <	0	1 <	2	0	0 <	1	0	0	0	0	0	0	0	5	22
08:15	0	0	0 <	0	0 <	5	0	0 <	2	0	0	0	0	0	0	0	7	23
08:30	0	0	0 <	0	0 <	2	0	0	2	0	0	0	0	2	0	0	6	25
08:45	0	0	0 <	0	0 <	5 <	0	0	5 <	0	0	0	0	1 <	0	0	11	29 <
09:00	0	0	0	0	0	0	1 <	0	0	0	0	0	0	0 <	0	0	1	25

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR
07:15	0	1	4	0	2	27	2	0	3	0	0	0	0	40	0	0	79	
07:30	0	0	17	0	5	25	3	2	1	0	0	0	0	38	0	0	91	
07:45	0	0	22	0	3	13	1	3	4	0	0	0	0	52	0	0	98	
08:00	0	0	21	0	4	31	3	3	5	0	0	0	0	34	0	0	101	369
08:15	0	0	21	0	3	61	8	1 <	7	0	0	0	0	50	0	0	151	441
08:30	0	0	26	0	5	64	22	0	22	1	1 <	0	1	111	0	0	253	603
08:45	1 <	2 <	29 <	0	7	78	21 <	1	22	3 <	0 <	0	2 <	94	1 <	0	261	766
09:00	0 <	0 <	9	0	8 <	36 <	3 <	0	10 <	0 <	0 <	0	0 <	65 <	0 <	0	131	796 <

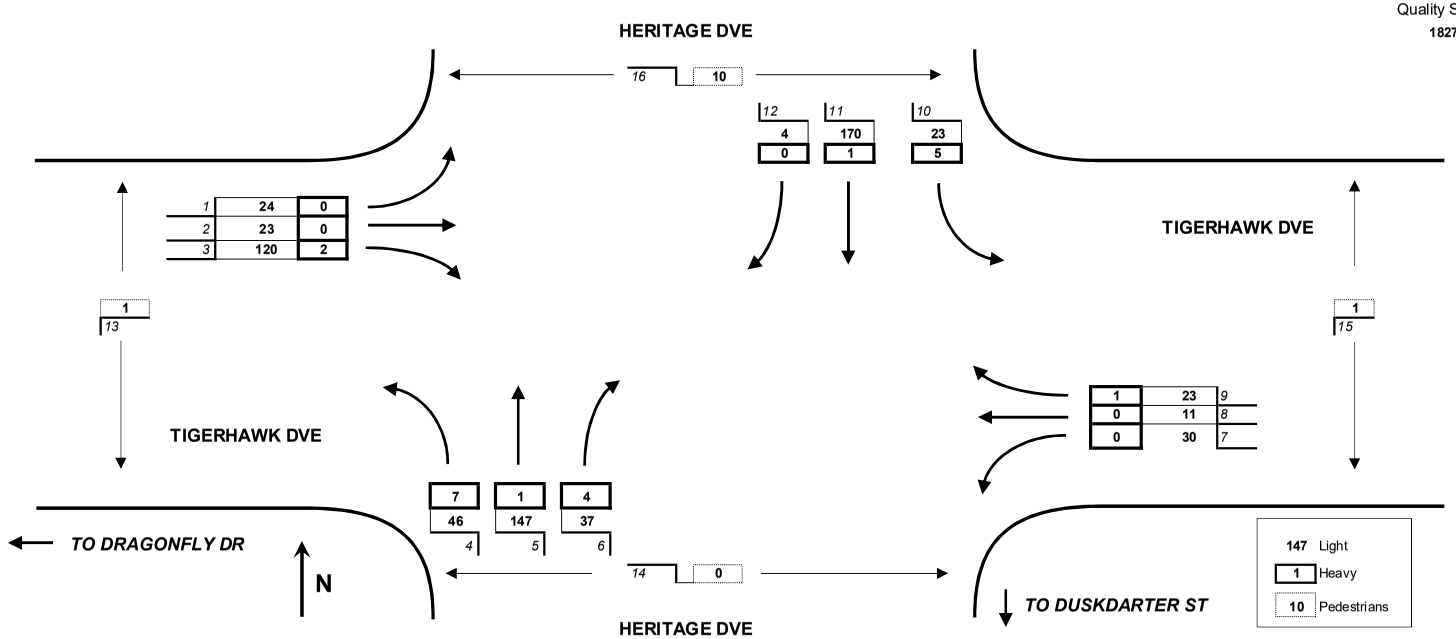
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - HERITAGE DVE / TIGERHAWK DVE, CHISHOLM

9:00 <<< HOUR ENDING **Thursday**

Summary:	HERITAGE DVE / TIGERHAWK DVE
658	Total Light Vehicles
21	Total Heavy Vehicles
12	Total Pedestrians

Quality Surveys
182790



22/3/2018 - HERITAGE DVE / TIGERHAWK DVE, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR		Pedestrians 13	14	15	16
07:15	0	0	22	7	12	3	0	0	0	0	12	0	56		0	1	0	0
07:30	0	1	22	8	12	2	1	2	1	1	14	0	64		2	0	0	6
07:45	2	0	35	2	7	0	1	1	0	3	16	0	67		0	0	0	3
08:00	1	3	25	10	12	4	0	0	0	1	13	1	70	257	1	0 <	0	0
08:15	3	6	38	15	30	11	2	4	2	5	9	0	125	326	1 <	0	0	4 <
08:30	9	12	30 <	9	41	11	13	3	6	7	68	1	210	472	0	0	0	2
08:45	11 <	5 <	26	10	55	9	13	2	11	8	61	3 <	214	619	0	0	0	4
09:00	1 <	0	26	12 <	21 <	6 <	2 <	2 <	4 <	3 <	32 <	0	109	658 <	0	0	1 <	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
07:15	0	0	1	1	2	1	0	0	0	0	0	0	5	
07:30	0	0	0	0	0	1	0	0	0	0	2	0	3	
07:45	0	0	0	0	0	2	0	0	0	0	0	0	2	
08:00	0	0	0	0	1 <	1 <	0	0	0	0	0 <	0	2	12
08:15	0	0	0	4	0	1 <	0	0	0	2	0 <	0	7	14
08:30	0	0	2 <	0	0	1 <	0	0	0	0	1	0	4	15
08:45	0	0	0 <	3 <	1	2 <	0	0	0	3 <	0	0	9	22 <
09:00	0	0	0 <	0 <	0	0	0	0	1 <	0 <	0	0	1	21

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
07:15	0	0	23	8	14	4	0	0	0	0	12	0	61	
07:30	0	1	22	8	12	3	1	2	1	1	16	0	67	
07:45	2	0	35	2	7	2	1	1	0	3	16	0	69	
08:00	1	3	25	10	13	5	0	0	0	1	13	1	72	269
08:15	3	6	38	19	30	12	2	4	2	7	9	0	132	340
08:30	9	12	32 <	9	41	12	13	3	6	7	69	1	214	487
08:45	11 <	5 <	26	13	56	11	13	2	11	11	61	3 <	223	641
09:00	1 <	0	26	12 <	21 <	6 <	2 <	2 <	5 <	3 <	32 <	0	110	679 <

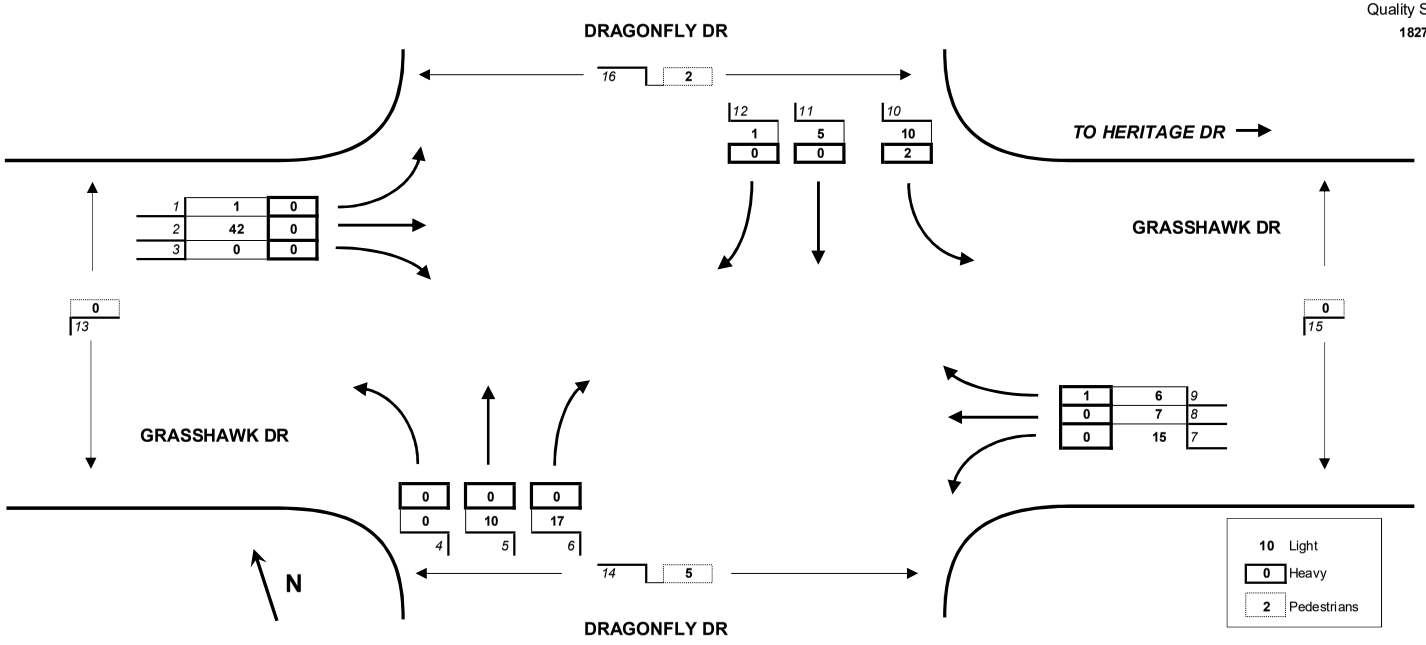
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - DRAGONFLY DR / GRASSHAWK DR, CHISHOLM

9:00 <<< HOUR ENDING **Thursday**

Summary:	DRAGONFLY DR / GRASSHAWK DR
114	Total Light Vehicles
3	Total Heavy Vehicles
7	Total Pedestrians

Quality Surveys
182790



22/3/2018 - DRAGONFLY DR / GRASSHAWK DR, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR		Pedestrians 13	14	15	16
07:15	0	2	0	0	0	2	0	1	2	4	1	0	12		0	0	0	0
07:30	1	5	0	0	0	2	1	2	1	1	0	1	14		0	0	0	3
07:45	0	14	0	0	0	3	0	0	0	3	0	1	21		0	0	0	0
08:00	1 <	5	0	0	0	3	1	3	0	2 <	0	0 <	15	62	0	1	0	1 <
08:15	0 <	13	0	0	2	6	5	1	2	2	0	0 <	31	81	0	2	0	0 <
08:30	0	11 <	0	0	6	6 <	2	0	1	3 <	2	0	31	98	0	3 <	0	0
08:45	1 <	12	0	0	2 <	3 <	3	5 <	2	3 <	2	1	34	111	0	0 <	0	2
09:00	0	6	0	0	0 <	2	5 <	1	1 <	2 <	1 <	0	18	114 <	0	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	1 <	0	0	0	1	1
08:30	0	0	0	0	0	0	0	0	0 <	2 <	0	0	2	3 <
08:45	0	0	0	0	0	0	0	0	0 <	0 <	0	0	0	3 <
09:00	0	0	0	0	0	0	0	0	0 <	0 <	0	0	0	3 <

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
07:15	0	2	0	0	0	2	0	1	2	4	1	0	12	
07:30	1	5	0	0	0	2	1	2	1	1	0	1	14	
07:45	0	14	0	0	0	3	0	0	0	3	0	1	21	
08:00	1 <	5	0	0	0	3	1	3	0	2	0	0 <	15	62
08:15	0 <	13	0	0	2	6	5	1	3	2	0	0 <	32	82
08:30	0	11 <	0	0	6	6 <	2	0	1	5 <	2	0	33	101
08:45	1 <	12	0	0	2 <	3 <	3	5 <	2	3 <	2	1	34	114
09:00	0	6	0	0	0 <	2	5 <	1	1 <	2 <	1 <	0	18	117 <

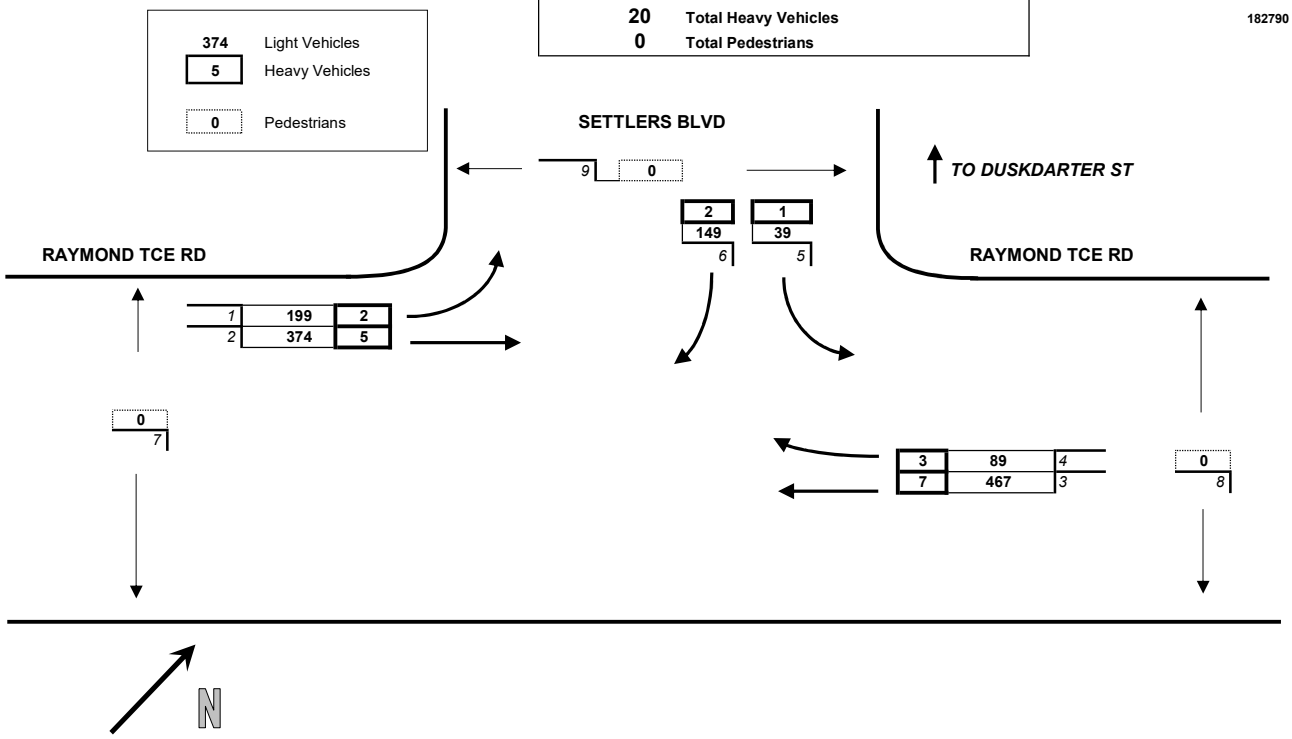
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

17:30 <<< HOUR ENDING **Thursday**

Quality Surveys
182790

Summary: RAYMOND TCE RD / SETTLERS BLVD	
1317	Total Light Vehicles
20	Total Heavy Vehicles
0	Total Pedestrians



22/3/2018 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	36	76	70	16	19	56	273	
15:30	47	104	81	21	9	52	314	
15:45	34	102	105	23	12	50	326	
16:00	51	107	105	18	9 <	34 <	324	1237
16:15	57	89	80	27	11	36	300	1264
16:30	28	105 <	111	26	7	32	309	1259
16:45	51	95	101	20	10	35	312	1245
17:00	44	103	104	26 <	9	33	319	1240
17:15	54	80	130	25	10	42	341	1281
17:30	50 <	96	132	18	10	39	345	1317 <
17:45	34	94	110 <	20	8	35	301	1306
18:00	48	66	94	21	8	32	269	1256

Pedestrians

	7	8	9
15:15	0	0	0
15:30	0	0	0
15:45	1	0	1
16:00	0 <	0	0 <
16:15	0 <	0	0 <
16:30	0 <	0	0 <
16:45	0	0	0
17:00	0	0	0
17:15	0	0	0
17:30	0	0	0
17:45	0	0	0
18:00	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	1	1	1	3	1	0	7	
15:30	2	3	3	0	2	2	12	
15:45	1	1	4	2	1	2	11	
16:00	2	3	2 <	0 <	0	1	8	38
16:15	4	1	0	0	2 <	0	7	38
16:30	4 <	3	1	2	2 <	3 <	15	41 <
16:45	1 <	2 <	3	1	0	2 <	9	39
17:00	0	1	2	1	0	0	4	35
17:15	1	1	1	0	1	0	4	32
17:30	0	1	1	1	0	0	3	20
17:45	0	1	0	0	0	1	2	13
18:00	0	1	2	0	0	0	3	12

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	37	77	71	19	20	56	280	
15:30	49	107	84	21	11	54	326	
15:45	35	103	109	25	13	52	337	
16:00	53	110	107	18	9 <	35 <	332	1275
16:15	61	90	80	27	13	36	307	1302
16:30	32	108 <	112	28	9	35	324	1300
16:45	52	97	104	21	10	37	321	1284
17:00	44	104	106	27 <	9	33	323	1275
17:15	55	81	131	25	11	42	345	1313
17:30	50 <	97	133	19	10	39	348	1337 <
17:45	34	95	110 <	20	8	36	303	1319
18:00	48	67	96	21	8	32	272	1268

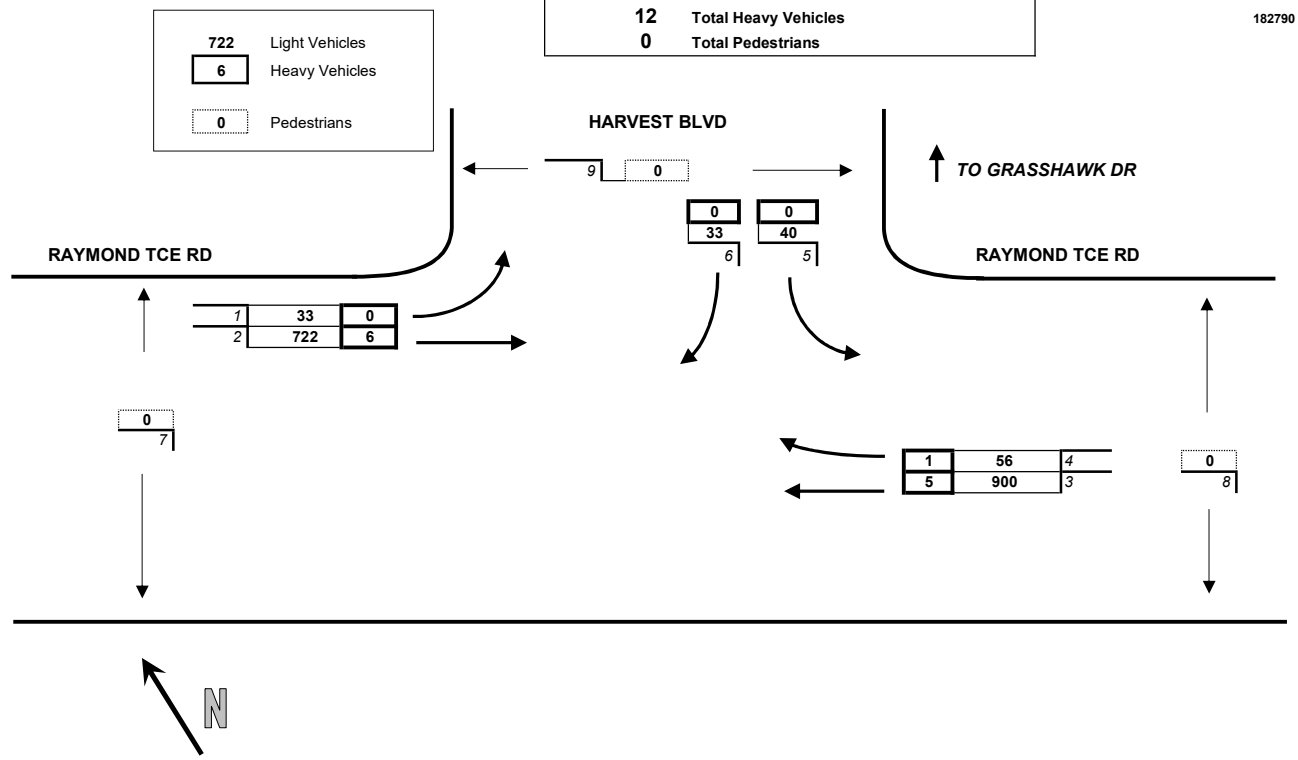
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - RAYMOND TCE RD / HARVEST BLVD, CHISHOLM

17:45 <<< HOUR ENDING **Thursday**

Quality Surveys
182790

Summary: RAYMOND TCE RD / HARVEST BLVD	
1784	Total Light Vehicles
12	Total Heavy Vehicles
0	Total Pedestrians



22/3/2018 - RAYMOND TCE RD / HARVEST BLVD, CHISHOLM

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
15:15	13	159	180	5	8	5	370		0	0	0
15:30	9	197	179	12	7	10	414		0	0	0
15:45	9	170	218	9	8	4	418		0	0	0
16:00	7 <	203	199	6	5	7	427	1629	0	1 <	0
16:15	11	178	186	16	10	4	405	1664	0	0 <	0
16:30	9	209	212	17	9	20	476	1726	0	0 <	0
16:45	4	182 <	194	9	14	3	406	1714	0	0 <	0
17:00	5	180	186	13	7	9	400	1687	0	0	0
17:15	11	165	251	17 <	11	7 <	462	1744	0	0	0
17:30	7	213	232	15	13 <	15	495	1763	0	0	0
17:45	10	164	231	11 <	9	2	427	1784 <	0	0	0
18:00	5	130	203 <	9	8	10	365	1749	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	0	4	3	0	0	0	7	
15:30	0	3	4	0	0	0	7	
15:45	0	2	8	0	1	0	11	
16:00	0	4	3 <	0	0	0	7	32
16:15	0	6	1	0	0	0	7	32
16:30	0	8	3	1	0	0	12	37 <
16:45	0	3 <	2	0	2 <	0	7	33
17:00	0	1	1	0	0 <	0	2	28
17:15	0	2	1	1 <	0 <	0	4	25
17:30	0	1	1	0	0 <	0	2	15
17:45	0	2	2	0	0	0	4	12
18:00	0	3	2	0	0	0	5	15

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	13	163	183	5	8	5	377	
15:30	9	200	183	12	7	10	421	
15:45	9	172	226	9	9	4	429	
16:00	7 <	207	202	6	5	7	434	1661
16:15	11	184	187	16	10	4	412	1696
16:30	9	217	215	18	9	20	488	1763
16:45	4	185 <	196	9	16	3	413	1747
17:00	5	181	187	13	7	9	402	1715
17:15	11	167	252	18 <	11	7 <	466	1769
17:30	7	214	233	15	13 <	15	497	1778
17:45	10	166	233	11	9	2	431	1796 <
18:00	5	133	205 <	9	8	10	370	1764

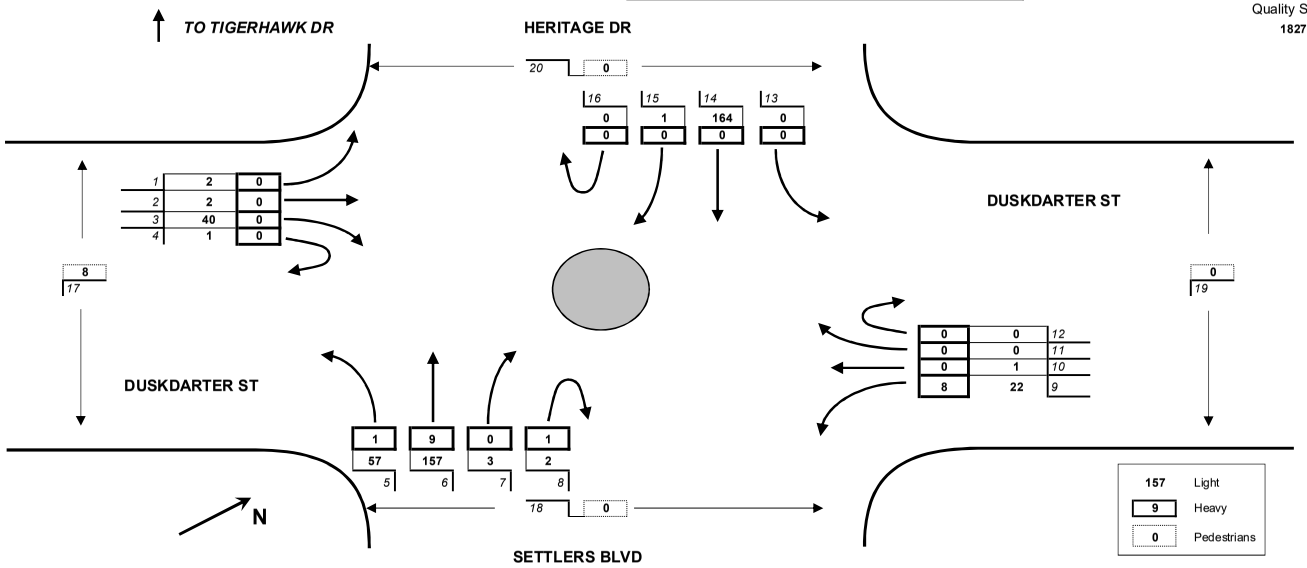
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - HERITAGE DR / DUSKDARTER ST, CHISHOLM

16:00 <<< HOUR ENDING Thursday

Summary:	HERITAGE DR / DUSKDARTER ST
452	Total Light Vehicles
19	Total Heavy Vehicles
8	Total Pedestrians

Quality Surveys
182790



22/3/2018 - HERITAGE DR / DUSKDARTER ST, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR	Pedestrians 17	18	19	20
15:15	0	0	11	0	10	38	0	0	8	0	0	0	0	51	0	0	118		0	0	0	0
15:30	1	0	10	0	17	47	0	1	3	1	0	0	0	43	0	0	123		7	0	0	0
15:45	1	2	9	1	17	31	3	1	7	0	0	0	0	42	1	0	115		1	0	0	0
16:00	0 <	0 <	10	0 <	13	41	0	0 <	4 <	0	0	0	0	28 <	0 <	0	96	452 <	0 <	0	0	0
16:15	0 <	0 <	0	0 <	24	54	0	0 <	4	1 <	0	0	0	32	0 <	0	115	449	0 <	1	0	0
16:30	0	0 <	6	0 <	16	41	0	0	1	0	0	0	0	29	0 <	0	93	419	0	0	0	0
16:45	1	0	10	0	16	45	1	1	4	0	0	0	0	26	0	0	104	408	4	0	0	0
17:00	1 <	0	20	0	22 <	45	1	0	3	0	0	0	0	29	0	0	121	433	2	1 <	0	0
17:15	0 <	0	9	0	17	55	1	0	5	0	0	0	0	36	0	0	123	441	0	0	0	0
17:30	0 <	0	10	0	14	45 <	1 <	0	4	0	0	0	0	30	0	0	104	452 <	0	0	0	0
17:45	1 <	0	19 <	0	10	43	1 <	0	1	0	0	0	0	23	0	0	98	446	0	0	0	0
18:00	0	0	12	0	16	46	0	0	1	0	0	0	0	28	0	0	103	428	0	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR
15:15	0	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0	5	
15:30	0	0	0	0	1	1	0	0	4	0	0	0	0	0	0	0	6	
15:45	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	6	
16:00	0	0	0	0	0 <	1	0	1	0	0	0	0	0	0	0	0	2	19
16:15	0	0	0	0	0 <	4	0	0	2 <	0	0	0	0	0	0	0	6	20
16:30	0	0	0	0	0	4 <	0	1 <	2	0	0	0	0	1 <	0	0	8	22 <
16:45	0	0	0	0	0	2	0	0 <	2	0	0	0	0	0 <	0	0	4	20
17:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0 <	0	0	1	19
17:15	0	0	0	0	0	1	0	0	1	0	0	0	0	0 <	0	0	2	15
17:30	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2	9
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR
15:15	0	0	11	0	10	42	0	0	9	0	0	0	0	51	0	0	123	
15:30	1	0	10	0	18	48	0	1	7	1	0	0	0	43	0	0	129	
15:45	1	2	9	1	17	34	3	1	10	0	0	0	0	42	1	0	121	
16:00	0 <	0 <	10	0 <	13	42	0	1 <	4 <	0	0	0	0	28 <	0 <	0	98	471 <
16:15	0 <	0 <	0	0 <	24	58	0	0 <	6	1 <	0	0	0	32	0 <	0	121	469
16:30	0	0 <	6	0 <	16	45	0	1 <	3	0	0	0	0	30	0 <	0	101	441
16:45	1	0	10	0	16	47	1	1 <	6	0	0	0	0	26	0	0	108	428
17:00	1 <	0	20	0	22 <	46 <	1	0	3	0	0	0	0	29	0	0	122	452
17:15	0 <	0	9	0	17	56	1	0	6	0	0	0	0	36	0	0	125	456
17:30	0 <	0	10	0	14	46	1 <	0	5	0	0	0	0	30	0	0	106	461
17:45	1 <	0	19 <	0	10	43	1 <	0	1	0	0	0	0	23	0	0	98	451
18:00	0	0	12	0	16	46	0	0	1	0	0	0	0	28	0	0	103	432

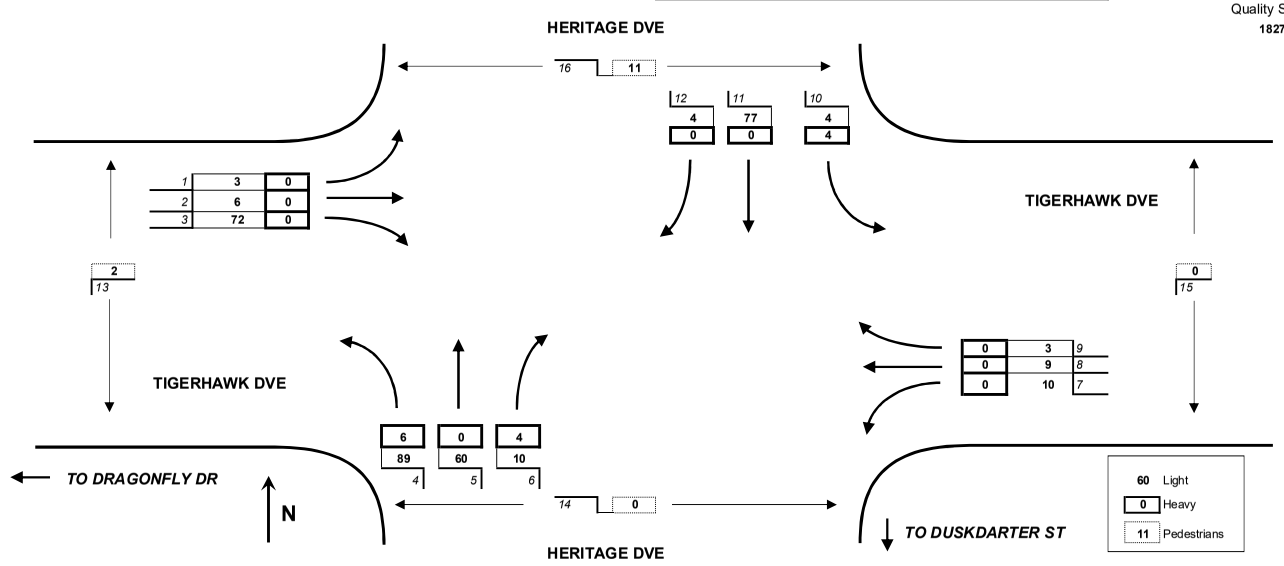
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - HERITAGE DVE / TIGERHAWK DVE, CHISHOLM

16:00 <<< HOUR ENDING **Thursday**

Summary:	HERITAGE DVE / TIGERHAWK DVE
347	Total Light Vehicles
14	Total Heavy Vehicles
13	Total Pedestrians

Quality Surveys
182790



22/3/2018 - HERITAGE DVE / TIGERHAWK DVE, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR		Pedestrians 13	14	15	16
15:15	2	0	31	21	17	0	4	0	0	2	17	2	96		0	0	0	1
15:30	0	3	13	30	12	3	1	2	0	0	26	1	91		2	0	0	5
15:45	1	2	19	14	15	5	3	5	3	1	18	0	86		0	0	0	5
16:00	0 <	1	9	24	16	2	2 <	2 <	0	1	16 <	1 <	74	347 <	0	0	0	0 <
16:15	0	0	24	32	20	2 <	0	0 <	1	0	9	1	89	340	0	0	0	1 <
16:30	1	3	13	25	15 <	2	0	2 <	1 <	1	21	0	84	333	0	0	0	3
16:45	0	2	10	30	13	2	2	1	1	1	13	0	75	322	1	0	0	2
17:00	0	0	19	27	15	3	1	2	1	3	7	1	79	327	2 <	0	0	2
17:15	0	1	24	34	21	2	2	2	2 <	2 <	9	0	99	337	0 <	0	0	1
17:30	0	4 <	18	32 <	9	1	2	2	1 <	1 <	12	1	83	336	0 <	0	0	1
17:45	1	0	21 <	26	14	2	0	2	0	0	6	0	72	333	0	1 <	0	0
18:00	0	1	16	23	21	1	0	2	1	1	8	0	74	328	0	0 <	0	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
15:15	0	0	0	5	0	1	0	0	0	0	0	0	6	
15:30	0	0	0	0	0	1	0	0	0	3	0	0	4	
15:45	0	0	0	1	0	2	0	0	0	1	0	0	4	
16:00	0	0	0	0 <	0	0	0	0	0	0 <	0	0	0	14 <
16:15	0	0	0	2	0	2	0	0	0	0 <	0	0	4	12
16:30	0	0	1 <	1	1 <	2 <	0	0	0	0	0	0	5	13
16:45	0	0	0 <	0	0 <	2 <	0	0	0	0	0	0	2	11
17:00	0	0	0 <	1	0 <	0 <	0	0	0	0	0	0	1	12
17:15	0	0	0 <	0	0 <	1	0	0	0	0	0	0	1	9
17:30	0	0	0	0	0	1	0	0	0	0	0	0	1	5
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	3
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
15:15	2	0	31	26	17	1	4	0	0	2	17	2	102	
15:30	0	3	13	30	12	4	1	2	0	3	26	1	95	
15:45	1	2	19	15	15	7	3	5	3	2	18	0	90	
16:00	0 <	1	9	24	16	2	2 <	2 <	0	1 <	16 <	1 <	74	361 <
16:15	0	0	24	34	20	4 <	0	0 <	1	0	9	1	93	352
16:30	1	3	14	26	16 <	4 <	0	2 <	1 <	1	21	0	89	346
16:45	0	2	10	30	13	4	2	1	1	1	13	0	77	333
17:00	0	0	19	28	15	3	1	2	1	3	7	1	80	339
17:15	0	1	24	34	21	3	2	2	2 <	2	9	0	100	346
17:30	0	4 <	18	32 <	9	2	2	2	1 <	1	12	1	84	341
17:45	1	0	21 <	26	14	2	0	2	0	0	6	0	72	336
18:00	0	1	16	23	21	1	0	2	1	1	8	0	74	330

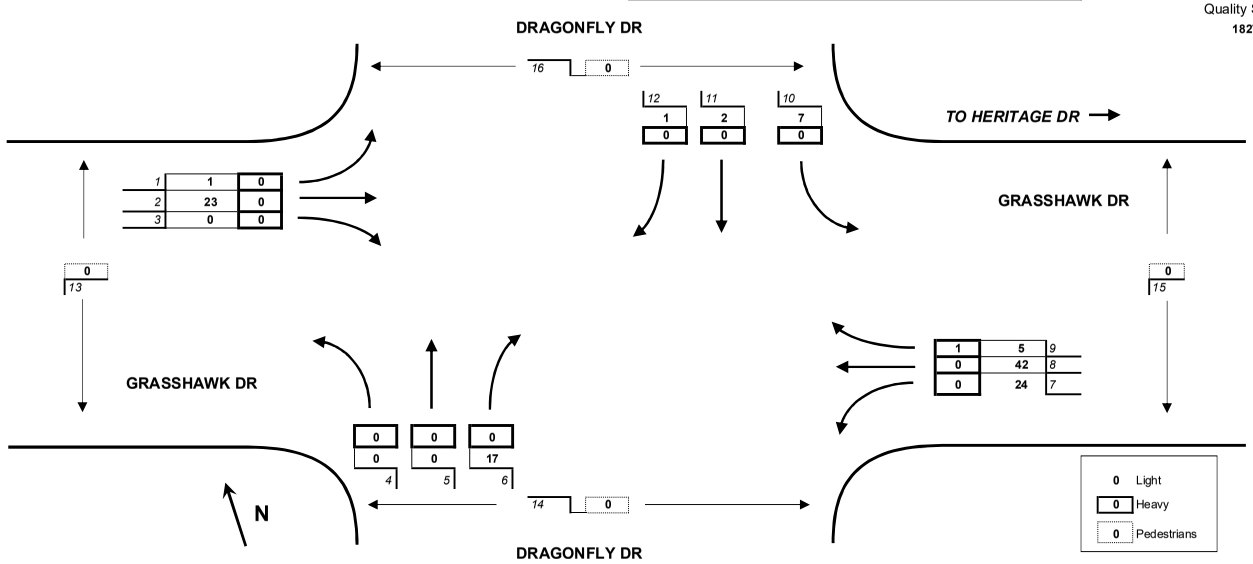
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/3/2018 - DRAGONFLY DR / GRASSHAWK DR, CHISHOLM

17:45 <<< HOUR ENDING **Thursday**

Summary:	DRAGONFLY DR / GRASSHAWK DR
122	Total Light Vehicles
1	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182790



22/3/2018 - DRAGONFLY DR / GRASSHAWK DR, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR		Pedestrians 13	14	15	16
15:15	3	4	0	0	1	9	4	7	2	2	1	0	33		0	0	0	0
15:30	0	7	1	0	1	3	6	13	1	0	0	0	32		0	0	0	0
15:45	0	4	0	0	0	2	5	2	4	3	0	0	20		0	0	0	0
16:00	0 <	5	0 <	0	1 <	2	5	6	3	2	1	0	25	110	0	0	1 <	0
16:15	1	1	0 <	0	1 <	3	6	9	3	3	1	1	29	106	0	0	0 <	1
16:30	0	3	0	0	0	4	3	8	3 <	4 <	2	0	27	101	0	0	0 <	0
16:45	0	1	0	0	1 <	5	7	9	3	0	1 <	2 <	29	110	0	1 <	0 <	3 <
17:00	0	8	0	0	0	2	6	9	0	0	0	0 <	25	110	0	0 <	0	0 <
17:15	1	3	0	0	0	5	6	6	2	4	1	0	28	109	0	0 <	0	0
17:30	0	4	0	0	0	7 <	6 <	18 <	1	0	1	1 <	38	120	0	0 <	0	0
17:45	0	8 <	0	0	0	3	6	9 <	2	3	0	0	31	122 <	0	0	0	0
18:00	0	5	0	0	0	4 <	4	9 <	0	1	0	0	23	120	0	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	1 <	0	0	0	0	1	1
16:30	0	0	0	0	0	0	0	0 <	0	0	0	0	0	1
16:45	0	0	0	0	0	0	0	0 <	0	0	0	0	0	1
17:00	0	0	0	0	0	0	0	0 <	1 <	0	0	0	1	2 <
17:15	0	0	0	0	0	0	0	0	0 <	0	0	0	0	1
17:30	0	0	0	0	0	0	0	0	0 <	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0 <	0	0	0	0	1
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
15:15	3	4	0	0	1	9	4	7	2	2	1	0	33	
15:30	0	7	1	0	1	3	6	13	1	0	0	0	32	
15:45	0	4	0	0	0	2	5	2	4	3	0	0	20	
16:00	0 <	5	0 <	0	1 <	2	5	6	3	2	1	0	25	110
16:15	1	1	0 <	0	1 <	3	6	10	3	3	1	1	30	107
16:30	0	3	0	0	0	4	3	8	3 <	4 <	2	0	27	102
16:45	0	1	0	0	1 <	5	7	9	3	0	1 <	2 <	29	111
17:00	0	8	0	0	0	2	6	9	1	0	0	0 <	26	112
17:15	1	3	0	0	0	5	6	6	2	4	1	0	28	110
17:30	0	4	0	0	0	7 <	6 <	18 <	1	0	1	1 <	38	121
17:45	0	8 <	0	0	0	3	6	9 <	2	3	0	0	31	123 <
18:00	0	5	0	0	0	4 <	4	9 <	0	1	0	0	23	120

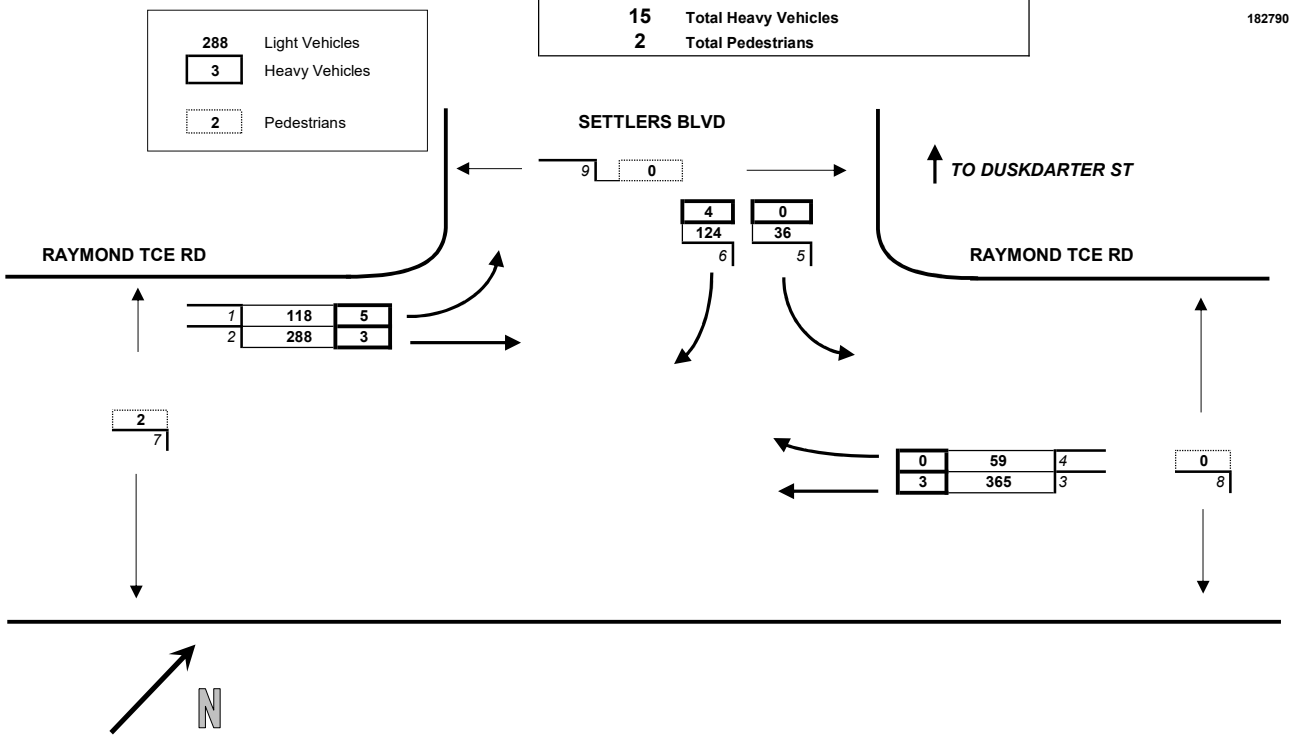
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

24/3/2018 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

12:00 <<< HOUR ENDING **Saturday**

Summary: RAYMOND TCE RD / SETTLERS BLVD	
990	Total Light Vehicles
15	Total Heavy Vehicles
2	Total Pedestrians

Quality Surveys
182790



24/3/2018 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
10:15	24	58	76	4	4	38	204		0	0	0
10:30	22	69	96	4	13	35	239		0	0	0
10:45	27	62	89	10	3	34	225		0	0	0
11:00	19	70	78	7	7	31 <	212	880	0	0	0
11:15	27	65	95	15	10	29	241	917	0	0	0
11:30	27	88	97	17	11	26	266	944	0	0	0
11:45	23	65	93	11	10 <	32	234	953	0	0	0
12:00	41	70	80 <	16 <	5	37	249	990 <	2 <	0	0
12:15	40	64	92	8	6	25	235	984	0 <	0	0
12:30	37	76	76	16	4	26	235	953	0 <	0	0
12:45	29 <	80 <	96	13	7	35	260	979	0 <	0	0
13:00	28	63	83	8	11	30	223	953	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
10:15	0	2	0	0	0	1	3	
10:30	0	0	2	0	0	2	4	
10:45	1	0	3	0	0	0	4	
11:00	1	1	0 <	0	0	0	2	13
11:15	0	0	0 <	0	0	1	1	11
11:30	1	1	1	0	0	0	3	10
11:45	1	1	1	0	0	0	3	9
12:00	3 <	1	1	0	0	3 <	8	15
12:15	0 <	1	1	0	0	1 <	3	17
12:30	0	2 <	2 <	0	0	0 <	4	18 <
12:45	0	0	1 <	0	1 <	0 <	2	17
13:00	0	0	0	0	0 <	1	1	10

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
10:15	24	60	76	4	4	39	207	
10:30	22	69	98	4	13	37	243	
10:45	28	62	92	10	3	34	229	
11:00	20	71	78	7	7	31 <	214	893
11:15	27	65	95	15	10	30	242	928
11:30	28	89	98	17	11	26	269	954
11:45	24	66	94	11	10 <	32	237	962
12:00	44	71	81 <	16 <	5	40	257	1005 <
12:15	40	65	93	8	6	26	238	1001
12:30	37	78	78	16	4	26	239	971
12:45	29 <	80 <	97	13	8	35	262	996
13:00	28	63	83	8	11	31	224	963

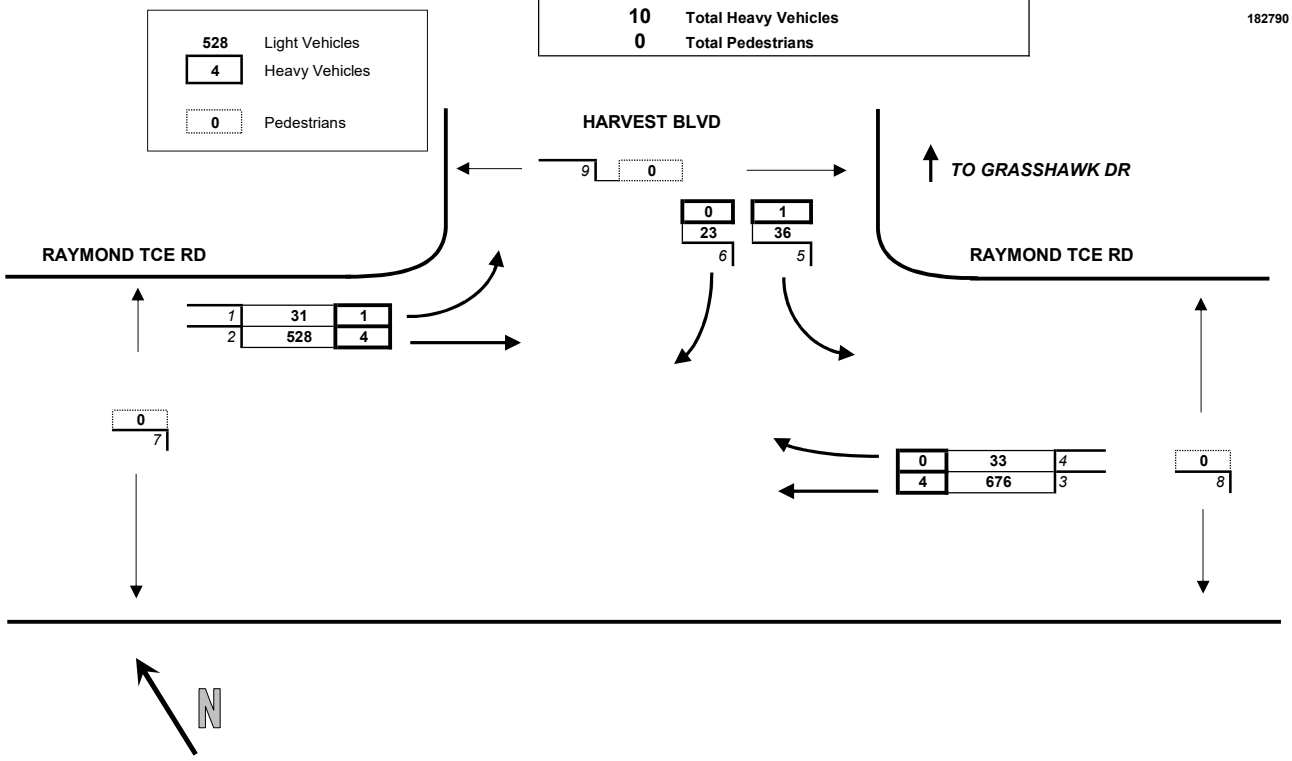
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

24/3/2018 - RAYMOND TCE RD / HARVEST BLVD, CHISHOLM

11:45 <<< HOUR ENDING **Saturday**

Summary: RAYMOND TCE RD / HARVEST BLVD	
1327	Total Light Vehicles
10	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182790



24/3/2018 - RAYMOND TCE RD / HARVEST BLVD, CHISHOLM

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
10:15	8	116	160	9	7	9	309		0	0	0
10:30	5	141	173	8	7	6	340		0	0	0
10:45	5	127	150	6	5	8	301		0	0	0
11:00	11	114	172	9	13	4	323	1273	0	0	0
11:15	4	129	173	9	8	9	332	1296	0	0	0
11:30	4	147	161	10	9	7	338	1294	0	0	0
11:45	12	138	170 <	5	6	3	334	1327 <	0	0	0
12:00	13	133	144	6	14 <	7	317	1321	0	0	0
12:15	5	142	159	12	2	3	323	1312	0	0	0
12:30	8 <	149 <	153	9	11	12	342	1316	0	0	1 <
12:45	2	133	149	11 <	8	9 <	312	1294	0	0	0 <
13:00	11	132	174	5	11	5	338	1315	0	0	0 <

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
10:15	1	1	0	0	0	0	2	
10:30	0	0	3	0	0	0	3	
10:45	0	1	3	0	0	0	4	
11:00	1 <	1	1	0	0	0	3	12
11:15	0	0	1 <	0	0	0	1	11
11:30	0	1	1	0	1 <	0	3	11
11:45	0	2	1	0	0 <	0	3	10
12:00	0	1	1	1	0 <	0	3	10
12:15	0	2 <	4	1	0 <	0	7	16
12:30	0	1 <	2 <	1 <	0	0	4	17 <
12:45	0	0	1 <	0 <	1 <	0	2	16
13:00	0	1	0	0	0 <	0	1	14

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
10:15	9	117	160	9	7	9	311	
10:30	5	141	176	8	7	6	343	
10:45	5	128	153	6	5	8	305	
11:00	12	115	173	9	13	4	326	1285
11:15	4	129	174	9	8	9	333	1307
11:30	4	148	162	10	10	7	341	1305
11:45	12	140	171 <	5	6	3	337	1337 <
12:00	13	134	145	7	14 <	7	320	1331
12:15	5	144	163	13	2	3	330	1328
12:30	8 <	150 <	155	10	11	12	346	1333
12:45	2	133	150	11 <	9	9 <	314	1310
13:00	11	133	174	5	11	5	339	1329

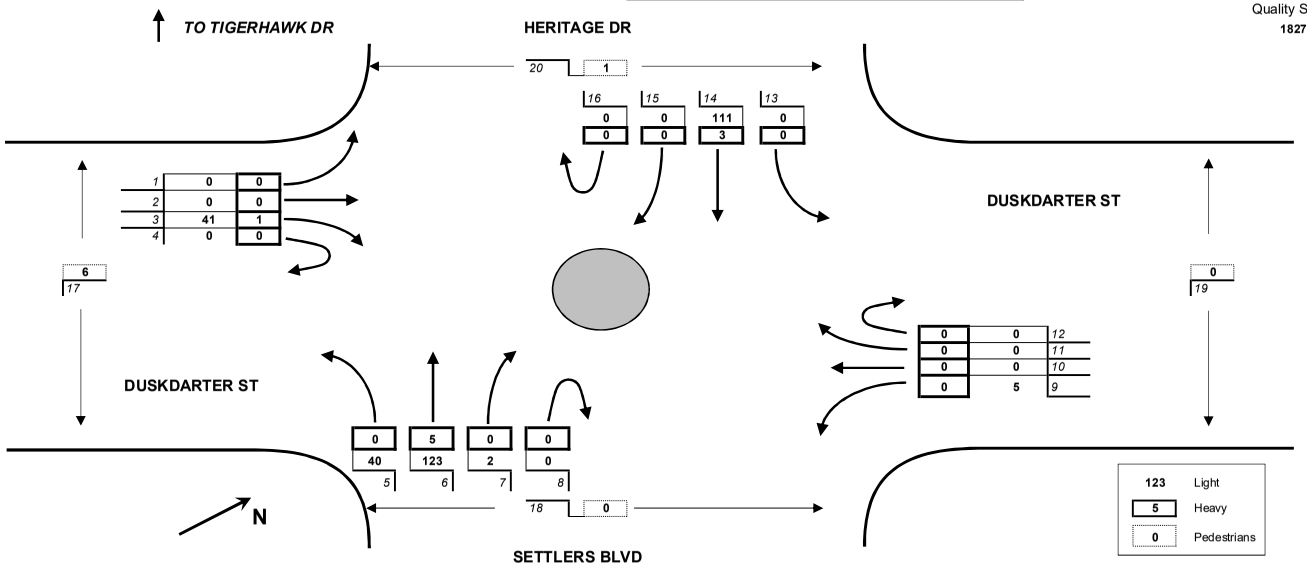
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

24/3/2018 - HERITAGE DR / DUSKDARTER ST, CHISHOLM

12:00 <<< HOUR ENDING **Saturday**

Summary:	HERITAGE DR / DUSKDARTER ST
322	Total Light Vehicles
9	Total Heavy Vehicles
7	Total Pedestrians

Quality Surveys
182790



24/3/2018 - HERITAGE DR / DUSKDARTER ST, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR	Pedestrians 17	18	19	20
10:15	0	0	14	0	6	20	0	0	0	0	0	0	0	28	0	0	68		0	0	0	1
10:30	0	0	13	0	7	16	2	2	2	0	0	0	0	28	0	0	70		2	1	1	0
10:45	0	0	14	0	12	20	2	1	0	1	0	0	0	20	0	0	70		0	0	0	0
11:00	0	0	7 <	0	6	19	1	0 <	1	0	0	0	0	25	0	0	59	267	0	0 <	0 <	0 <
11:15	0	0	9	0	12	23	1 <	0 <	2 <	0	0	0	0	28	0	0	75	274	5 <	0 <	0 <	1 <
11:30	0	0	12	0	9	32	0	0	2 <	0	0	0	0	23	0	0	78	282	0	0	0	0 <
11:45	0	0	15	0	5	32	0	0	0 <	0	0	0	0	27	0	0	79	291	1	0	0	0 <
12:00	0	0	5	0	14	36	1	0	1 <	0	0	0	0	33 <	0	0	90	322 <	0	0	0	0 <
12:15	0	0	6	0	8	36	0	0	0	2 <	0	0	0	21	0	0	73	320	1	0	0	0
12:30	0	0	6	0	11	34 <	0	0	1	0 <	0	0	0	20	0	0	72	314	0	0	0	0
12:45	0	0	8	0	12 <	28	1	1	0	0 <	0	0	0	36	0	0	86	321	0	0	0	0
13:00	0	0	7	0	8	26	2	0	3	0 <	0	0	1 <	28	0	0	75	306	0	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR
10:15	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	3	
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
11:00	0	0	0	0	1 <	0	0	0	0 <	0	0	0	0	0	0	0	1	5
11:15	0	0	0	0	0 <	0	0	0	0	0	0	0	0	1	0	0	1	3
11:30	0	0	0	0	0 <	1	0	0	0	0	0	0	0	0	0	0	1	4
11:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	4
12:00	0	0	1 <	0	0	3 <	0	0	0	0	0	0	0	2	0	0	6	9 <
12:15	0	0	0 <	0	0	0 <	0	0	0	0	0	0	0	1	0	0	1	9 <
12:30	0	0	0 <	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
12:45	0	0	0 <	0	0	0	0	0	0	0	0	0	0	1 <	0	0	1	8
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total Vehicles 15 MIN	Total Vehicles HOUR
10:15	0	0	14	0	6	20	0	0	1	0	0	0	0	30	0	0	71	
10:30	0	0	13	0	7	16	2	2	2	0	0	0	0	28	0	0	70	
10:45	0	0	14	0	13	20	2	1	0	1	0	0	0	20	0	0	71	
11:00	0	0	7 <	0	7	19	1	0 <	1	0	0	0	0	25	0	0	60	272
11:15	0	0	9	0	12	23	1 <	0 <	2 <	0	0	0	0	29	0	0	76	277
11:30	0	0	12	0	9	33	0	0	2 <	0	0	0	0	23	0	0	79	286
11:45	0	0	15	0	5	33	0	0	0 <	0	0	0	0	27	0	0	80	295
12:00	0	0	6	0	14	39	1	0	1 <	0	0	0	0	35 <	0	0	96	331 <
12:15	0	0	6	0	8	36	0	0	0	2 <	0	0	0	22	0	0	74	329
12:30	0	0	6	0	11	34 <	0	0	1	0 <	0	0	0	20	0	0	72	322
12:45	0	0	8	0	12 <	28	1	1	0	0 <	0	0	0	37 <	0	0	87	329
13:00	0	0	7	0	8	26	2	0	3	0 <	0	0	1 <	29	0	0	76	309

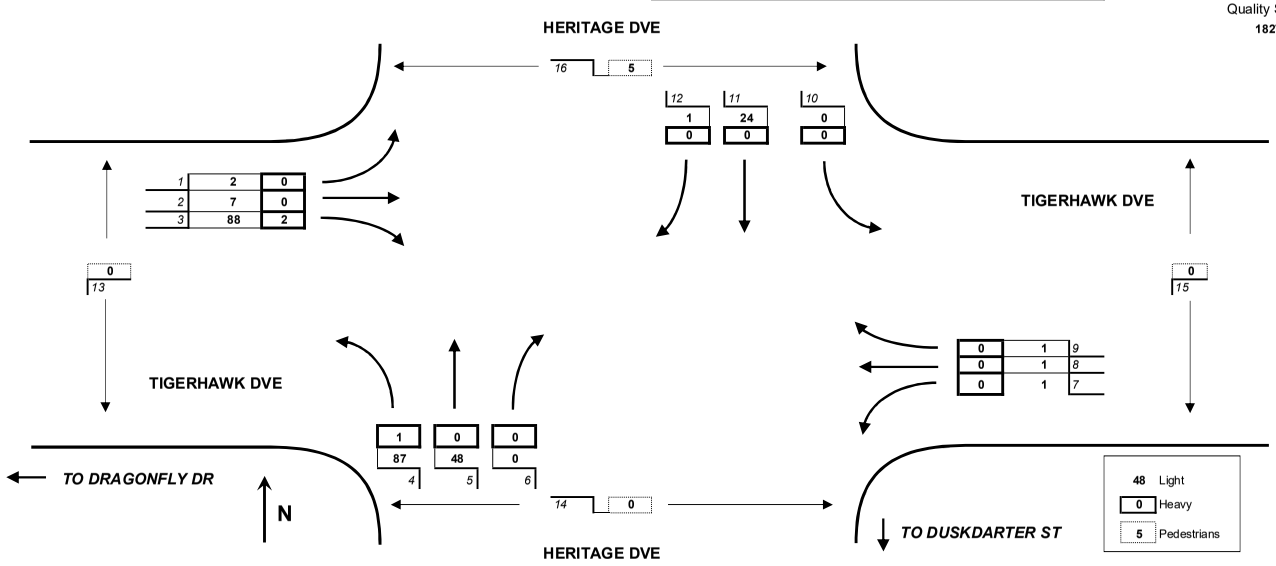
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

24/3/2018 - HERITAGE DVE / TIGERHAWK DVE, CHISHOLM

12:45 <<< HOUR ENDING **Saturday**

Summary:	HERITAGE DVE / TIGERHAWK DVE
260	Total Light Vehicles
3	Total Heavy Vehicles
5	Total Pedestrians

Quality Surveys
182790



24/3/2018 - HERITAGE DVE / TIGERHAWK DVE, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR		Pedestrians 13	14	15	16
10:15	0	1	15	13	8	0	0	1	0	0	11	0	49		1	0	0	1
10:30	0	2	20	11	5	0	1	1	1	1	7	0	49		0	0	0	1
10:45	0	0	18	13	7	0	0	1	0	0	5	1	45		0	0	0	0
11:00	1	0	21	14	5	0	0 <	0 <	0	1	3	0 <	45	188	0 <	0	0	0
11:15	0	1	21	20	3	0	0 <	0	1 <	1 <	7	0 <	54	193	1 <	0	0	0
11:30	0	1	16	26	6	0	0	0	0	0	7	0 <	56	200	0 <	0	0	1
11:45	0	1	23	21	11	0	1 <	0	0	0	2	0	59	214	0 <	0	0	0
12:00	1	3	32 <	24	13	0	0 <	0	1 <	0	6	0	80	249	0 <	0	0	2
12:15	1 <	2 <	15	28 <	8	0	0 <	1	0	0	3	1 <	59	254	0	0	0	3 <
12:30	0 <	1 <	15	21	13	0	0 <	0	0	0	5	0 <	55	253	0	0	0	0
12:45	0 <	1 <	26	14	14 <	0	1 <	0	0	0	10	0 <	66	260 <	0	0	0	0
13:00	0	2	23	17	9	0	0 <	1	2 <	0	9 <	0 <	63	243	0	0	0	2

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
10:15	0	1	1	0	0	0	0	0	0	0	0	0	2	
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00	0	0 <	0	0	0	0	0	0	0	0	0	0	0	2
11:15	0	0	1	0	0	0	0	0	0	0	0	0	1	1
11:30	0	0	0	1	0	0	0	0	0	0	0	0	1	2
11:45	0	0	0	1	0	0	0	0	0	0	0	0	1	3
12:00	0	0	1 <	1 <	0	0	0	0	0	0	0	0	2	5 <
12:15	0	0	0	0 <	0	0	0	0	0	0	0	0	0	4
12:30	0	0	1 <	0	0	0	0	0	0	0	0	0	1	4
12:45	0	0	0 <	0	0	0	0	0	0	0	0	0	0	3
13:00	0	0	0	0	0	0	0	0	0	0	1 <	0	1	2

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
10:15	0	2	16	13	8	0	0	1	0	0	11	0	51	
10:30	0	2	20	11	5	0	1	1	1	1	7	0	49	
10:45	0	0	18	13	7	0	0	1	0	0	5	1	45	
11:00	1	0	21	14	5	0	0 <	0 <	0	1	3	0 <	45	190
11:15	0	1	22	20	3	0	0 <	0	1 <	1 <	7	0 <	55	194
11:30	0	1	16	27	6	0	0	0	0	0	7	0 <	57	202
11:45	0	1	23	22	11	0	1 <	0	0	0	2	0	60	217
12:00	1	3	33 <	25	13	0	0 <	0	1 <	0	6	0	82	254
12:15	1 <	2 <	15	28 <	8	0	0 <	1	0	0	3	1 <	59	258
12:30	0 <	1 <	16	21	13	0	0 <	0	0	0	5	0 <	56	257
12:45	0 <	1 <	26	14	14 <	0	1 <	0	0	0	10	0 <	66	263 <
13:00	0	2	23	17	9	0	0 <	1	2 <	0	10 <	0 <	64	245

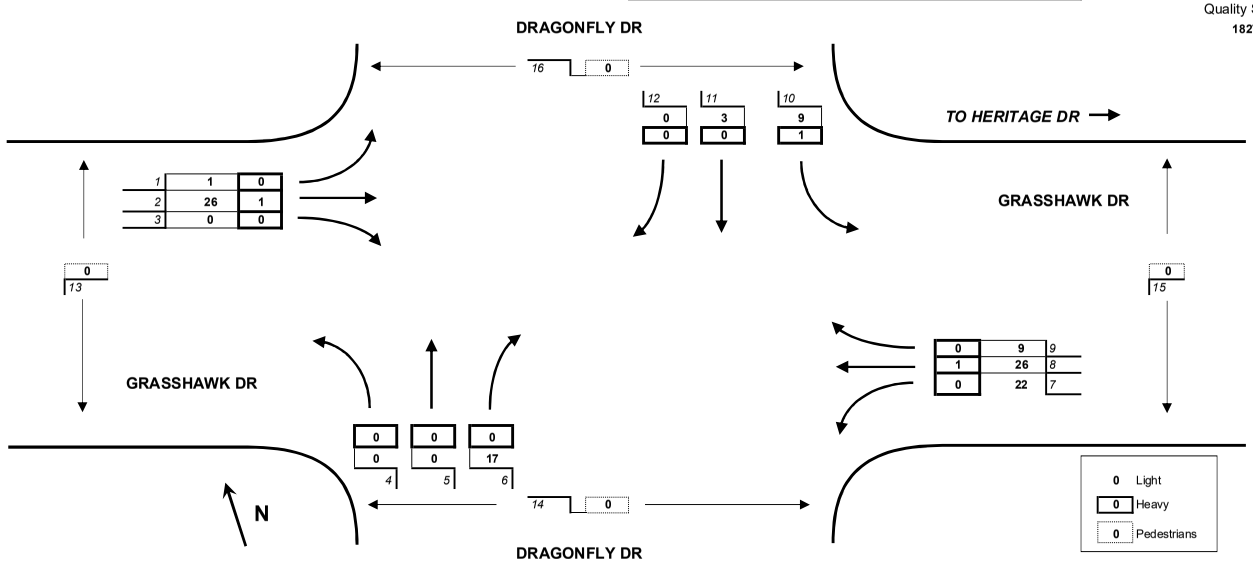
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

24/3/2018 - DRAGONFLY DR / GRASSHAWK DR, CHISHOLM

12:30 <<< HOUR ENDING **Saturday**

Summary:	DRAGONFLY DR / GRASSHAWK DR
113	Total Light Vehicles
3	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182790



24/3/2018 - DRAGONFLY DR / GRASSHAWK DR, CHISHOLM

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR		Pedestrians 13	14	15	16
10:15	0	4	0	0	1	1	1	5	4	5	0	0	21		0	0	0	0
10:30	0	9	0	0	0	2	3	4	0	3	1	0	22		1	0	0	0
10:45	0	4	0	0	0	2	0	4	1	2	0	0	13		0	0	0	0
11:00	0	5	0	0	1	5	1	2	0	1 <	0	0	15	71	0	0	1	0
11:15	0	7	0	0	0	7	5	6	1	1	0	1	28	78	1 <	0	0	0
11:30	0	6	0	0	1	1	1	8	0	1	0	0	18	74	0	0	1 <	1 <
11:45	0	9	0	0	0	5	6	5	2	3	0	0	30	91	0	0	0 <	0 <
12:00	0	9 <	0	0	0	5	6	6	2	4	0	0	32	108	0	0	0	0 <
12:15	0	1	0	0	0	5	4	8 <	2	2	3	0	25	105	0	0	0	0 <
12:30	1	7	0	0	0	2	6 <	7	3 <	0	0	0	26	113 <	0	0	0	0
12:45	1	4	0	0	1	3	2	6 <	0	2	3	1	23	106	0	0	0	1 <
13:00	1 <	6	0	1 <	2 <	12 <	10 <	1	1	1	2 <	1 <	38	112	0	0	0	0 <

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
10:15	0	1	0	0	0	0	0	0	0	0	1	0	2	
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00	0	0 <	0	0	0	0	0	0	1 <	0	0 <	0	1	3 <
11:15	0	0	0	0	0	0	0	0	0 <	0	0	0	0	1
11:30	0	0	0	0	0	0	0	1	0 <	0	0	0	1	2
11:45	0	0	0	0	0	0	0	0	0 <	0	0	0	0	2
12:00	0	0	0	0	0	0	0	1 <	0	1 <	0	0	2	3 <
12:15	0	0	0	0	0	0	0	0 <	0	0 <	0	0	0	3 <
12:30	0	1 <	0	0	0	0	0	0	0	0 <	0	0	1	3 <
12:45	0	0 <	0	0	0	0	0	0	0	0 <	0	0	0	3 <
13:00	0	0 <	0	0	0	0	0	0	0	0	0	0	0	1

All Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN HOUR	
10:15	0	5	0	0	1	1	1	5	4	5	1	0	23	
10:30	0	9	0	0	0	2	3	4	0	3	1	0	22	
10:45	0	4	0	0	0	2	0	4	1	2	0	0	13	
11:00	0	5	0	0	1	5	1	2	1	1 <	0	0	16	74
11:15	0	7	0	0	0	7	5	6	1	1	0	1	28	79
11:30	0	6	0	0	1	1	1	9	0	1	0	0	19	76
11:45	0	9	0	0	0	5	6	5	2	3	0	0	30	93
12:00	0	9 <	0	0	0	5	6	7	2	5	0	0	34	111
12:15	0	1	0	0	0	5	4	8 <	2	2 <	3	0	25	108
12:30	1	8	0	0	0	2	6 <	7	3 <	0	0	0	27	116 <
12:45	1	4	0	0	1	3	2	6	0	2	3	1	23	109
13:00	1 <	6	0	1 <	2 <	12 <	10 <	1	1	1	2 <	1 <	38	113

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

ANNEXURE C: SIDRA RESULTS
(45 SHEETS)

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018] AM (Site Folder: Existing 2018 Volumes)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]
AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	426	12	448	2.8	0.252	12.1	LOS A	5.4	38.5	0.59	0.49	0.59	50.5
6	R2	141	5	148	3.5	* 0.437	37.6	LOS C	5.3	38.3	0.93	0.79	0.93	36.4
Approach		567	17	597	3.0	0.437	18.4	LOS B	5.4	38.5	0.67	0.57	0.67	46.0
North: Settlers Boulevarde (N)														
7	L2	125	4	132	3.2	0.380	27.2	LOS B	7.0	50.4	0.80	0.79	0.80	40.8
9	R2	351	8	369	2.3	* 0.461	29.3	LOS C	8.4	59.8	0.84	0.80	0.84	40.1
Approach		476	12	501	2.5	0.461	28.7	LOS C	8.4	59.8	0.83	0.79	0.83	40.3
West: Raymond Terrace Road (W)														
10	L2	181	9	191	5.0	0.106	6.0	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
11	T1	298	13	314	4.4	* 0.461	27.4	LOS B	7.4	53.6	0.88	0.72	0.88	41.4
Approach		479	22	504	4.6	0.461	19.3	LOS B	7.4	53.6	0.54	0.64	0.54	45.7
All Vehicles		1522	51	1602	3.4	0.461	21.9	LOS B	8.4	59.8	0.68	0.66	0.68	44.0

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018] PM (Site Folder: Existing 2018 Volumes)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]
PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	474	7	499	1.5	0.219	6.4	LOS A	4.3	30.6	0.43	0.36	0.43	54.6
6	R2	92	3	97	3.3	* 0.328	38.7	LOS C	3.5	25.0	0.93	0.77	0.93	36.0
Approach		566	10	596	1.8	0.328	11.6	LOS A	4.3	30.6	0.51	0.43	0.51	50.4
North: Settlers Boulevarde (N)														
7	L2	40	1	42	2.5	0.269	36.0	LOS C	3.3	23.1	0.89	0.76	0.89	37.2
9	R2	151	2	159	1.3	* 0.327	37.3	LOS C	3.7	26.3	0.91	0.77	0.91	36.8
Approach		191	3	201	1.6	0.327	37.0	LOS C	3.7	26.3	0.90	0.77	0.90	36.9
West: Raymond Terrace Road (W)														
10	L2	201	2	212	1.0	0.115	5.8	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
11	T1	379	5	399	1.3	* 0.348	17.1	LOS B	7.5	52.8	0.71	0.59	0.71	47.0
Approach		580	7	611	1.2	0.348	13.2	LOS A	7.5	52.8	0.46	0.57	0.46	49.5
All Vehicles		1337	20	1407	1.5	0.348	15.9	LOS B	7.5	52.8	0.55	0.54	0.55	47.5

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018] Weekend (Site Folder: Existing 2018 Volumes)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]
Weekend Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	368	3	387	0.8	0.173	6.5	LOS A	3.3	23.6	0.43	0.36	0.43	54.5
6	R2	59	0	62	0.0	* 0.243	40.0	LOS C	2.3	15.8	0.93	0.75	0.93	35.6
Approach		427	3	449	0.7	0.243	11.1	LOS A	3.3	23.6	0.50	0.41	0.50	50.8
North: Settlers Boulevarde (N)														
7	L2	36	0	38	0.0	0.217	34.6	LOS C	2.7	19.4	0.86	0.75	0.86	37.8
9	R2	128	4	135	3.1	* 0.263	35.9	LOS C	3.1	22.1	0.88	0.76	0.88	37.3
Approach		164	4	173	2.4	0.263	35.6	LOS C	3.1	22.1	0.88	0.76	0.88	37.4
West: Raymond Terrace Road (W)														
10	L2	123	5	129	4.1	0.072	5.8	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	291	3	306	1.0	* 0.259	15.7	LOS B	5.4	37.9	0.67	0.55	0.67	47.8
Approach		414	8	436	1.9	0.259	12.8	LOS A	5.4	37.9	0.47	0.54	0.47	49.7
All Vehicles		1005	15	1058	1.5	0.263	15.8	LOS B	5.4	37.9	0.55	0.52	0.55	47.6

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018] AM (Site Folder: Existing 2018 Volumes)]

Harvest Boulevarde / Raymond Terrace
Existing [2018]
AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	929	3	978	0.3	0.359	6.0	LOS A	7.6	53.0	0.43	0.38	0.43	55.3
6	R2	35	1	37	2.9	* 0.270	45.9	LOS D	1.5	10.5	0.98	0.72	0.98	33.6
Approach		964	4	1015	0.4	0.359	7.4	LOS A	7.6	53.0	0.45	0.39	0.45	54.1
North: Harvest Boulevarde (N)														
7	L2	45	1	47	2.2	0.086	28.3	LOS B	1.3	9.5	0.75	0.71	0.75	40.6
9	R2	35	1	37	2.9	* 0.162	40.6	LOS C	1.3	9.6	0.93	0.72	0.93	35.2
Approach		80	2	84	2.5	0.162	33.6	LOS C	1.3	9.6	0.83	0.72	0.83	38.1
West: Raymond Terrace Road (W)														
10	L2	9	0	9	0.0	0.235	15.5	LOS B	4.9	35.5	0.55	0.48	0.55	50.2
11	T1	622	22	655	3.5	* 0.399	11.0	LOS A	9.4	67.5	0.59	0.52	0.59	51.0
Approach		631	22	664	3.5	0.399	11.1	LOS A	9.4	67.5	0.59	0.52	0.59	51.0
All Vehicles		1675	28	1763	1.7	0.399	10.1	LOS A	9.4	67.5	0.52	0.46	0.52	51.8

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018] PM (Site Folder: Existing 2018 Volumes)]

Harvest Boulevarde / Raymond Terrace
Existing [2018]
PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	905	5	953	0.6	0.350	5.9	LOS A	7.3	51.3	0.43	0.38	0.43	55.4
6	R2	57	1	60	1.8	* 0.436	46.7	LOS D	2.4	17.2	0.99	0.75	0.99	33.4
Approach		962	6	1013	0.6	0.436	8.3	LOS A	7.3	51.3	0.46	0.40	0.46	53.3
North: Harvest Boulevarde (N)														
7	L2	40	0	42	0.0	0.076	28.4	LOS B	1.2	8.3	0.75	0.71	0.75	40.7
9	R2	33	0	35	0.0	* 0.150	40.4	LOS C	1.3	8.8	0.92	0.72	0.92	35.3
Approach		73	0	77	0.0	0.150	33.8	LOS C	1.3	8.8	0.83	0.71	0.83	38.1
West: Raymond Terrace Road (W)														
10	L2	33	0	35	0.0	0.279	15.8	LOS B	6.1	42.9	0.57	0.52	0.57	49.7
11	T1	728	6	766	0.8	* 0.474	11.6	LOS A	11.9	84.2	0.62	0.56	0.62	50.5
Approach		761	6	801	0.8	0.474	11.8	LOS A	11.9	84.2	0.62	0.55	0.62	50.5
All Vehicles		1796	12	1891	0.7	0.474	10.8	LOS A	11.9	84.2	0.54	0.48	0.54	51.2

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018] Weekend (Site Folder: Existing 2018 Volumes)]

Harvest Boulevarde / Raymond Terrace
Existing [2018]
Weekend Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	680	4	716	0.6	0.263	5.1	LOS A	5.1	35.6	0.39	0.34	0.39	55.7
6	R2	37	4	39	10.8	* 0.301	46.3	LOS D	1.6	11.9	0.98	0.73	0.98	33.4
Approach		717	8	755	1.1	0.301	7.3	LOS A	5.1	35.6	0.42	0.36	0.42	53.8
North: Harvest Boulevarde (N)														
7	L2	37	1	39	2.7	0.071	28.0	LOS B	1.1	7.8	0.75	0.71	0.75	40.7
9	R2	23	0	24	0.0	* 0.104	40.1	LOS C	0.9	6.1	0.92	0.71	0.92	35.5
Approach		60	1	63	1.7	0.104	32.6	LOS C	1.1	7.8	0.81	0.71	0.81	38.5
West: Raymond Terrace Road (W)														
10	L2	32	1	34	3.1	0.207	15.3	LOS B	4.3	30.3	0.54	0.50	0.54	49.8
11	T1	532	4	560	0.8	* 0.351	10.7	LOS A	8.1	57.2	0.58	0.51	0.58	51.0
Approach		564	5	594	0.9	0.351	10.9	LOS A	8.1	57.2	0.58	0.51	0.58	51.0
All Vehicles		1341	14	1412	1.0	0.351	9.9	LOS A	8.1	57.2	0.50	0.44	0.50	51.7

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018] AM (Site Folder: Existing 2018 Volumes)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]
AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	23	0	24	0.0	0.018	3.7	LOS A	0.1	0.7	0.05	0.42	0.05	56.3
2	T1	239	12	252	5.0	0.167	3.6	LOS A	1.0	7.4	0.05	0.41	0.05	57.3
3	R2	54	1	57	1.9	0.167	9.2	LOS A	1.0	7.4	0.05	0.41	0.05	57.7
Approach		316	13	333	4.1	0.167	4.5	LOS A	1.0	7.4	0.05	0.41	0.05	57.3
East: Settlers Boulevarde (E)														
4	L2	61	9	64	14.8	0.051	5.4	LOS A	0.3	2.3	0.50	0.53	0.50	54.1
5	T1	4	0	4	0.0	0.006	5.5	LOS A	0.0	0.2	0.51	0.49	0.51	55.0
6	R2	1	0	1	0.0	0.006	11.1	LOS B	0.0	0.2	0.51	0.49	0.51	55.4
Approach		66	9	69	13.6	0.051	5.5	LOS A	0.3	2.3	0.50	0.53	0.50	54.2
North: Heritage Drive (N)														
7	L2	3	0	3	0.0	0.250	4.2	LOS A	1.5	10.6	0.35	0.42	0.35	54.8
8	T1	320	3	337	0.9	0.250	4.4	LOS A	1.5	10.6	0.35	0.42	0.35	56.5
9	R2	1	0	1	0.0	0.250	9.9	LOS A	1.5	10.6	0.35	0.42	0.35	56.9
Approach		324	3	341	0.9	0.250	4.4	LOS A	1.5	10.6	0.35	0.42	0.35	56.5
West: Duskdarter Street (W)														
10	L2	1	0	1	0.0	0.077	4.7	LOS A	0.4	2.7	0.42	0.64	0.42	51.2
11	T1	2	0	2	0.0	0.077	4.9	LOS A	0.4	2.7	0.42	0.64	0.42	52.6
12	R2	85	0	89	0.0	0.077	10.5	LOS B	0.4	2.7	0.42	0.64	0.42	52.9
Approach		88	0	93	0.0	0.077	10.3	LOS B	0.4	2.7	0.42	0.64	0.42	52.9
All Vehicles		794	25	836	3.1	0.250	5.2	LOS A	1.5	10.6	0.25	0.45	0.25	56.2

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018] PM (Site Folder: Existing 2018 Volumes)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]
PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	58	1	61	1.7	0.043	3.7	LOS A	0.2	1.5	0.03	0.43	0.03	56.3
2	T1	166	9	175	5.4	0.096	3.6	LOS A	0.5	3.7	0.03	0.35	0.03	58.2
3	R2	3	0	3	0.0	0.096	9.2	LOS A	0.5	3.7	0.03	0.35	0.03	58.7
Approach		227	10	239	4.4	0.096	3.7	LOS A	0.5	3.7	0.03	0.37	0.03	57.7
East: Settlers Boulevarde (E)														
4	L2	30	8	32	26.7	0.023	4.7	LOS A	0.1	1.0	0.34	0.45	0.34	54.4
5	T1	1	0	1	0.0	0.002	4.5	LOS A	0.0	0.1	0.36	0.49	0.36	54.7
6	R2	1	0	1	0.0	0.002	10.2	LOS B	0.0	0.1	0.36	0.49	0.36	55.1
Approach		32	8	34	25.0	0.023	4.8	LOS A	0.1	1.0	0.34	0.46	0.34	54.5
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.118	3.6	LOS A	0.6	4.5	0.17	0.35	0.17	55.8
8	T1	167	3	176	1.8	0.118	3.8	LOS A	0.6	4.5	0.17	0.35	0.17	57.5
9	R2	1	0	1	0.0	0.118	9.4	LOS A	0.6	4.5	0.17	0.35	0.17	58.0
Approach		169	3	178	1.8	0.118	3.8	LOS A	0.6	4.5	0.17	0.35	0.17	57.5
West: Duskdarter Street (W)														
10	L2	2	0	2	0.0	0.035	4.1	LOS A	0.2	1.2	0.31	0.59	0.31	51.8
11	T1	2	0	2	0.0	0.035	4.2	LOS A	0.2	1.2	0.31	0.59	0.31	53.3
12	R2	40	0	42	0.0	0.035	9.9	LOS A	0.2	1.2	0.31	0.59	0.31	53.6
Approach		44	0	46	0.0	0.035	9.4	LOS A	0.2	1.2	0.31	0.59	0.31	53.5
All Vehicles		472	21	497	4.4	0.118	4.3	LOS A	0.6	4.5	0.13	0.39	0.13	57.0

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018] Weekend (Site Folder: Existing 2018 Volumes)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]
Weekend Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	40	0	42	0.0	0.030	3.6	LOS A	0.1	1.0	0.03	0.43	0.03	56.3
2	T1	128	5	135	3.9	0.074	3.6	LOS A	0.4	2.7	0.03	0.35	0.03	58.3
3	R2	2	0	2	0.0	0.074	9.2	LOS A	0.4	2.7	0.03	0.35	0.03	58.7
Approach		170	5	179	2.9	0.074	3.6	LOS A	0.4	2.7	0.03	0.37	0.03	57.8
East: Settlers Boulevarde (E)														
4	L2	5	0	5	0.0	0.003	4.1	LOS A	0.0	0.1	0.27	0.41	0.27	55.4
5	T1	1	0	1	0.0	0.002	4.2	LOS A	0.0	0.1	0.30	0.49	0.30	55.0
6	R2	1	0	1	0.0	0.002	9.8	LOS A	0.0	0.1	0.30	0.49	0.30	55.3
Approach		7	0	7	0.0	0.003	4.9	LOS A	0.0	0.1	0.28	0.43	0.28	55.3
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.083	3.6	LOS A	0.4	3.0	0.16	0.35	0.16	55.8
8	T1	114	3	120	2.6	0.083	3.8	LOS A	0.4	3.0	0.16	0.35	0.16	57.5
9	R2	1	0	1	0.0	0.083	9.4	LOS A	0.4	3.0	0.16	0.35	0.16	58.0
Approach		116	3	122	2.6	0.083	3.8	LOS A	0.4	3.0	0.16	0.35	0.16	57.5
West: Duskdarter Street (W)														
10	L2	1	0	1	0.0	0.035	3.9	LOS A	0.2	1.1	0.27	0.59	0.27	51.7
11	T1	1	0	1	0.0	0.035	4.0	LOS A	0.2	1.1	0.27	0.59	0.27	53.2
12	R2	42	1	44	2.4	0.035	9.7	LOS A	0.2	1.1	0.27	0.59	0.27	53.5
Approach		44	1	46	2.3	0.035	9.5	LOS A	0.2	1.1	0.27	0.59	0.27	53.4
All Vehicles		337	9	355	2.7	0.083	4.5	LOS A	0.4	3.0	0.11	0.39	0.11	57.0

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018] AM (Site Folder: Existing 2018 Volumes)]

Heritage Drive / Tigerhawk
Existing [2018]
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	53	7	56	13.2	0.145	6.1	LOS A	0.4	3.1	0.17	0.21	0.17	55.3
2	T1	148	1	156	0.7	0.145	0.3	LOS A	0.4	3.1	0.17	0.21	0.17	57.5
3	R2	41	4	43	9.8	0.145	6.4	LOS A	0.4	3.1	0.17	0.21	0.17	54.9
Approach		242	12	255	5.0	0.145	2.6	NA	0.4	3.1	0.17	0.21	0.17	56.5
East: Tigerhawk Drive (E)														
4	L2	30	0	32	0.0	0.074	6.1	LOS A	0.3	1.9	0.34	0.62	0.34	52.6
5	T1	11	0	12	0.0	0.074	6.3	LOS A	0.3	1.9	0.34	0.62	0.34	52.7
6	R2	24	1	25	4.2	0.074	8.2	LOS A	0.3	1.9	0.34	0.62	0.34	51.9
Approach		65	1	68	1.5	0.074	6.9	LOS A	0.3	1.9	0.34	0.62	0.34	52.3
North: Heritage Drive (N)														
7	L2	28	5	29	17.9	0.113	5.8	LOS A	0.0	0.3	0.02	0.09	0.02	56.7
8	T1	171	1	180	0.6	0.113	0.0	LOS A	0.0	0.3	0.02	0.09	0.02	59.2
9	R2	4	0	4	0.0	0.113	6.2	LOS A	0.0	0.3	0.02	0.09	0.02	57.0
Approach		203	6	214	3.0	0.113	0.9	NA	0.0	0.3	0.02	0.09	0.02	58.8
West: Tigerhawk Drive (W)														
10	L2	24	0	25	0.0	0.234	6.1	LOS A	0.9	6.2	0.44	0.72	0.44	51.8
11	T1	23	0	24	0.0	0.234	6.5	LOS A	0.9	6.2	0.44	0.72	0.44	51.9
12	R2	122	2	128	1.6	0.234	8.6	LOS A	0.9	6.2	0.44	0.72	0.44	51.2
Approach		169	2	178	1.2	0.234	8.0	LOS A	0.9	6.2	0.44	0.72	0.44	51.4
All Vehicles		679	21	715	3.1	0.234	3.9	NA	0.9	6.2	0.21	0.34	0.21	55.4

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018] PM (Site Folder: Existing 2018 Volumes)]

Heritage Drive / Tigerhawk
Existing [2018]
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	95	6	100	6.3	0.103	5.7	LOS A	0.2	1.4	0.07	0.36	0.07	54.8
2	T1	60	0	63	0.0	0.103	0.1	LOS A	0.2	1.4	0.07	0.36	0.07	56.5
3	R2	16	6	17	37.5	0.103	6.3	LOS A	0.2	1.4	0.07	0.36	0.07	52.8
Approach		171	12	180	7.0	0.103	3.8	NA	0.2	1.4	0.07	0.36	0.07	55.2
East: Tigerhawk Drive (E)														
4	L2	10	0	11	0.0	0.019	5.8	LOS A	0.1	0.5	0.20	0.54	0.20	53.5
5	T1	9	0	9	0.0	0.019	5.2	LOS A	0.1	0.5	0.20	0.54	0.20	53.6
6	R2	3	0	3	0.0	0.019	6.3	LOS A	0.1	0.5	0.20	0.54	0.20	53.0
Approach		22	0	23	0.0	0.019	5.6	LOS A	0.1	0.5	0.20	0.54	0.20	53.5
North: Heritage Drive (N)														
7	L2	8	4	8	50.0	0.050	6.3	LOS A	0.0	0.3	0.04	0.08	0.04	55.3
8	T1	77	0	81	0.0	0.050	0.0	LOS A	0.0	0.3	0.04	0.08	0.04	59.3
9	R2	4	0	4	0.0	0.050	6.0	LOS A	0.0	0.3	0.04	0.08	0.04	57.1
Approach		89	4	94	4.5	0.050	0.9	NA	0.0	0.3	0.04	0.08	0.04	58.9
West: Tigerhawk Drive (W)														
10	L2	3	0	3	0.0	0.098	5.7	LOS A	0.3	2.4	0.31	0.62	0.31	52.8
11	T1	6	0	6	0.0	0.098	5.1	LOS A	0.3	2.4	0.31	0.62	0.31	53.0
12	R2	74	2	78	2.7	0.098	6.8	LOS A	0.3	2.4	0.31	0.62	0.31	52.2
Approach		83	2	87	2.4	0.098	6.6	LOS A	0.3	2.4	0.31	0.62	0.31	52.2
All Vehicles		365	18	384	4.9	0.103	3.8	NA	0.3	2.4	0.12	0.36	0.12	55.2

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018] Weekend (Site Folder: Existing 2018 Volumes)]

Heritage Drive / Tigerhawk
Existing [2018]
Weekend Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	88	1	93	1.1	0.077	5.6	LOS A	0.0	0.1	0.00	0.38	0.00	55.1
2	T1	48	0	51	0.0	0.077	0.0	LOS A	0.0	0.1	0.00	0.38	0.00	56.7
3	R2	1	0	1	0.0	0.077	5.5	LOS A	0.0	0.1	0.00	0.38	0.00	54.6
Approach		137	1	144	0.7	0.077	3.6	NA	0.0	0.1	0.00	0.38	0.00	55.7
East: Tigerhawk Drive (E)														
4	L2	1	0	1	0.0	0.003	5.6	LOS A	0.0	0.1	0.10	0.54	0.10	53.7
5	T1	1	0	1	0.0	0.003	4.7	LOS A	0.0	0.1	0.10	0.54	0.10	53.9
6	R2	1	0	1	0.0	0.003	5.8	LOS A	0.0	0.1	0.10	0.54	0.10	53.2
Approach		3	0	3	0.0	0.003	5.4	LOS A	0.0	0.1	0.10	0.54	0.10	53.6
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.014	5.8	LOS A	0.0	0.1	0.03	0.05	0.03	57.9
8	T1	24	0	25	0.0	0.014	0.0	LOS A	0.0	0.1	0.03	0.05	0.03	59.5
9	R2	1	0	1	0.0	0.014	5.8	LOS A	0.0	0.1	0.03	0.05	0.03	57.2
Approach		26	0	27	0.0	0.014	0.5	NA	0.0	0.1	0.03	0.05	0.03	59.3
West: Tigerhawk Drive (W)														
10	L2	2	0	2	0.0	0.104	5.7	LOS A	0.4	2.6	0.23	0.58	0.23	53.1
11	T1	7	0	7	0.0	0.104	4.6	LOS A	0.4	2.6	0.23	0.58	0.23	53.3
12	R2	90	2	95	2.2	0.104	6.1	LOS A	0.4	2.6	0.23	0.58	0.23	52.5
Approach		99	2	104	2.0	0.104	6.0	LOS A	0.4	2.6	0.23	0.58	0.23	52.5
All Vehicles		265	3	279	1.1	0.104	4.2	NA	0.4	2.6	0.09	0.43	0.09	54.8

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018] AM (Site Folder: Existing 2018 Volumes)]

Grasshawk Drive / Dragonfly Drive
Existing [2018]
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.016	5.6	LOS A	0.1	0.5	0.07	0.37	0.07	55.0
2	T1	10	0	11	0.0	0.016	0.0	LOS A	0.1	0.5	0.07	0.37	0.07	56.5
3	R2	17	0	18	0.0	0.016	5.5	LOS A	0.1	0.5	0.07	0.37	0.07	54.5
Approach		28	0	29	0.0	0.016	3.6	NA	0.1	0.5	0.07	0.37	0.07	55.2
East: Grasshawk Drive (E)														
4	L2	15	0	16	0.0	0.023	5.6	LOS A	0.1	0.6	0.03	0.56	0.03	53.8
5	T1	7	0	7	0.0	0.023	4.3	LOS A	0.1	0.6	0.03	0.56	0.03	54.0
6	R2	7	1	7	14.3	0.023	6.0	LOS A	0.1	0.6	0.03	0.56	0.03	52.6
Approach		29	1	31	3.4	0.023	5.4	LOS A	0.1	0.6	0.03	0.56	0.03	53.5
North: Dragonfly Drive (N)														
7	L2	12	2	13	16.7	0.011	5.7	LOS A	0.0	0.1	0.01	0.42	0.01	54.2
8	T1	5	0	5	0.0	0.011	0.0	LOS A	0.0	0.1	0.01	0.42	0.01	56.4
9	R2	1	0	1	0.0	0.011	5.5	LOS A	0.0	0.1	0.01	0.42	0.01	54.4
Approach		18	2	19	11.1	0.011	4.1	NA	0.0	0.1	0.01	0.42	0.01	54.8
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.036	5.6	LOS A	0.1	0.9	0.12	0.51	0.12	54.3
11	T1	42	0	44	0.0	0.036	4.3	LOS A	0.1	0.9	0.12	0.51	0.12	54.5
12	R2	1	0	1	0.0	0.036	5.7	LOS A	0.1	0.9	0.12	0.51	0.12	53.8
Approach		44	0	46	0.0	0.036	4.4	LOS A	0.1	0.9	0.12	0.51	0.12	54.5
All Vehicles		119	3	125	2.5	0.036	4.4	NA	0.1	0.9	0.07	0.48	0.07	54.5

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018] PM (Site Folder: Existing 2018 Volumes)]

Grasshawk Drive / Dragonfly Drive
Existing [2018]
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.011	5.6	LOS A	0.1	0.4	0.06	0.54	0.06	53.7
2	T1	1	0	1	0.0	0.011	0.0	LOS A	0.1	0.4	0.06	0.54	0.06	55.1
3	R2	17	0	18	0.0	0.011	5.5	LOS A	0.1	0.4	0.06	0.54	0.06	53.2
Approach		19	0	20	0.0	0.011	5.2	NA	0.1	0.4	0.06	0.54	0.06	53.3
East: Grasshawk Drive (E)														
4	L2	24	0	25	0.0	0.056	5.5	LOS A	0.2	1.5	0.02	0.55	0.02	54.2
5	T1	42	0	44	0.0	0.056	4.2	LOS A	0.2	1.5	0.02	0.55	0.02	54.4
6	R2	6	1	6	16.7	0.056	5.9	LOS A	0.2	1.5	0.02	0.55	0.02	52.9
Approach		72	1	76	1.4	0.056	4.8	LOS A	0.2	1.5	0.02	0.55	0.02	54.2
North: Dragonfly Drive (N)														
7	L2	9	2	9	22.2	0.008	5.8	LOS A	0.0	0.1	0.00	0.48	0.00	53.5
8	T1	2	0	2	0.0	0.008	0.0	LOS A	0.0	0.1	0.00	0.48	0.00	55.9
9	R2	1	0	1	0.0	0.008	5.5	LOS A	0.0	0.1	0.00	0.48	0.00	54.0
Approach		12	2	13	16.7	0.008	4.8	NA	0.0	0.1	0.00	0.48	0.00	53.9
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.020	5.5	LOS A	0.1	0.5	0.04	0.52	0.04	54.5
11	T1	23	0	24	0.0	0.020	4.2	LOS A	0.1	0.5	0.04	0.52	0.04	54.7
12	R2	1	0	1	0.0	0.020	5.8	LOS A	0.1	0.5	0.04	0.52	0.04	54.0
Approach		25	0	26	0.0	0.020	4.4	LOS A	0.1	0.5	0.04	0.52	0.04	54.6
All Vehicles		128	3	135	2.3	0.056	4.8	NA	0.2	1.5	0.03	0.53	0.03	54.1

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018] Weekend (Site Folder: Existing 2018 Volumes)]

Grasshawk Drive / Dragonfly Drive
Existing [2018]
Weekend Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.011	5.6	LOS A	0.1	0.4	0.06	0.54	0.06	53.7
2	T1	1	0	1	0.0	0.011	0.0	LOS A	0.1	0.4	0.06	0.54	0.06	55.1
3	R2	17	0	18	0.0	0.011	5.5	LOS A	0.1	0.4	0.06	0.54	0.06	53.2
Approach		19	0	20	0.0	0.011	5.2	NA	0.1	0.4	0.06	0.54	0.06	53.3
East: Grasshawk Drive (E)														
4	L2	22	0	23	0.0	0.045	5.6	LOS A	0.2	1.2	0.02	0.55	0.02	54.1
5	T1	27	1	28	3.7	0.045	4.3	LOS A	0.2	1.2	0.02	0.55	0.02	54.1
6	R2	9	0	9	0.0	0.045	5.7	LOS A	0.2	1.2	0.02	0.55	0.02	53.5
Approach		58	1	61	1.7	0.045	5.0	LOS A	0.2	1.2	0.02	0.55	0.02	54.0
North: Dragonfly Drive (N)														
7	L2	10	1	11	10.0	0.008	5.7	LOS A	0.0	0.1	0.00	0.46	0.00	54.2
8	T1	3	0	3	0.0	0.008	0.0	LOS A	0.0	0.1	0.00	0.46	0.00	56.1
9	R2	1	0	1	0.0	0.008	5.5	LOS A	0.0	0.1	0.00	0.46	0.00	54.1
Approach		14	1	15	7.1	0.008	4.4	NA	0.0	0.1	0.00	0.46	0.00	54.6
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.024	5.5	LOS A	0.1	0.6	0.05	0.52	0.05	54.5
11	T1	27	1	28	3.7	0.024	4.3	LOS A	0.1	0.6	0.05	0.52	0.05	54.5
12	R2	1	0	1	0.0	0.024	5.8	LOS A	0.1	0.6	0.05	0.52	0.05	54.0
Approach		29	1	31	3.4	0.024	4.4	LOS A	0.1	0.6	0.05	0.52	0.05	54.5
All Vehicles		120	3	126	2.5	0.045	4.8	NA	0.2	1.2	0.03	0.53	0.03	54.1

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018 + Residential] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Settlers Boulevarde / Raymond Terrace
Existing [2018] + Residential
AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	782	12	823	1.5	0.522	19.2	LOS B	12.8	90.5	0.75	0.65	0.75	47.1
6	R2	145	5	153	3.4	* 0.674	44.6	LOS D	6.1	44.3	1.00	0.84	1.10	34.0
Approach		927	17	976	1.8	0.674	23.2	LOS B	12.8	90.5	0.79	0.68	0.81	44.5
North: Settlers Boulevarde (N)														
7	L2	174	4	183	2.3	0.540	26.2	LOS B	11.8	84.1	0.82	0.81	0.82	41.4
9	R2	629	8	662	1.3	* 0.655	29.2	LOS C	14.8	104.7	0.86	0.83	0.86	40.8
Approach		803	12	845	1.5	0.655	28.5	LOS C	14.8	104.7	0.85	0.83	0.85	40.9
West: Raymond Terrace Road (W)														
10	L2	259	9	273	3.5	0.150	6.0	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	417	13	439	3.1	* 0.640	28.8	LOS C	10.9	78.4	0.92	0.76	0.92	40.9
Approach		676	22	712	3.3	0.640	20.1	LOS B	10.9	78.4	0.57	0.67	0.57	45.3
All Vehicles		2406	51	2533	2.1	0.674	24.1	LOS B	14.8	104.7	0.75	0.73	0.75	43.4

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018 + Residential] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Settlers Boulevarde / Raymond Terrace
Existing [2018] + Residential
PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	576	7	606	1.2	0.251	5.5	LOS A	4.9	34.4	0.40	0.34	0.40	55.5
6	R2	110	3	116	2.7	* 0.636	46.0	LOS D	4.7	33.7	1.00	0.82	1.09	33.6
Approach		686	10	722	1.5	0.636	12.0	LOS A	4.9	34.4	0.49	0.42	0.51	50.3
North: Settlers Boulevarde (N)														
7	L2	54	1	57	1.9	0.501	41.7	LOS C	5.3	37.3	0.96	0.79	0.96	35.6
9	R2	227	2	239	0.9	* 0.607	42.1	LOS C	6.0	42.2	0.98	0.81	1.00	35.2
Approach		281	3	296	1.1	0.607	42.0	LOS C	6.0	42.2	0.97	0.80	0.99	35.3
West: Raymond Terrace Road (W)														
10	L2	543	2	572	0.4	0.309	6.0	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	851	5	896	0.6	* 0.627	14.6	LOS B	17.5	122.9	0.72	0.64	0.72	48.7
Approach		1394	7	1467	0.5	0.627	11.3	LOS A	17.5	122.9	0.44	0.59	0.44	51.0
All Vehicles		2361	20	2485	0.8	0.636	15.1	LOS B	17.5	122.9	0.52	0.57	0.53	48.2

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018 + Residential] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Settlers Boulevarde / Raymond Terrace
Existing [2018] + Residential
Weekend Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	527	3	555	0.6	0.262	8.5	LOS A	5.6	39.4	0.50	0.43	0.50	53.1
6	R2	66	0	69	0.0	* 0.428	45.4	LOS D	2.8	19.3	0.99	0.76	0.99	33.8
Approach		593	3	624	0.5	0.428	12.6	LOS A	5.6	39.4	0.55	0.46	0.55	49.9
North: Settlers Boulevarde (N)														
7	L2	58	0	61	0.0	0.343	33.3	LOS C	5.0	35.2	0.86	0.78	0.86	38.4
9	R2	250	4	263	1.6	* 0.416	34.5	LOS C	5.9	41.7	0.89	0.79	0.89	37.9
Approach		308	4	324	1.3	0.416	34.3	LOS C	5.9	41.7	0.88	0.79	0.88	38.0
West: Raymond Terrace Road (W)														
10	L2	260	5	274	1.9	0.149	5.8	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	484	3	509	0.6	* 0.417	16.3	LOS B	9.5	67.1	0.71	0.60	0.71	47.5
Approach		744	8	783	1.1	0.417	12.6	LOS A	9.5	67.1	0.46	0.58	0.46	49.8
All Vehicles		1645	15	1732	0.9	0.428	16.7	LOS B	9.5	67.1	0.57	0.57	0.57	47.1

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018 + Residential] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Harvest Boulevarde / Raymond Terrace
Existing [2018] + Residential
AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	1366	3	1438	0.2	0.527	8.7	LOS A	13.2	92.7	0.51	0.47	0.51	54.5
6	R2	49	1	52	2.0	* 0.376	46.4	LOS D	2.1	14.7	0.99	0.74	0.99	33.5
Approach		1415	4	1489	0.3	0.527	10.0	LOS A	13.2	92.7	0.53	0.48	0.53	53.4
North: Harvest Boulevarde (N)														
7	L2	106	1	112	0.9	0.202	29.7	LOS C	3.3	23.1	0.78	0.75	0.78	40.2
9	R2	56	1	59	1.8	* 0.257	41.1	LOS C	2.2	15.5	0.94	0.75	0.94	35.1
Approach		162	2	171	1.2	0.257	33.6	LOS C	3.3	23.1	0.84	0.75	0.84	38.3
West: Raymond Terrace Road (W)														
10	L2	15	0	16	0.0	0.285	15.8	LOS B	6.2	44.4	0.57	0.50	0.57	49.9
11	T1	754	22	794	2.9	* 0.484	11.8	LOS A	12.2	87.3	0.63	0.55	0.63	50.5
Approach		769	22	809	2.9	0.484	11.9	LOS A	12.2	87.3	0.63	0.55	0.63	50.5
All Vehicles		2346	28	2469	1.2	0.527	12.3	LOS A	13.2	92.7	0.58	0.52	0.58	51.0

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018 + Residential] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Harvest Boulevarde / Raymond Terrace
Existing [2018] + Residential
PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	1025	5	1079	0.5	0.380	6.4	LOS A	9.7	67.8	0.40	0.36	0.40	55.2
6	R2	120	1	126	0.8	* 0.760	58.6	LOS E	6.6	46.6	1.00	0.88	1.21	30.1
Approach		1145	6	1205	0.5	0.760	11.9	LOS A	9.7	67.8	0.47	0.42	0.49	50.7
North: Harvest Boulevarde (N)														
7	L2	57	0	60	0.0	0.108	37.8	LOS C	2.1	14.8	0.76	0.73	0.76	38.4
9	R2	38	0	40	0.0	* 0.179	49.4	LOS D	1.8	12.7	0.93	0.73	0.93	32.5
Approach		95	0	100	0.0	0.179	42.5	LOS C	2.1	14.8	0.83	0.73	0.83	35.8
West: Raymond Terrace Road (W)														
10	L2	60	0	63	0.0	0.473	18.5	LOS B	14.8	103.9	0.62	0.58	0.62	48.0
11	T1	1304	6	1373	0.5	* 0.803	18.0	LOS B	34.7	243.9	0.77	0.72	0.78	47.2
Approach		1364	6	1436	0.4	0.803	18.0	LOS B	34.7	243.9	0.77	0.71	0.77	47.2
All Vehicles		2604	12	2741	0.5	0.803	16.2	LOS B	34.7	243.9	0.64	0.58	0.65	48.1

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018 + Residential] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Harvest Boulevarde / Raymond Terrace
Existing [2018] + Residential
Weekend Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	873	4	919	0.5	0.338	5.8	LOS A	7.0	48.9	0.42	0.37	0.42	55.4
6	R2	62	4	65	6.5	* 0.490	47.1	LOS D	2.7	19.6	1.00	0.75	1.00	33.2
Approach		935	8	984	0.9	0.490	8.5	LOS A	7.0	48.9	0.46	0.40	0.46	53.1
North: Harvest Boulevarde (N)														
7	L2	64	1	67	1.6	0.122	29.0	LOS C	1.9	13.6	0.76	0.73	0.76	40.5
9	R2	32	0	34	0.0	* 0.145	40.4	LOS C	1.2	8.5	0.92	0.72	0.92	35.4
Approach		96	1	101	1.0	0.145	32.8	LOS C	1.9	13.6	0.81	0.73	0.81	38.6
West: Raymond Terrace Road (W)														
10	L2	43	1	45	2.3	0.295	15.9	LOS B	6.5	45.9	0.57	0.53	0.57	49.5
11	T1	763	4	803	0.5	* 0.501	11.9	LOS A	12.9	91.0	0.64	0.57	0.64	50.3
Approach		806	5	848	0.6	0.501	12.1	LOS A	12.9	91.0	0.63	0.57	0.63	50.3
All Vehicles		1837	14	1934	0.8	0.501	11.4	LOS A	12.9	91.0	0.55	0.49	0.55	50.8

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018 + Residential] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Settlers Boulevarde / Raymond Terrace
Existing [2018] + Residential
AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	23	0	24	0.0	0.018	3.7	LOS A	0.1	0.7	0.05	0.42	0.05	56.3
2	T1	239	12	252	5.0	0.212	3.6	LOS A	1.4	9.8	0.05	0.47	0.05	56.4
3	R2	136	1	143	0.7	0.212	9.2	LOS A	1.4	9.8	0.05	0.47	0.05	56.9
Approach		398	13	419	3.3	0.212	5.5	LOS A	1.4	9.8	0.05	0.47	0.05	56.6
East: Settlers Boulevarde (E)														
4	L2	388	9	408	2.3	0.305	5.7	LOS A	2.1	15.0	0.59	0.61	0.59	54.1
5	T1	4	0	4	0.0	0.006	5.5	LOS A	0.0	0.2	0.52	0.49	0.52	55.0
6	R2	1	0	1	0.0	0.006	11.1	LOS B	0.0	0.2	0.52	0.49	0.52	55.3
Approach		393	9	414	2.3	0.305	5.7	LOS A	2.1	15.0	0.59	0.61	0.59	54.1
North: Heritage Drive (N)														
7	L2	3	0	3	0.0	0.271	4.8	LOS A	1.6	11.4	0.44	0.46	0.44	54.4
8	T1	320	3	337	0.9	0.271	4.9	LOS A	1.6	11.4	0.44	0.46	0.44	56.0
9	R2	1	0	1	0.0	0.271	10.3	LOS B	1.6	11.4	0.44	0.46	0.44	56.4
Approach		324	3	341	0.9	0.271	5.0	LOS A	1.6	11.4	0.44	0.46	0.44	56.0
West: Duskdarter Street (W)														
10	L2	1	0	1	0.0	0.082	5.1	LOS A	0.4	2.9	0.48	0.66	0.48	51.0
11	T1	2	0	2	0.0	0.082	5.4	LOS A	0.4	2.9	0.48	0.66	0.48	52.4
12	R2	85	0	89	0.0	0.082	10.9	LOS B	0.4	2.9	0.48	0.66	0.48	52.7
Approach		88	0	93	0.0	0.082	10.7	LOS B	0.4	2.9	0.48	0.66	0.48	52.7
All Vehicles		1203	25	1266	2.1	0.305	5.8	LOS A	2.1	15.0	0.36	0.53	0.36	55.3

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018 + Residential] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Settlers Boulevarde / Raymond Terrace
Existing [2018] + Residential
PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	58	1	61	1.7	0.045	3.7	LOS A	0.2	1.6	0.03	0.42	0.03	56.3
2	T1	166	9	175	5.4	0.294	3.6	LOS A	1.9	13.6	0.04	0.58	0.04	55.1
3	R2	363	0	382	0.0	0.294	9.2	LOS A	1.9	13.6	0.04	0.58	0.04	55.5
Approach		587	10	618	1.7	0.294	7.1	LOS A	1.9	13.6	0.04	0.56	0.04	55.4
East: Settlers Boulevarde (E)														
4	L2	120	8	126	6.7	0.086	4.4	LOS A	0.5	3.5	0.37	0.47	0.37	54.8
5	T1	1	0	1	0.0	0.002	4.5	LOS A	0.0	0.1	0.38	0.49	0.38	54.6
6	R2	1	0	1	0.0	0.002	10.2	LOS B	0.0	0.1	0.38	0.49	0.38	55.0
Approach		122	8	128	6.6	0.086	4.5	LOS A	0.5	3.5	0.37	0.47	0.37	54.8
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.161	6.0	LOS A	0.9	6.2	0.52	0.55	0.52	53.9
8	T1	167	3	176	1.8	0.161	5.6	LOS A	0.9	6.2	0.52	0.55	0.52	55.6
9	R2	1	0	1	0.0	0.161	11.2	LOS B	0.9	6.2	0.52	0.55	0.52	56.0
Approach		169	3	178	1.8	0.161	5.7	LOS A	0.9	6.2	0.52	0.55	0.52	55.6
West: Duskdarter Street (W)														
10	L2	2	0	2	0.0	0.045	5.9	LOS A	0.2	1.7	0.55	0.67	0.55	51.0
11	T1	2	0	2	0.0	0.045	6.6	LOS A	0.2	1.7	0.55	0.67	0.55	52.4
12	R2	40	0	42	0.0	0.045	11.7	LOS B	0.2	1.7	0.55	0.67	0.55	52.7
Approach		44	0	46	0.0	0.045	11.2	LOS B	0.2	1.7	0.55	0.67	0.55	52.7
All Vehicles		922	21	971	2.3	0.294	6.7	LOS A	1.9	13.6	0.19	0.55	0.19	55.2

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018 + Residential] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Settlers Boulevarde / Raymond Terrace
Existing [2018] + Residential
Weekend Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	40	0	42	0.0	0.031	3.6	LOS A	0.1	1.0	0.03	0.42	0.03	56.3
2	T1	128	5	135	3.9	0.153	3.6	LOS A	0.8	6.0	0.03	0.54	0.03	55.8
3	R2	146	0	154	0.0	0.153	9.2	LOS A	0.8	6.0	0.03	0.54	0.03	56.2
Approach		314	5	331	1.6	0.153	6.2	LOS A	0.8	6.0	0.03	0.52	0.03	56.0
East: Settlers Boulevarde (E)														
4	L2	149	0	157	0.0	0.098	4.2	LOS A	0.5	3.7	0.30	0.45	0.30	55.3
5	T1	1	0	1	0.0	0.002	4.3	LOS A	0.0	0.1	0.32	0.49	0.32	54.9
6	R2	1	0	1	0.0	0.002	9.9	LOS A	0.0	0.1	0.32	0.49	0.32	55.2
Approach		151	0	159	0.0	0.098	4.2	LOS A	0.5	3.7	0.30	0.45	0.30	55.3
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.096	4.4	LOS A	0.5	3.4	0.34	0.42	0.34	54.8
8	T1	114	3	120	2.6	0.096	4.5	LOS A	0.5	3.4	0.34	0.42	0.34	56.5
9	R2	1	0	1	0.0	0.096	10.0	LOS A	0.5	3.4	0.34	0.42	0.34	56.9
Approach		116	3	122	2.6	0.096	4.5	LOS A	0.5	3.4	0.34	0.42	0.34	56.5
West: Duskdarter Street (W)														
10	L2	1	0	1	0.0	0.038	4.5	LOS A	0.2	1.3	0.40	0.62	0.40	51.3
11	T1	1	0	1	0.0	0.038	4.9	LOS A	0.2	1.3	0.40	0.62	0.40	52.8
12	R2	42	1	44	2.4	0.038	10.4	LOS B	0.2	1.3	0.40	0.62	0.40	53.0
Approach		44	1	46	2.3	0.038	10.1	LOS B	0.2	1.3	0.40	0.62	0.40	53.0
All Vehicles		625	9	658	1.4	0.153	5.7	LOS A	0.8	6.0	0.18	0.49	0.18	55.7

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018 + Residential] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Heritage Drive / Tigerhawk
Existing [2018] + Residential
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	53	7	56	13.2	0.145	6.1	LOS A	0.4	3.1	0.17	0.21	0.17	55.3
2	T1	148	1	156	0.7	0.145	0.3	LOS A	0.4	3.1	0.17	0.21	0.17	57.5
3	R2	41	4	43	9.8	0.145	6.4	LOS A	0.4	3.1	0.17	0.21	0.17	54.9
Approach		242	12	255	5.0	0.145	2.6	NA	0.4	3.1	0.17	0.21	0.17	56.5
East: Tigerhawk Drive (E)														
4	L2	30	0	32	0.0	0.074	6.1	LOS A	0.3	1.9	0.34	0.62	0.34	52.6
5	T1	11	0	12	0.0	0.074	6.3	LOS A	0.3	1.9	0.34	0.62	0.34	52.7
6	R2	24	1	25	4.2	0.074	8.2	LOS A	0.3	1.9	0.34	0.62	0.34	51.9
Approach		65	1	68	1.5	0.074	6.9	LOS A	0.3	1.9	0.34	0.62	0.34	52.3
North: Heritage Drive (N)														
7	L2	28	5	29	17.9	0.113	5.8	LOS A	0.0	0.3	0.02	0.09	0.02	56.7
8	T1	171	1	180	0.6	0.113	0.0	LOS A	0.0	0.3	0.02	0.09	0.02	59.2
9	R2	4	0	4	0.0	0.113	6.2	LOS A	0.0	0.3	0.02	0.09	0.02	57.0
Approach		203	6	214	3.0	0.113	0.9	NA	0.0	0.3	0.02	0.09	0.02	58.8
West: Tigerhawk Drive (W)														
10	L2	24	0	25	0.0	0.234	6.1	LOS A	0.9	6.2	0.44	0.72	0.44	51.8
11	T1	23	0	24	0.0	0.234	6.5	LOS A	0.9	6.2	0.44	0.72	0.44	51.9
12	R2	122	2	128	1.6	0.234	8.6	LOS A	0.9	6.2	0.44	0.72	0.44	51.2
Approach		169	2	178	1.2	0.234	8.0	LOS A	0.9	6.2	0.44	0.72	0.44	51.4
All Vehicles		679	21	715	3.1	0.234	3.9	NA	0.9	6.2	0.21	0.34	0.21	55.4

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018 + Residential] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Heritage Drive / Tigerhawk
Existing [2018] + Residential
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	95	6	100	6.3	0.103	5.7	LOS A	0.2	1.4	0.07	0.36	0.07	54.8
2	T1	60	0	63	0.0	0.103	0.1	LOS A	0.2	1.4	0.07	0.36	0.07	56.5
3	R2	16	6	17	37.5	0.103	6.3	LOS A	0.2	1.4	0.07	0.36	0.07	52.8
Approach		171	12	180	7.0	0.103	3.8	NA	0.2	1.4	0.07	0.36	0.07	55.2
East: Tigerhawk Drive (E)														
4	L2	10	0	11	0.0	0.019	5.8	LOS A	0.1	0.5	0.20	0.54	0.20	53.5
5	T1	9	0	9	0.0	0.019	5.2	LOS A	0.1	0.5	0.20	0.54	0.20	53.6
6	R2	3	0	3	0.0	0.019	6.3	LOS A	0.1	0.5	0.20	0.54	0.20	53.0
Approach		22	0	23	0.0	0.019	5.6	LOS A	0.1	0.5	0.20	0.54	0.20	53.5
North: Heritage Drive (N)														
7	L2	8	4	8	50.0	0.050	6.3	LOS A	0.0	0.3	0.04	0.08	0.04	55.3
8	T1	77	0	81	0.0	0.050	0.0	LOS A	0.0	0.3	0.04	0.08	0.04	59.3
9	R2	4	0	4	0.0	0.050	6.0	LOS A	0.0	0.3	0.04	0.08	0.04	57.1
Approach		89	4	94	4.5	0.050	0.9	NA	0.0	0.3	0.04	0.08	0.04	58.9
West: Tigerhawk Drive (W)														
10	L2	3	0	3	0.0	0.098	5.7	LOS A	0.3	2.4	0.31	0.62	0.31	52.8
11	T1	6	0	6	0.0	0.098	5.1	LOS A	0.3	2.4	0.31	0.62	0.31	53.0
12	R2	74	2	78	2.7	0.098	6.8	LOS A	0.3	2.4	0.31	0.62	0.31	52.2
Approach		83	2	87	2.4	0.098	6.6	LOS A	0.3	2.4	0.31	0.62	0.31	52.2
All Vehicles		365	18	384	4.9	0.103	3.8	NA	0.3	2.4	0.12	0.36	0.12	55.2

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018 + Residential] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Heritage Drive / Tigerhawk
Existing [2018] + Residential
Weekend Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	88	1	93	1.1	0.077	5.6	LOS A	0.0	0.1	0.00	0.38	0.00	55.1
2	T1	48	0	51	0.0	0.077	0.0	LOS A	0.0	0.1	0.00	0.38	0.00	56.7
3	R2	1	0	1	0.0	0.077	5.5	LOS A	0.0	0.1	0.00	0.38	0.00	54.6
Approach		137	1	144	0.7	0.077	3.6	NA	0.0	0.1	0.00	0.38	0.00	55.7
East: Tigerhawk Drive (E)														
4	L2	1	0	1	0.0	0.003	5.6	LOS A	0.0	0.1	0.10	0.54	0.10	53.7
5	T1	1	0	1	0.0	0.003	4.7	LOS A	0.0	0.1	0.10	0.54	0.10	53.9
6	R2	1	0	1	0.0	0.003	5.8	LOS A	0.0	0.1	0.10	0.54	0.10	53.2
Approach		3	0	3	0.0	0.003	5.4	LOS A	0.0	0.1	0.10	0.54	0.10	53.6
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.014	5.8	LOS A	0.0	0.1	0.03	0.05	0.03	57.9
8	T1	24	0	25	0.0	0.014	0.0	LOS A	0.0	0.1	0.03	0.05	0.03	59.5
9	R2	1	0	1	0.0	0.014	5.8	LOS A	0.0	0.1	0.03	0.05	0.03	57.2
Approach		26	0	27	0.0	0.014	0.5	NA	0.0	0.1	0.03	0.05	0.03	59.3
West: Tigerhawk Drive (W)														
10	L2	2	0	2	0.0	0.104	5.7	LOS A	0.4	2.6	0.23	0.58	0.23	53.1
11	T1	7	0	7	0.0	0.104	4.6	LOS A	0.4	2.6	0.23	0.58	0.23	53.3
12	R2	90	2	95	2.2	0.104	6.1	LOS A	0.4	2.6	0.23	0.58	0.23	52.5
Approach		99	2	104	2.0	0.104	6.0	LOS A	0.4	2.6	0.23	0.58	0.23	52.5
All Vehicles		265	3	279	1.1	0.104	4.2	NA	0.4	2.6	0.09	0.43	0.09	54.8

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018+ Residential] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Grasshawk Drive / Dragonfly Drive
Existing [2018] + Residential
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.028	5.8	LOS A	0.1	0.7	0.15	0.22	0.15	56.0
2	T1	30	0	32	0.0	0.028	0.2	LOS A	0.1	0.7	0.15	0.22	0.15	57.5
3	R2	17	0	18	0.0	0.028	5.7	LOS A	0.1	0.7	0.15	0.22	0.15	55.4
Approach		48	0	51	0.0	0.028	2.3	NA	0.1	0.7	0.15	0.22	0.15	56.7
East: Grasshawk Drive (E)														
4	L2	15	0	16	0.0	0.025	5.8	LOS A	0.1	0.7	0.20	0.54	0.20	53.3
5	T1	7	0	7	0.0	0.025	4.7	LOS A	0.1	0.7	0.20	0.54	0.20	53.5
6	R2	7	1	7	14.3	0.025	6.6	LOS A	0.1	0.7	0.20	0.54	0.20	52.1
Approach		29	1	31	3.4	0.025	5.7	LOS A	0.1	0.7	0.20	0.54	0.20	53.1
North: Dragonfly Drive (N)														
7	L2	12	2	13	16.7	0.055	5.7	LOS A	0.0	0.1	0.00	0.08	0.00	56.9
8	T1	87	0	92	0.0	0.055	0.0	LOS A	0.0	0.1	0.00	0.08	0.00	59.4
9	R2	1	0	1	0.0	0.055	5.5	LOS A	0.0	0.1	0.00	0.08	0.00	57.2
Approach		100	2	105	2.0	0.055	0.7	NA	0.0	0.1	0.00	0.08	0.00	59.1
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.040	5.6	LOS A	0.1	1.0	0.23	0.52	0.23	54.0
11	T1	42	0	44	0.0	0.040	4.7	LOS A	0.1	1.0	0.23	0.52	0.23	54.2
12	R2	1	0	1	0.0	0.040	6.2	LOS A	0.1	1.0	0.23	0.52	0.23	53.5
Approach		44	0	46	0.0	0.040	4.8	LOS A	0.1	1.0	0.23	0.52	0.23	54.1
All Vehicles		221	3	233	1.4	0.055	2.5	NA	0.1	1.0	0.11	0.26	0.11	56.7

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018 + Residential] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Grasshawk Drive / Dragonfly Drive
Existing [2018] + Residential
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.060	5.6	LOS A	0.1	0.8	0.04	0.10	0.04	57.4
2	T1	91	0	96	0.0	0.060	0.0	LOS A	0.1	0.8	0.04	0.10	0.04	59.0
3	R2	17	0	18	0.0	0.060	5.5	LOS A	0.1	0.8	0.04	0.10	0.04	56.8
Approach		109	0	115	0.0	0.060	0.9	NA	0.1	0.8	0.04	0.10	0.04	58.6
East: Grasshawk Drive (E)														
4	L2	24	0	25	0.0	0.061	5.6	LOS A	0.2	1.6	0.11	0.54	0.11	53.9
5	T1	42	0	44	0.0	0.061	4.7	LOS A	0.2	1.6	0.11	0.54	0.11	54.1
6	R2	6	1	6	16.7	0.061	6.6	LOS A	0.2	1.6	0.11	0.54	0.11	52.6
Approach		72	1	76	1.4	0.061	5.2	LOS A	0.2	1.6	0.11	0.54	0.11	53.9
North: Dragonfly Drive (N)														
7	L2	9	2	9	22.2	0.019	5.8	LOS A	0.0	0.1	0.02	0.17	0.02	56.0
8	T1	24	0	25	0.0	0.019	0.0	LOS A	0.0	0.1	0.02	0.17	0.02	58.6
9	R2	1	0	1	0.0	0.019	5.7	LOS A	0.0	0.1	0.02	0.17	0.02	56.4
Approach		34	2	36	5.9	0.019	1.7	NA	0.0	0.1	0.02	0.17	0.02	57.8
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.023	5.8	LOS A	0.1	0.6	0.24	0.52	0.24	53.9
11	T1	23	0	24	0.0	0.023	4.7	LOS A	0.1	0.6	0.24	0.52	0.24	54.1
12	R2	1	0	1	0.0	0.023	6.4	LOS A	0.1	0.6	0.24	0.52	0.24	53.4
Approach		25	0	26	0.0	0.023	4.8	LOS A	0.1	0.6	0.24	0.52	0.24	54.1
All Vehicles		240	3	253	1.3	0.061	2.7	NA	0.2	1.6	0.08	0.28	0.08	56.5

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018 + Residential] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield)]

Grasshawk Drive / Dragonfly Drive
Existing [2018] + Residential
Weekend Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.031	5.7	LOS A	0.1	0.7	0.09	0.19	0.09	56.4
2	T1	37	0	39	0.0	0.031	0.1	LOS A	0.1	0.7	0.09	0.19	0.09	57.9
3	R2	17	0	18	0.0	0.031	5.6	LOS A	0.1	0.7	0.09	0.19	0.09	55.8
Approach		55	0	58	0.0	0.031	1.9	NA	0.1	0.7	0.09	0.19	0.09	57.2
East: Grasshawk Drive (E)														
4	L2	22	0	23	0.0	0.048	5.7	LOS A	0.2	1.3	0.14	0.54	0.14	53.7
5	T1	27	1	28	3.7	0.048	4.6	LOS A	0.2	1.3	0.14	0.54	0.14	53.7
6	R2	9	0	9	0.0	0.048	6.1	LOS A	0.2	1.3	0.14	0.54	0.14	53.2
Approach		58	1	61	1.7	0.048	5.2	LOS A	0.2	1.3	0.14	0.54	0.14	53.6
North: Dragonfly Drive (N)														
7	L2	10	1	11	10.0	0.028	5.7	LOS A	0.0	0.1	0.01	0.13	0.01	56.8
8	T1	40	0	42	0.0	0.028	0.0	LOS A	0.0	0.1	0.01	0.13	0.01	58.9
9	R2	1	0	1	0.0	0.028	5.6	LOS A	0.0	0.1	0.01	0.13	0.01	56.7
Approach		51	1	54	2.0	0.028	1.2	NA	0.0	0.1	0.01	0.13	0.01	58.4
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.026	5.6	LOS A	0.1	0.7	0.19	0.51	0.19	54.1
11	T1	27	1	28	3.7	0.026	4.6	LOS A	0.1	0.7	0.19	0.51	0.19	54.1
12	R2	1	0	1	0.0	0.026	6.1	LOS A	0.1	0.7	0.19	0.51	0.19	53.5
Approach		29	1	31	3.4	0.026	4.7	LOS A	0.1	0.7	0.19	0.51	0.19	54.1
All Vehicles		193	3	203	1.6	0.048	3.1	NA	0.2	1.3	0.10	0.33	0.10	55.9

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018 + Residential + Development] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Settlers Boulevarde / Raymond Terrace
Existing [2018] + Residential + Development
AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	782	12	823	1.5	0.508	18.7	LOS B	12.5	88.3	0.73	0.64	0.73	47.6
6	R2	199	5	209	2.5	* 0.707	42.6	LOS D	8.3	59.5	1.00	0.86	1.10	34.7
Approach		981	17	1033	1.7	0.707	23.5	LOS B	12.5	88.3	0.79	0.68	0.81	44.3
North: Settlers Boulevarde (N)														
7	L2	228	4	240	1.8	0.602	26.9	LOS B	13.5	95.9	0.85	0.83	0.85	41.1
9	R2	647	8	681	1.2	* 0.730	31.2	LOS C	17.1	121.2	0.90	0.86	0.93	39.9
Approach		875	12	921	1.4	0.730	30.0	LOS C	17.1	121.2	0.89	0.85	0.91	40.2
West: Raymond Terrace Road (W)														
10	L2	277	9	292	3.2	0.161	6.1	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	417	13	439	3.1	* 0.711	31.7	LOS C	11.6	83.6	0.95	0.82	0.99	39.6
Approach		694	22	731	3.2	0.711	21.5	LOS B	11.6	83.6	0.57	0.70	0.60	44.6
All Vehicles		2550	51	2684	2.0	0.730	25.2	LOS B	17.1	121.2	0.76	0.75	0.78	42.9

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018 + Residential + Development] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	576	7	606	1.2	0.256	6.0	LOS A	5.1	35.8	0.41	0.36	0.41	55.2
6	R2	213	3	224	1.4	* 0.750	43.7	LOS D	9.1	64.7	1.00	0.89	1.16	34.3
Approach		789	10	831	1.3	0.750	16.2	LOS B	9.1	64.7	0.57	0.50	0.61	47.4
North: Settlers Boulevarde (N)														
7	L2	158	1	166	0.6	0.615	39.4	LOS C	8.6	60.6	0.96	0.82	0.96	36.6
9	R2	262	2	276	0.8	* 0.746	43.0	LOS D	8.6	60.6	0.99	0.87	1.11	34.9
Approach		420	3	442	0.7	0.746	41.7	LOS C	8.6	60.6	0.98	0.85	1.05	35.5
West: Raymond Terrace Road (W)														
10	L2	577	2	607	0.3	0.328	6.3	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	851	5	896	0.6	* 0.734	19.8	LOS B	20.5	144.2	0.83	0.74	0.84	45.7
Approach		1428	7	1503	0.5	0.734	14.3	LOS A	20.5	144.2	0.50	0.65	0.50	49.0
All Vehicles		2637	20	2776	0.8	0.750	19.2	LOS B	20.5	144.2	0.59	0.64	0.62	45.8

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Raymond Terrace EX [2018 + Residential + Development] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
Weekend Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	527	3	555	0.6	0.268	9.1	LOS A	5.8	40.7	0.51	0.44	0.51	52.7
6	R2	178	0	187	0.0	* 0.538	38.3	LOS C	6.8	47.9	0.95	0.81	0.95	36.2
Approach		705	3	742	0.4	0.538	16.5	LOS B	6.8	47.9	0.62	0.53	0.62	47.3
North: Settlers Boulevarde (N)														
7	L2	170	0	179	0.0	0.443	30.3	LOS C	7.8	54.8	0.85	0.80	0.85	39.7
9	R2	287	4	302	1.4	* 0.537	34.1	LOS C	8.2	58.2	0.91	0.81	0.91	38.0
Approach		457	4	481	0.9	0.537	32.7	LOS C	8.2	58.2	0.88	0.81	0.88	38.6
West: Raymond Terrace Road (W)														
10	L2	267	5	281	1.9	0.153	6.0	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
11	T1	484	3	509	0.6	* 0.562	23.7	LOS B	11.6	81.5	0.85	0.72	0.85	43.3
Approach		751	8	791	1.1	0.562	17.4	LOS B	11.6	81.5	0.55	0.65	0.55	46.9
All Vehicles		1913	15	2014	0.8	0.562	20.7	LOS B	11.6	81.5	0.66	0.64	0.66	44.7

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018 + Residential + Development] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Harvest Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
AM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	1366	3	1438	0.2	0.527	9.1	LOS A	13.2	92.7	0.51	0.47	0.51	54.5
6	R2	49	1	52	2.0	* 0.376	46.4	LOS D	2.1	14.7	0.99	0.74	0.99	33.5
Approach		1415	4	1489	0.3	0.527	10.4	LOS A	13.2	92.7	0.53	0.48	0.53	53.4
North: Harvest Boulevarde (N)														
7	L2	106	1	112	0.9	0.202	29.7	LOS C	3.3	23.1	0.78	0.75	0.78	40.2
9	R2	92	1	97	1.1	* 0.420	42.1	LOS C	3.7	25.9	0.97	0.77	0.97	34.8
Approach		198	2	208	1.0	0.420	35.5	LOS C	3.7	25.9	0.87	0.76	0.87	37.5
West: Raymond Terrace Road (W)														
10	L2	52	0	55	0.0	0.299	15.9	LOS B	6.5	46.8	0.57	0.54	0.57	49.4
11	T1	754	22	794	2.9	* 0.508	12.0	LOS A	13.0	93.3	0.64	0.58	0.64	50.2
Approach		806	22	848	2.7	0.508	12.3	LOS A	13.0	93.3	0.64	0.57	0.64	50.2
All Vehicles		2419	28	2546	1.2	0.527	13.0	LOS A	13.2	93.3	0.59	0.53	0.59	50.5

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018 + Residential + Development] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Harvest Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
PM Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	1025	5	1079	0.5	0.372	6.5	LOS A	10.0	70.1	0.38	0.34	0.38	55.3
6	R2	120	1	126	0.8	* 0.753	63.1	LOS E	7.2	50.7	1.00	0.87	1.18	29.1
Approach		1145	6	1205	0.5	0.753	12.5	LOS A	10.0	70.1	0.45	0.40	0.46	50.5
North: Harvest Boulevarde (N)														
7	L2	57	0	60	0.0	0.111	41.5	LOS C	2.3	16.4	0.77	0.73	0.77	37.0
9	R2	107	0	113	0.0	* 0.513	56.3	LOS D	5.9	41.2	0.98	0.79	0.98	30.6
Approach		164	0	173	0.0	0.513	51.2	LOS D	5.9	41.2	0.91	0.77	0.91	32.6
West: Raymond Terrace Road (W)														
10	L2	129	0	136	0.0	0.481	18.7	LOS B	16.5	115.8	0.61	0.60	0.61	47.4
11	T1	1304	6	1373	0.5	* 0.817	18.4	LOS B	39.6	278.6	0.78	0.73	0.78	46.8
Approach		1433	6	1508	0.4	0.817	18.4	LOS B	39.6	278.6	0.76	0.72	0.76	46.8
All Vehicles		2742	12	2886	0.4	0.817	17.9	LOS B	39.6	278.6	0.64	0.59	0.65	47.0

MOVEMENT SUMMARY

Site: 101 [Harvest Boulevarde / Raymond Terrace EX [2018 + Residential + Development] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Harvest Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
Weekend Peak
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Raymond Terrace Road (E)														
5	T1	873	4	919	0.5	0.338	6.0	LOS A	7.0	48.9	0.42	0.37	0.42	55.4
6	R2	62	4	65	6.5	* 0.490	47.1	LOS D	2.7	19.6	1.00	0.75	1.00	33.2
Approach		935	8	984	0.9	0.490	8.7	LOS A	7.0	48.9	0.46	0.40	0.46	53.1
North: Harvest Boulevarde (N)														
7	L2	64	1	67	1.6	0.122	29.1	LOS C	1.9	13.6	0.76	0.73	0.76	40.5
9	R2	106	0	112	0.0	* 0.481	42.4	LOS C	4.3	29.9	0.97	0.78	0.97	34.7
Approach		170	1	179	0.6	0.481	37.4	LOS C	4.3	29.9	0.89	0.76	0.89	36.7
West: Raymond Terrace Road (W)														
10	L2	118	1	124	0.8	0.324	16.1	LOS B	7.2	50.8	0.58	0.60	0.58	48.6
11	T1	763	4	803	0.5	* 0.550	12.3	LOS A	14.8	103.7	0.66	0.61	0.66	49.8
Approach		881	5	927	0.6	0.550	12.8	LOS A	14.8	103.7	0.65	0.61	0.65	49.6
All Vehicles		1986	14	2091	0.7	0.550	13.0	LOS A	14.8	103.7	0.58	0.52	0.58	49.6

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018 + Residential + Development] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	23	0	24	0.0	0.018	3.7	LOS A	0.1	0.7	0.05	0.42	0.05	56.3
2	T1	239	12	252	5.0	0.262	3.6	LOS A	1.8	12.9	0.06	0.51	0.06	55.8
3	R2	227	1	239	0.4	0.262	9.2	LOS A	1.8	12.9	0.06	0.51	0.06	56.3
Approach		489	13	515	2.7	0.262	6.2	LOS A	1.8	12.9	0.06	0.51	0.06	56.1
East: Settlers Boulevarde (E)														
4	L2	434	9	457	2.1	0.355	6.0	LOS A	2.6	18.6	0.66	0.65	0.66	53.9
5	T1	4	0	4	0.0	0.006	5.7	LOS A	0.0	0.2	0.55	0.50	0.55	54.8
6	R2	1	0	1	0.0	0.006	11.3	LOS B	0.0	0.2	0.55	0.50	0.55	55.1
Approach		439	9	462	2.1	0.355	6.0	LOS A	2.6	18.6	0.66	0.65	0.66	53.9
North: Heritage Drive (N)														
7	L2	3	0	3	0.0	0.329	5.6	LOS A	2.0	14.4	0.53	0.52	0.53	53.9
8	T1	363	3	382	0.8	0.329	5.6	LOS A	2.0	14.4	0.53	0.52	0.53	55.5
9	R2	1	0	1	0.0	0.329	11.0	LOS B	2.0	14.4	0.53	0.52	0.53	55.9
Approach		367	3	386	0.8	0.329	5.6	LOS A	2.0	14.4	0.53	0.52	0.53	55.5
West: Duskdarter Street (W)														
10	L2	1	0	1	0.0	0.087	5.6	LOS A	0.5	3.2	0.54	0.68	0.54	50.8
11	T1	2	0	2	0.0	0.087	6.1	LOS A	0.5	3.2	0.54	0.68	0.54	52.2
12	R2	85	0	89	0.0	0.087	11.4	LOS B	0.5	3.2	0.54	0.68	0.54	52.6
Approach		88	0	93	0.0	0.087	11.2	LOS B	0.5	3.2	0.54	0.68	0.54	52.5
All Vehicles		1383	25	1456	1.8	0.355	6.3	LOS A	2.6	18.6	0.40	0.57	0.40	55.0

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018 + Residential + Development] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	58	1	61	1.7	0.045	3.7	LOS A	0.2	1.6	0.03	0.42	0.03	56.3
2	T1	166	9	175	5.4	0.387	3.6	LOS A	2.9	20.5	0.04	0.59	0.04	54.7
3	R2	533	0	561	0.0	0.387	9.2	LOS A	2.9	20.5	0.04	0.59	0.04	55.2
Approach		757	10	797	1.3	0.387	7.5	LOS A	2.9	20.5	0.04	0.58	0.04	55.1
East: Settlers Boulevarde (E)														
4	L2	209	8	220	3.8	0.157	4.8	LOS A	1.0	7.1	0.48	0.53	0.48	54.5
5	T1	1	0	1	0.0	0.002	4.9	LOS A	0.0	0.1	0.46	0.50	0.46	54.3
6	R2	1	0	1	0.0	0.002	10.5	LOS B	0.0	0.1	0.46	0.50	0.46	54.7
Approach		211	8	222	3.8	0.157	4.8	LOS A	1.0	7.1	0.48	0.53	0.48	54.5
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.269	7.8	LOS A	1.6	11.5	0.65	0.67	0.65	53.3
8	T1	250	3	263	1.2	0.269	7.0	LOS A	1.6	11.5	0.65	0.67	0.65	54.9
9	R2	1	0	1	0.0	0.269	12.5	LOS B	1.6	11.5	0.65	0.67	0.65	55.2
Approach		252	3	265	1.2	0.269	7.0	LOS A	1.6	11.5	0.65	0.67	0.65	54.9
West: Duskdarter Street (W)														
10	L2	2	0	2	0.0	0.051	7.2	LOS A	0.3	2.0	0.65	0.70	0.65	50.2
11	T1	2	0	2	0.0	0.051	8.4	LOS A	0.3	2.0	0.65	0.70	0.65	51.6
12	R2	40	0	42	0.0	0.051	13.0	LOS B	0.3	2.0	0.65	0.70	0.65	51.9
Approach		44	0	46	0.0	0.051	12.5	LOS B	0.3	2.0	0.65	0.70	0.65	51.8
All Vehicles		1264	21	1331	1.7	0.387	7.2	LOS A	2.9	20.5	0.26	0.59	0.26	54.9

MOVEMENT SUMMARY

Site: 101 [Settlers Boulevarde / Heritage Drive / Duskdarter EX [2018 + Residential + Developme] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Settlers Boulevarde / Raymond Terrace
Existing [2018]+ Residential + Development
Weekend Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Settlers Boulevarde (S)														
1	L2	40	0	42	0.0	0.031	3.6	LOS A	0.2	1.1	0.03	0.42	0.03	56.3
2	T1	128	5	135	3.9	0.254	3.6	LOS A	1.6	11.3	0.03	0.58	0.03	54.9
3	R2	331	0	348	0.0	0.254	9.2	LOS A	1.6	11.3	0.03	0.58	0.03	55.4
Approach		499	5	525	1.0	0.254	7.3	LOS A	1.6	11.3	0.03	0.57	0.03	55.3
East: Settlers Boulevarde (E)														
4	L2	244	0	257	0.0	0.172	4.6	LOS A	1.0	7.3	0.43	0.51	0.43	54.8
5	T1	1	0	1	0.0	0.002	4.7	LOS A	0.0	0.1	0.41	0.50	0.41	54.5
6	R2	1	0	1	0.0	0.002	10.3	LOS B	0.0	0.1	0.41	0.50	0.41	54.9
Approach		246	0	259	0.0	0.172	4.6	LOS A	1.0	7.3	0.43	0.51	0.43	54.8
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.191	5.8	LOS A	1.1	7.5	0.51	0.53	0.51	54.0
8	T1	203	3	214	1.5	0.191	5.5	LOS A	1.1	7.5	0.51	0.53	0.51	55.6
9	R2	1	0	1	0.0	0.191	11.0	LOS B	1.1	7.5	0.51	0.53	0.51	56.0
Approach		205	3	216	1.5	0.191	5.5	LOS A	1.1	7.5	0.51	0.53	0.51	55.6
West: Duskdarter Street (W)														
10	L2	1	0	1	0.0	0.044	5.5	LOS A	0.2	1.6	0.51	0.66	0.51	50.9
11	T1	1	0	1	0.0	0.044	6.1	LOS A	0.2	1.6	0.51	0.66	0.51	52.4
12	R2	42	1	44	2.4	0.044	11.3	LOS B	0.2	1.6	0.51	0.66	0.51	52.6
Approach		44	1	46	2.3	0.044	11.1	LOS B	0.2	1.6	0.51	0.66	0.51	52.6
All Vehicles		994	9	1046	0.9	0.254	6.4	LOS A	1.6	11.3	0.25	0.55	0.25	55.1

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018 + Residential + Development] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Heritage Drive / Tigerhawk
Existing [2018]+ Residential + Development
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	161	7	169	4.3	0.207	5.9	LOS A	0.5	3.6	0.15	0.30	0.15	54.9
2	T1	148	1	156	0.7	0.207	0.3	LOS A	0.5	3.6	0.15	0.30	0.15	56.5
3	R2	41	4	43	9.8	0.207	6.6	LOS A	0.5	3.6	0.15	0.30	0.15	54.1
Approach		350	12	368	3.4	0.207	3.6	NA	0.5	3.6	0.15	0.30	0.15	55.5
East: Tigerhawk Drive (E)														
4	L2	30	0	32	0.0	0.078	6.2	LOS A	0.3	2.0	0.37	0.64	0.37	52.3
5	T1	11	0	12	0.0	0.078	7.4	LOS A	0.3	2.0	0.37	0.64	0.37	52.5
6	R2	24	1	25	4.2	0.078	8.5	LOS A	0.3	2.0	0.37	0.64	0.37	51.6
Approach		65	1	68	1.5	0.078	7.2	LOS A	0.3	2.0	0.37	0.64	0.37	52.1
North: Heritage Drive (N)														
7	L2	28	5	29	17.9	0.128	5.9	LOS A	0.0	0.4	0.03	0.08	0.03	56.8
8	T1	197	1	207	0.5	0.128	0.0	LOS A	0.0	0.4	0.03	0.08	0.03	59.2
9	R2	4	0	4	0.0	0.128	6.7	LOS A	0.0	0.4	0.03	0.08	0.03	57.0
Approach		229	6	241	2.6	0.128	0.9	NA	0.0	0.4	0.03	0.08	0.03	58.9
West: Tigerhawk Drive (W)														
10	L2	24	0	25	0.0	0.443	7.2	LOS A	2.4	16.8	0.56	0.88	0.78	49.9
11	T1	23	0	24	0.0	0.443	8.7	LOS A	2.4	16.8	0.56	0.88	0.78	50.1
12	R2	231	2	243	0.9	0.443	11.1	LOS B	2.4	16.8	0.56	0.88	0.78	49.4
Approach		278	2	293	0.7	0.443	10.5	LOS B	2.4	16.8	0.56	0.88	0.78	49.5
All Vehicles		922	21	971	2.3	0.443	5.3	NA	2.4	16.8	0.26	0.44	0.32	54.1

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018 + Residential + Development] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Heritage Drive / Tigerhawk
Existing [2018]+ Residential + Development
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	303	6	319	2.0	0.222	5.6	LOS A	0.2	1.7	0.05	0.47	0.05	54.1
2	T1	60	0	63	0.0	0.222	0.2	LOS A	0.2	1.7	0.05	0.47	0.05	55.6
3	R2	16	6	17	37.5	0.222	6.7	LOS A	0.2	1.7	0.05	0.47	0.05	52.0
Approach		379	12	399	3.2	0.222	4.8	NA	0.2	1.7	0.05	0.47	0.05	54.2
East: Tigerhawk Drive (E)														
4	L2	10	0	11	0.0	0.023	5.9	LOS A	0.1	0.6	0.28	0.57	0.28	53.0
5	T1	9	0	9	0.0	0.023	6.8	LOS A	0.1	0.6	0.28	0.57	0.28	53.1
6	R2	3	0	3	0.0	0.023	6.6	LOS A	0.1	0.6	0.28	0.57	0.28	52.5
Approach		22	0	23	0.0	0.023	6.4	LOS A	0.1	0.6	0.28	0.57	0.28	53.0
North: Heritage Drive (N)														
7	L2	8	4	8	50.0	0.078	6.6	LOS A	0.0	0.3	0.04	0.05	0.04	55.5
8	T1	127	0	134	0.0	0.078	0.1	LOS A	0.0	0.3	0.04	0.05	0.04	59.5
9	R2	4	0	4	0.0	0.078	6.9	LOS A	0.0	0.3	0.04	0.05	0.04	57.3
Approach		139	4	146	2.9	0.078	0.6	NA	0.0	0.3	0.04	0.05	0.04	59.2
West: Tigerhawk Drive (W)														
10	L2	3	0	3	0.0	0.412	6.4	LOS A	2.2	15.3	0.52	0.84	0.66	50.9
11	T1	6	0	6	0.0	0.412	7.2	LOS A	2.2	15.3	0.52	0.84	0.66	51.0
12	R2	280	2	295	0.7	0.412	9.2	LOS A	2.2	15.3	0.52	0.84	0.66	50.4
Approach		289	2	304	0.7	0.412	9.2	LOS A	2.2	15.3	0.52	0.84	0.66	50.4
All Vehicles		829	18	873	2.2	0.412	5.7	NA	2.2	15.3	0.22	0.53	0.27	53.5

MOVEMENT SUMMARY

Site: 101 [Heritage Drive / Tigerhawk Drive EX [2018 + Residential + Development] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Heritage Drive / Tigerhawk
Existing [2018]+ Residential + Development
Weekend Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heritage Drive (S)														
1	L2	310	1	326	0.3	0.203	5.5	LOS A	0.0	0.1	0.00	0.50	0.00	54.2
2	T1	48	0	51	0.0	0.203	0.0	LOS A	0.0	0.1	0.00	0.50	0.00	55.6
3	R2	1	0	1	0.0	0.203	5.7	LOS A	0.0	0.1	0.00	0.50	0.00	53.7
Approach		359	1	378	0.3	0.203	4.8	NA	0.0	0.1	0.00	0.50	0.00	54.4
East: Tigerhawk Drive (E)														
4	L2	1	0	1	0.0	0.003	5.8	LOS A	0.0	0.1	0.20	0.54	0.20	53.3
5	T1	1	0	1	0.0	0.003	6.1	LOS A	0.0	0.1	0.20	0.54	0.20	53.4
6	R2	1	0	1	0.0	0.003	6.0	LOS A	0.0	0.1	0.20	0.54	0.20	52.7
Approach		3	0	3	0.0	0.003	6.0	LOS A	0.0	0.1	0.20	0.54	0.20	53.1
North: Heritage Drive (N)														
7	L2	1	0	1	0.0	0.044	6.3	LOS A	0.0	0.1	0.02	0.02	0.02	58.2
8	T1	78	0	82	0.0	0.044	0.0	LOS A	0.0	0.1	0.02	0.02	0.02	59.8
9	R2	1	0	1	0.0	0.044	6.8	LOS A	0.0	0.1	0.02	0.02	0.02	57.5
Approach		80	0	84	0.0	0.044	0.2	NA	0.0	0.1	0.02	0.02	0.02	59.7
West: Tigerhawk Drive (W)														
10	L2	2	0	2	0.0	0.412	6.2	LOS A	2.2	15.6	0.47	0.76	0.56	51.6
11	T1	7	0	7	0.0	0.412	6.4	LOS A	2.2	15.6	0.47	0.76	0.56	51.8
12	R2	314	2	331	0.6	0.412	8.2	LOS A	2.2	15.6	0.47	0.76	0.56	51.1
Approach		323	2	340	0.6	0.412	8.2	LOS A	2.2	15.6	0.47	0.76	0.56	51.1
All Vehicles		765	3	805	0.4	0.412	5.7	NA	2.2	15.6	0.20	0.56	0.24	53.4

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018+ Residential + Development] AM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Grasshawk Drive / Dragonfly Drive
Existing [2018]+ Residential + Development
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.098	5.9	LOS A	0.5	3.3	0.22	0.46	0.22	53.9
2	T1	30	0	32	0.0	0.098	0.3	LOS A	0.5	3.3	0.22	0.46	0.22	55.2
3	R2	126	0	133	0.0	0.098	5.8	LOS A	0.5	3.3	0.22	0.46	0.22	53.3
Approach		157	0	165	0.0	0.098	4.7	NA	0.5	3.3	0.22	0.46	0.22	53.7
East: Grasshawk Drive (E)														
4	L2	123	0	129	0.0	0.102	5.8	LOS A	0.4	3.0	0.19	0.55	0.19	53.1
5	T1	7	0	7	0.0	0.102	5.3	LOS A	0.4	3.0	0.19	0.55	0.19	53.2
6	R2	7	1	7	14.3	0.102	7.6	LOS A	0.4	3.0	0.19	0.55	0.19	51.9
Approach		137	1	144	0.7	0.102	5.9	LOS A	0.4	3.0	0.19	0.55	0.19	53.0
North: Dragonfly Drive (N)														
7	L2	12	2	13	16.7	0.055	5.7	LOS A	0.0	0.1	0.00	0.08	0.00	56.9
8	T1	87	0	92	0.0	0.055	0.0	LOS A	0.0	0.1	0.00	0.08	0.00	59.4
9	R2	1	0	1	0.0	0.055	5.5	LOS A	0.0	0.1	0.00	0.08	0.00	57.2
Approach		100	2	105	2.0	0.055	0.7	NA	0.0	0.1	0.00	0.08	0.00	59.1
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.045	5.6	LOS A	0.2	1.1	0.30	0.56	0.30	53.8
11	T1	42	0	44	0.0	0.045	5.2	LOS A	0.2	1.1	0.30	0.56	0.30	53.9
12	R2	1	0	1	0.0	0.045	7.6	LOS A	0.2	1.1	0.30	0.56	0.30	53.3
Approach		44	0	46	0.0	0.045	5.3	LOS A	0.2	1.1	0.30	0.56	0.30	53.9
All Vehicles		438	3	461	0.7	0.102	4.2	NA	0.5	3.3	0.17	0.41	0.17	54.6

MOVEMENT SUMMARY

Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018 + Residential + Development] PM (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Grasshawk Drive / Dragonfly Drive
Existing [2018]+ Residential + Development
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.216	6.5	LOS A	1.2	8.1	0.39	0.45	0.39	53.8
2	T1	91	0	96	0.0	0.216	0.9	LOS A	1.2	8.1	0.39	0.45	0.39	55.1
3	R2	223	0	235	0.0	0.216	6.4	LOS A	1.2	8.1	0.39	0.45	0.39	53.2
Approach		315	0	332	0.0	0.216	4.9	NA	1.2	8.1	0.39	0.45	0.39	53.8
East: Grasshawk Drive (E)														
4	L2	24	0	25	0.0	0.080	5.6	LOS A	0.3	2.1	0.11	0.56	0.11	53.0
5	T1	42	0	44	0.0	0.080	6.4	LOS A	0.3	2.1	0.11	0.56	0.11	53.1
6	R2	6	1	6	16.7	0.080	9.4	LOS A	0.3	2.1	0.11	0.56	0.11	51.7
Approach		72	1	76	1.4	0.080	6.4	LOS A	0.3	2.1	0.11	0.56	0.11	52.9
North: Dragonfly Drive (N)														
7	L2	217	2	228	0.9	0.137	5.6	LOS A	0.0	0.1	0.00	0.52	0.00	54.0
8	T1	24	0	25	0.0	0.137	0.0	LOS A	0.0	0.1	0.00	0.52	0.00	55.4
9	R2	1	0	1	0.0	0.137	5.8	LOS A	0.0	0.1	0.00	0.52	0.00	53.5
Approach		242	2	255	0.8	0.137	5.0	NA	0.0	0.1	0.00	0.52	0.00	54.2
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.036	5.8	LOS A	0.1	0.9	0.45	0.66	0.45	52.5
11	T1	23	0	24	0.0	0.036	7.0	LOS A	0.1	0.9	0.45	0.66	0.45	52.6
12	R2	1	0	1	0.0	0.036	7.8	LOS A	0.1	0.9	0.45	0.66	0.45	52.0
Approach		25	0	26	0.0	0.036	7.0	LOS A	0.1	0.9	0.45	0.66	0.45	52.6
All Vehicles		654	3	688	0.5	0.216	5.2	NA	1.2	8.1	0.22	0.49	0.22	53.8

MOVEMENT SUMMARY

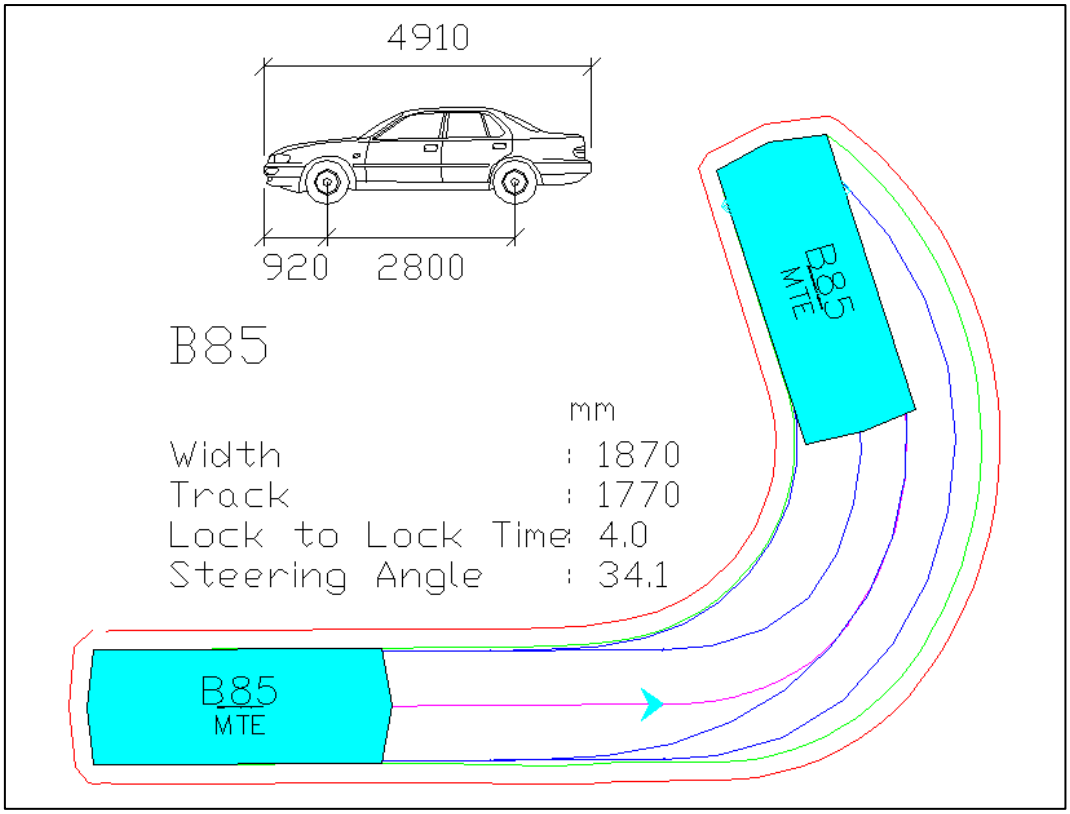
Site: 101 [Grasshawk Drive / Dragonfly Drive EX [2018 + Residential + Development] Weekend (Site Folder: Existing 2018 Volumes + Thorton North Residential Yield + Development)]

Grasshawk Drive / Dragonfly Drive
Existing [2018]+ Residential + Development
Weekend Peak
Site Category: (None)
Give-Way (Two-Way)

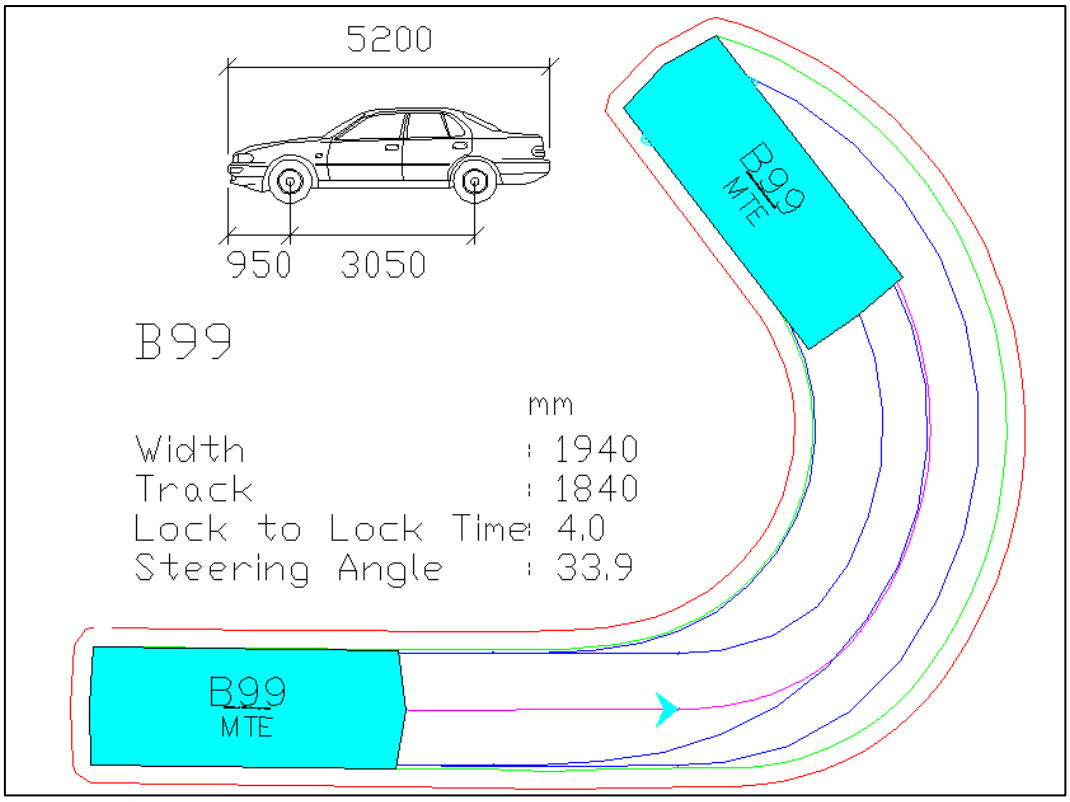
Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dragonfly Drive (S)														
1	L2	1	0	1	0.0	0.205	6.7	LOS A	1.0	7.3	0.42	0.55	0.42	53.0
2	T1	37	0	39	0.0	0.205	1.1	LOS A	1.0	7.3	0.42	0.55	0.42	54.4
3	R2	241	0	254	0.0	0.205	6.6	LOS A	1.0	7.3	0.42	0.55	0.42	52.5
Approach		279	0	294	0.0	0.205	5.8	NA	1.0	7.3	0.42	0.55	0.42	52.8
East: Grasshawk Drive (E)														
4	L2	22	0	23	0.0	0.064	5.7	LOS A	0.2	1.6	0.15	0.57	0.15	52.9
5	T1	27	1	28	3.7	0.064	6.4	LOS A	0.2	1.6	0.15	0.57	0.15	52.9
6	R2	9	0	9	0.0	0.064	8.4	LOS A	0.2	1.6	0.15	0.57	0.15	52.4
Approach		58	1	61	1.7	0.064	6.4	LOS A	0.2	1.6	0.15	0.57	0.15	52.8
North: Dragonfly Drive (N)														
7	L2	232	1	244	0.4	0.154	5.5	LOS A	0.0	0.1	0.00	0.50	0.00	54.2
8	T1	40	0	42	0.0	0.154	0.0	LOS A	0.0	0.1	0.00	0.50	0.00	55.7
9	R2	1	0	1	0.0	0.154	5.6	LOS A	0.0	0.1	0.00	0.50	0.00	53.7
Approach		273	1	287	0.4	0.154	4.7	NA	0.0	0.1	0.00	0.50	0.00	54.5
West: Grasshawk Drive (W)														
10	L2	1	0	1	0.0	0.042	5.6	LOS A	0.1	1.0	0.40	0.65	0.40	52.4
11	T1	27	1	28	3.7	0.042	7.1	LOS A	0.1	1.0	0.40	0.65	0.40	52.4
12	R2	1	0	1	0.0	0.042	7.5	LOS A	0.1	1.0	0.40	0.65	0.40	51.9
Approach		29	1	31	3.4	0.042	7.1	LOS A	0.1	1.0	0.40	0.65	0.40	52.4
All Vehicles		639	3	673	0.5	0.205	5.5	NA	1.0	7.3	0.21	0.53	0.21	53.5

ANNEXURE D: SWEPT PATH TESTING
(11 SHEETS)



AUSTRALIAN STANDARD 85TH PERCENTILE SIZE VEHICLE (B85)

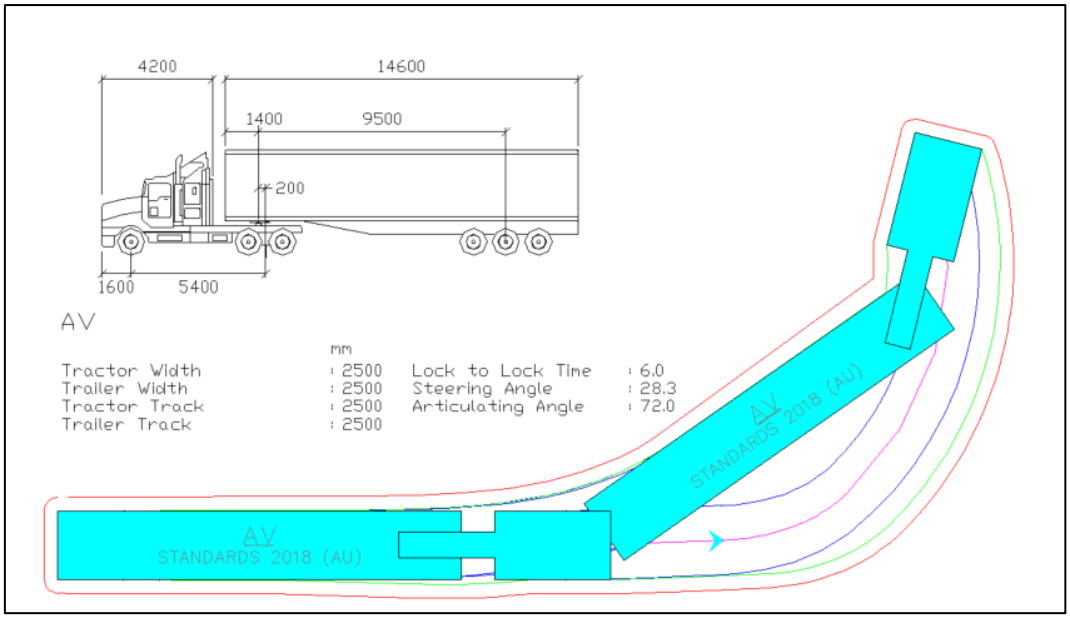


AUSTRALIAN STANDARD 99.8TH PERCENTILE SIZE VEHICLE (B99)

Blue – Tyre Path

Green – Vehicle Body

Red – 300mm Clearance

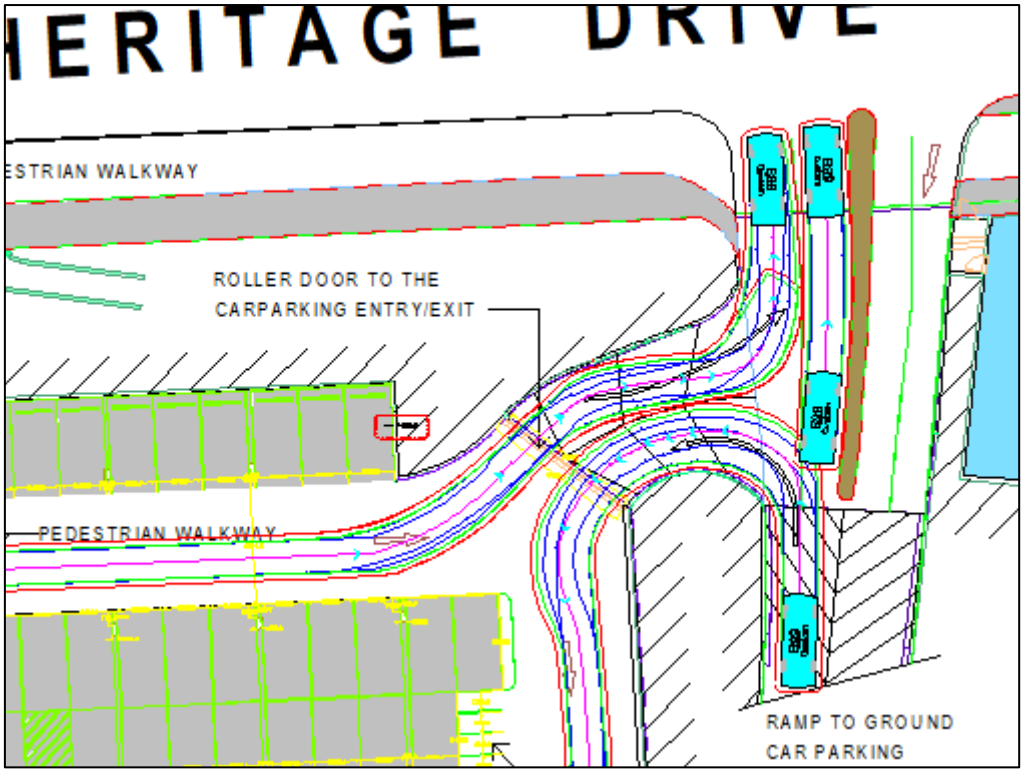


AUSTRALIAN STANDARD ARTICULATED VEHICLE (AV)

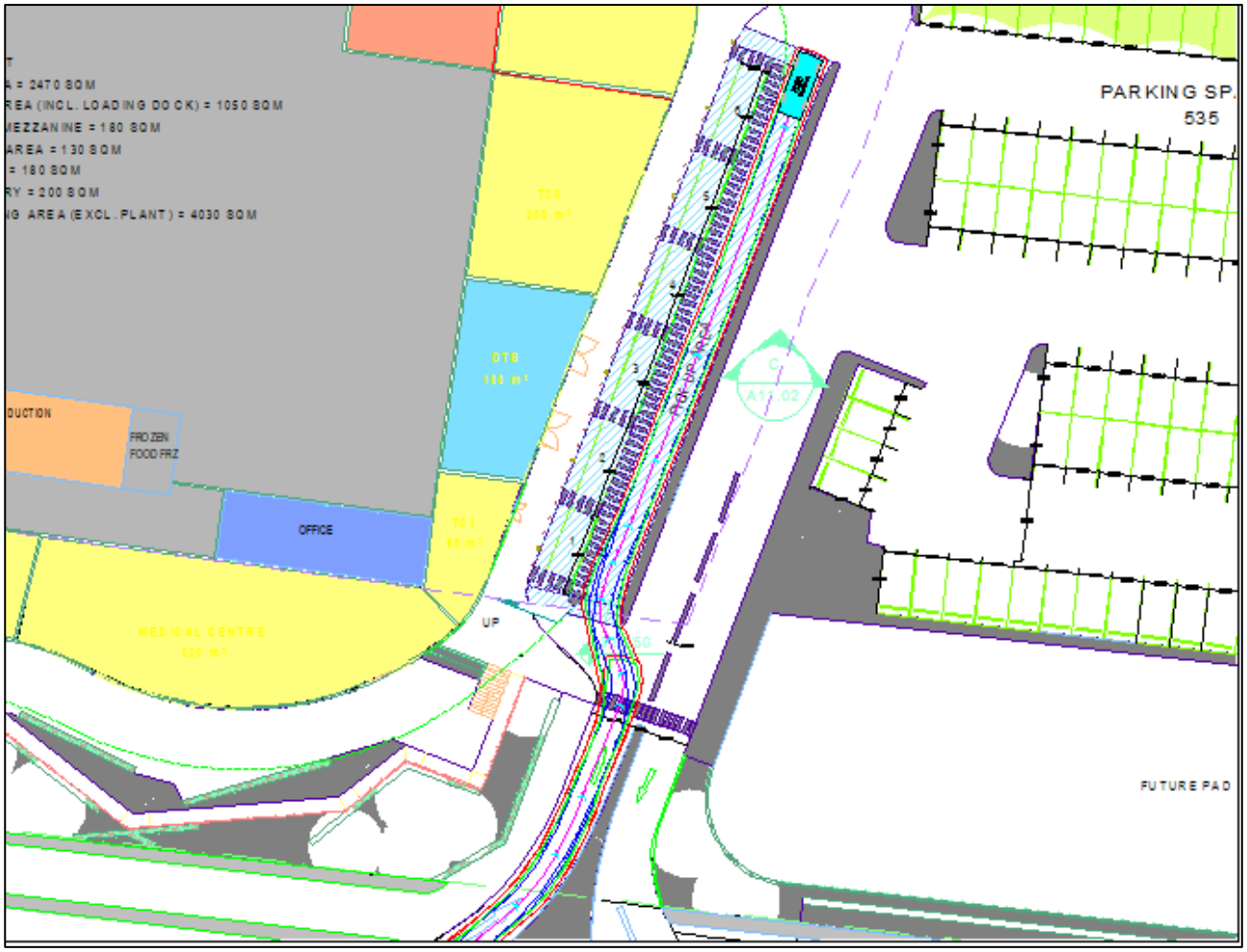
Blue – Tyre Path

Green – Vehicle Body

Red – 500mm Clearance

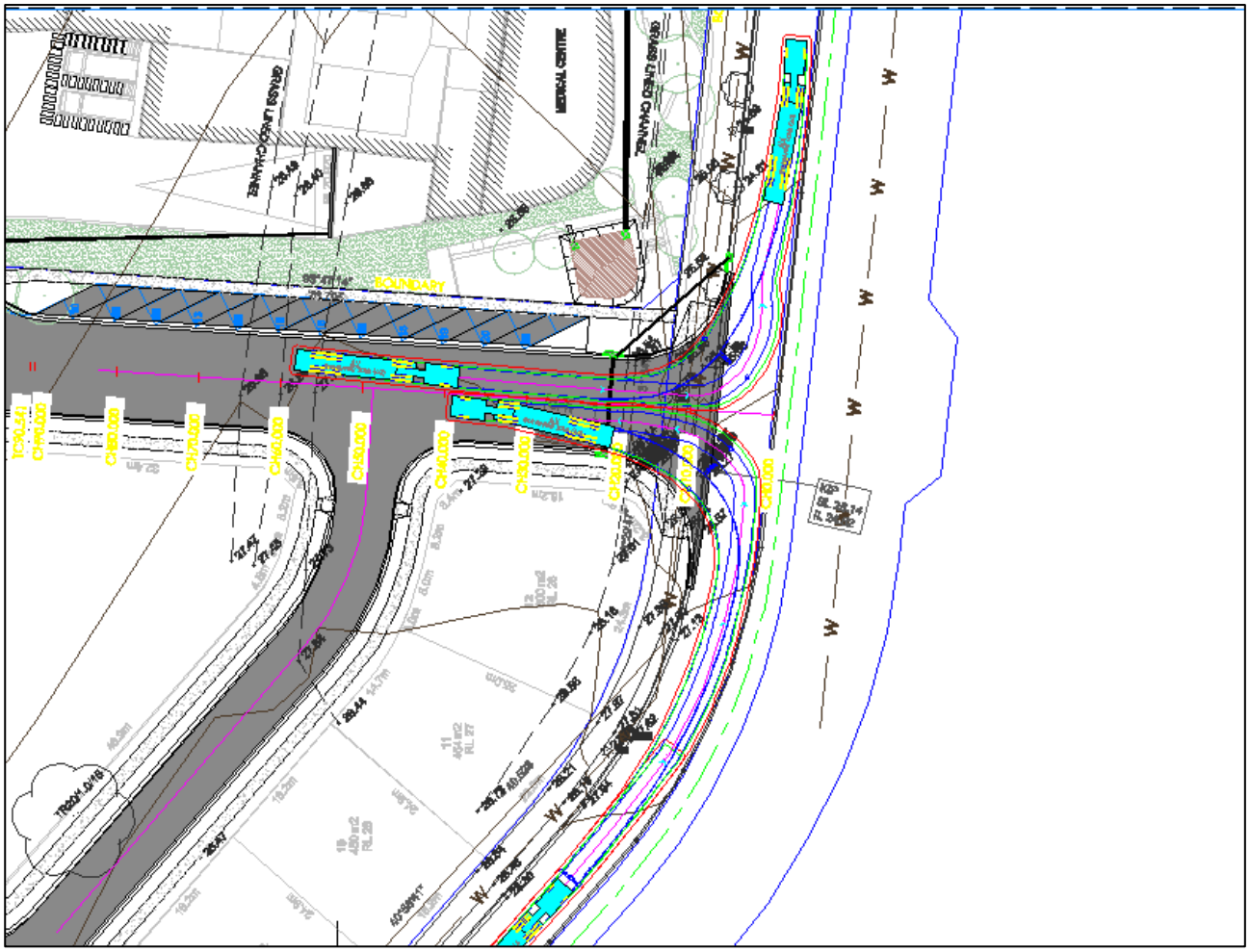


B99 passing B99 into the basement
Successful

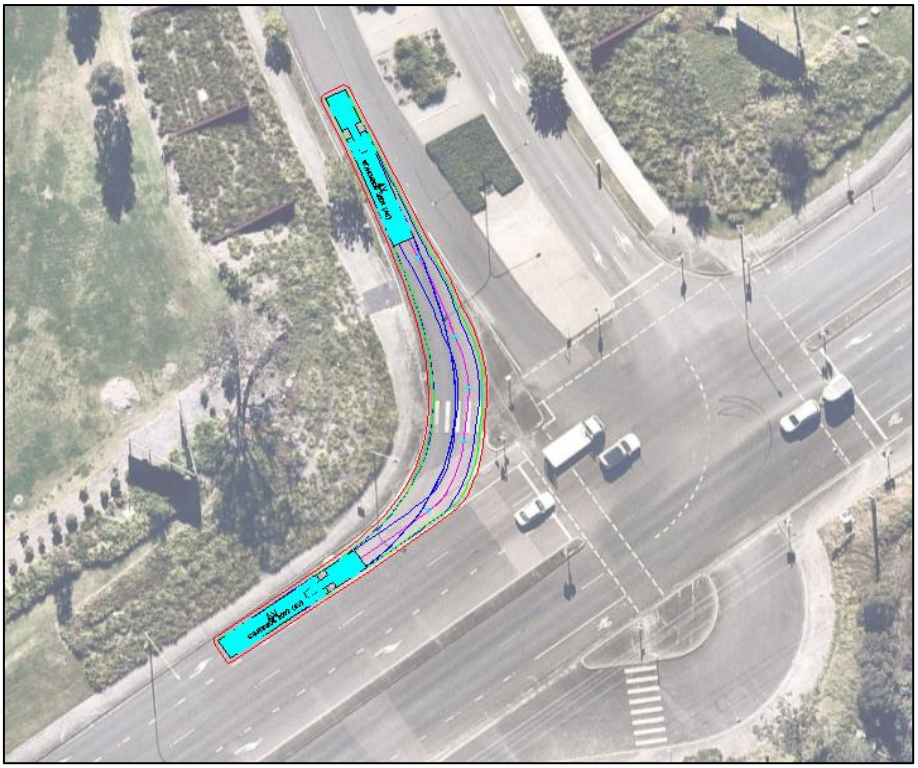


B99 circulation through the direct to boot pick-up area

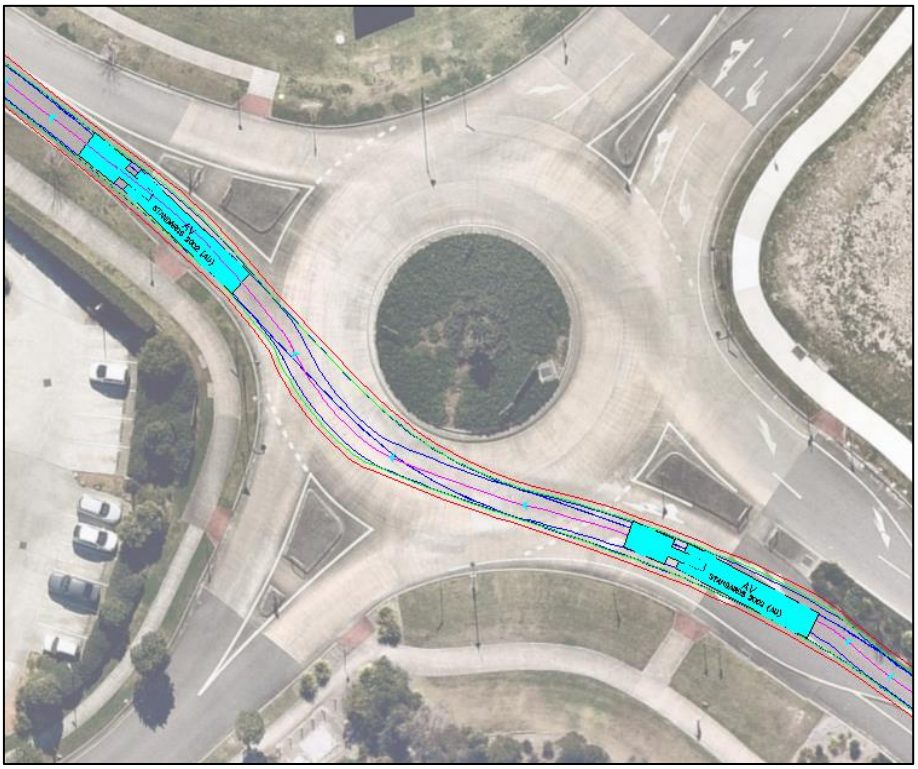
Successful



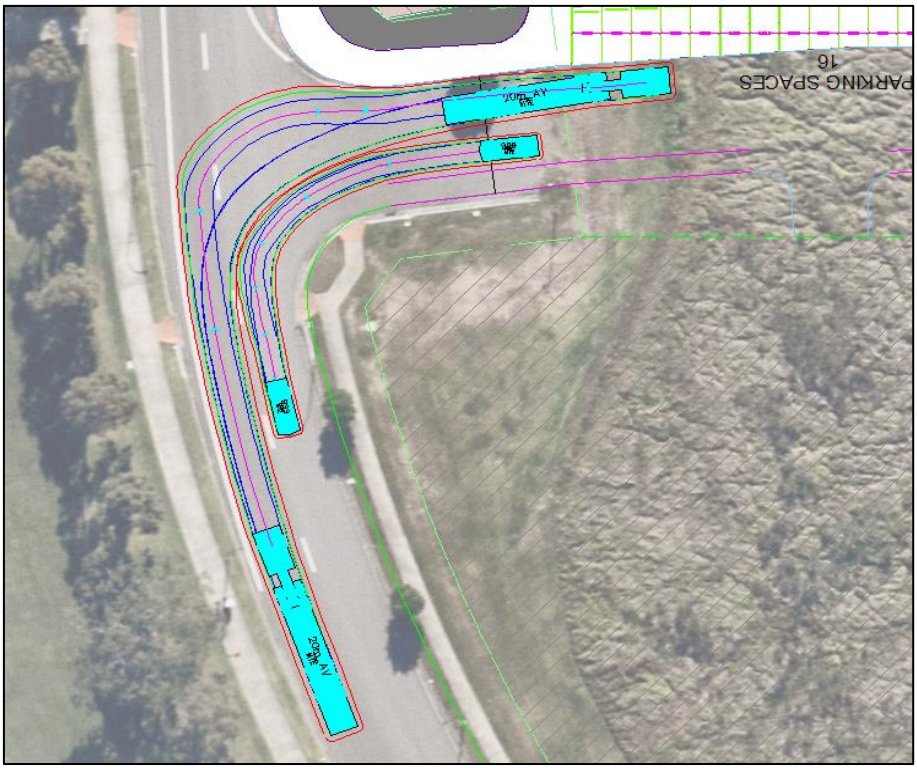
AV into and out of New Link Road from Settlers Boulevard
Successful



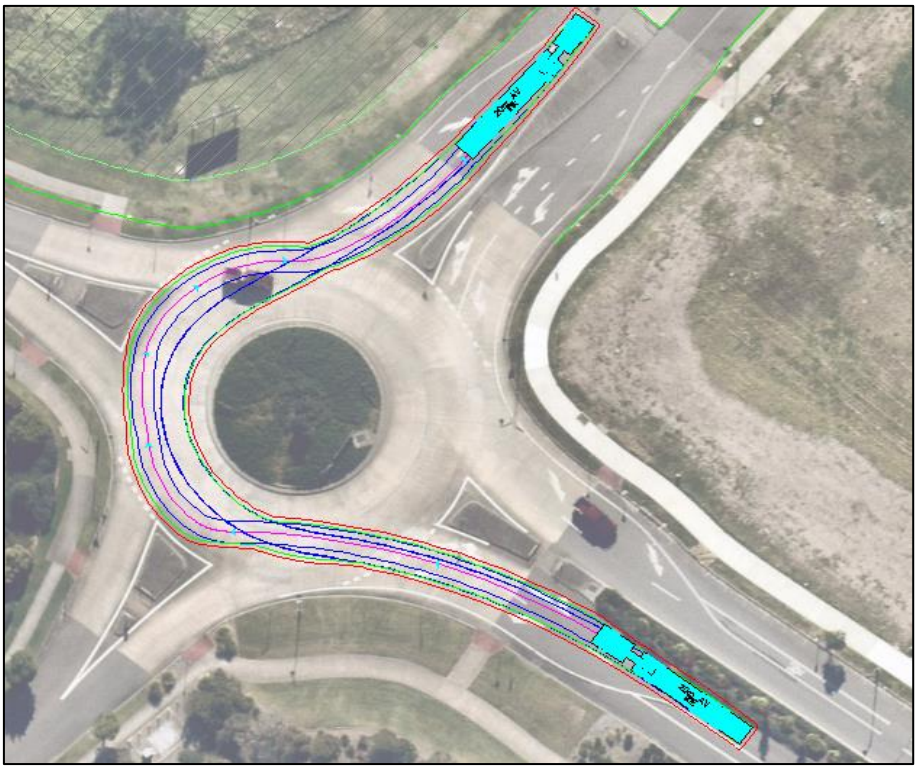
Entry Route – AV Left Turn Into Settlers Boulevard From Raymond Terrace Drive Successful



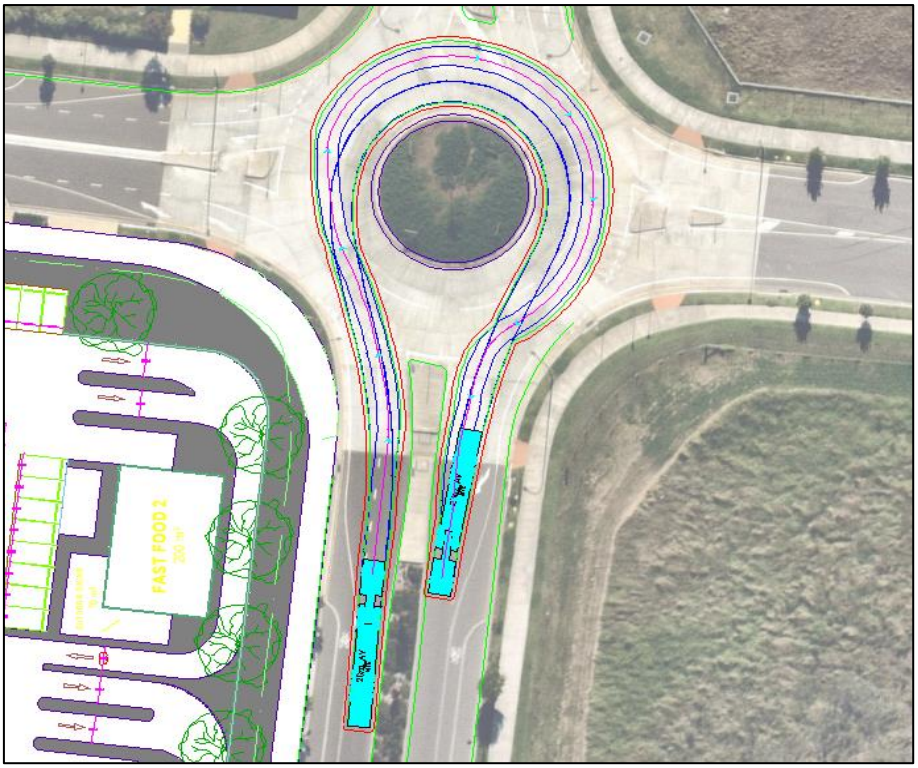
Entry Route – AV Through The Roundabout Onto Hertiage Drive Successful



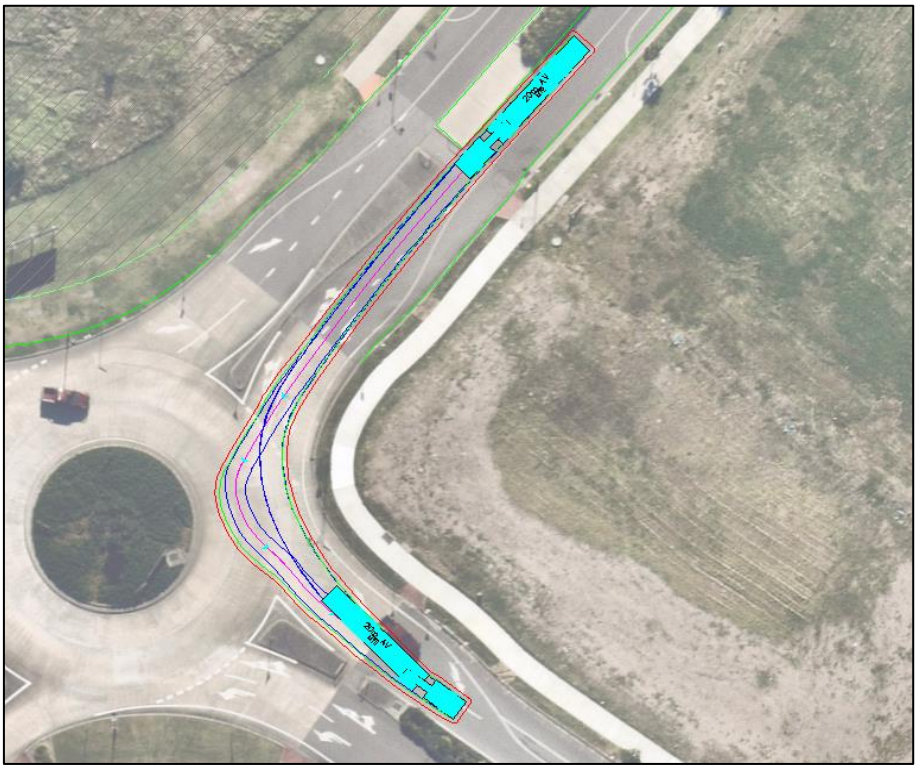
Entry Route – AV Right Turn Into Proposed Road From Heritage Drive (Including Two-Way Passing With B99)
Successful



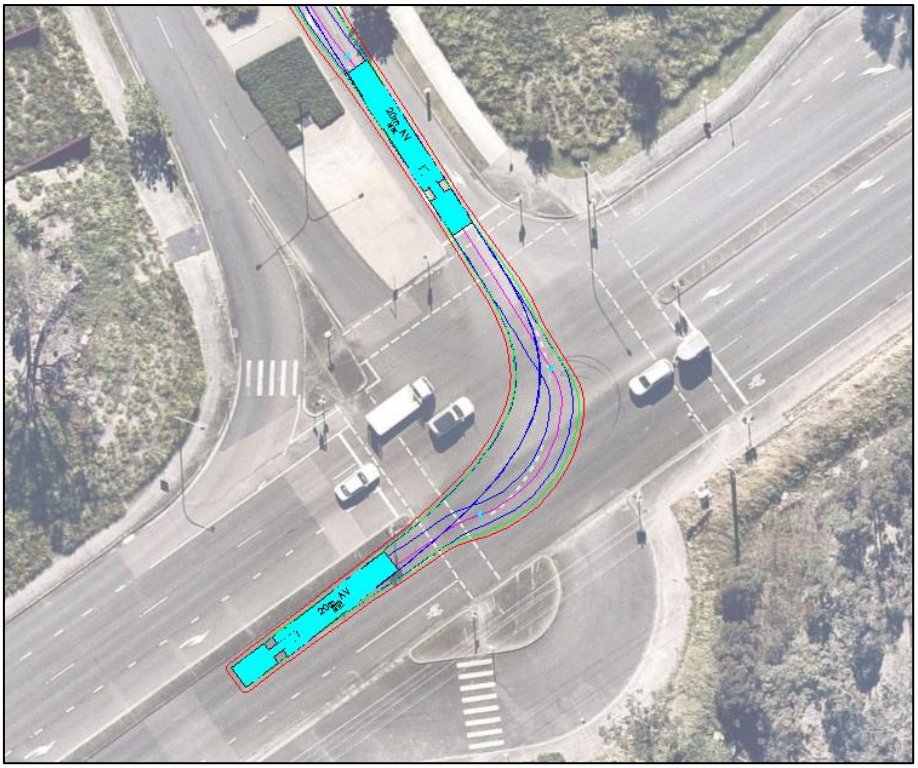
Entry Route – AV Right Turn Into Settlers Boulevard
Successful



Exit Route – AV U-Turn On Settlers Boulevard / Tigerhawk Drive Successful

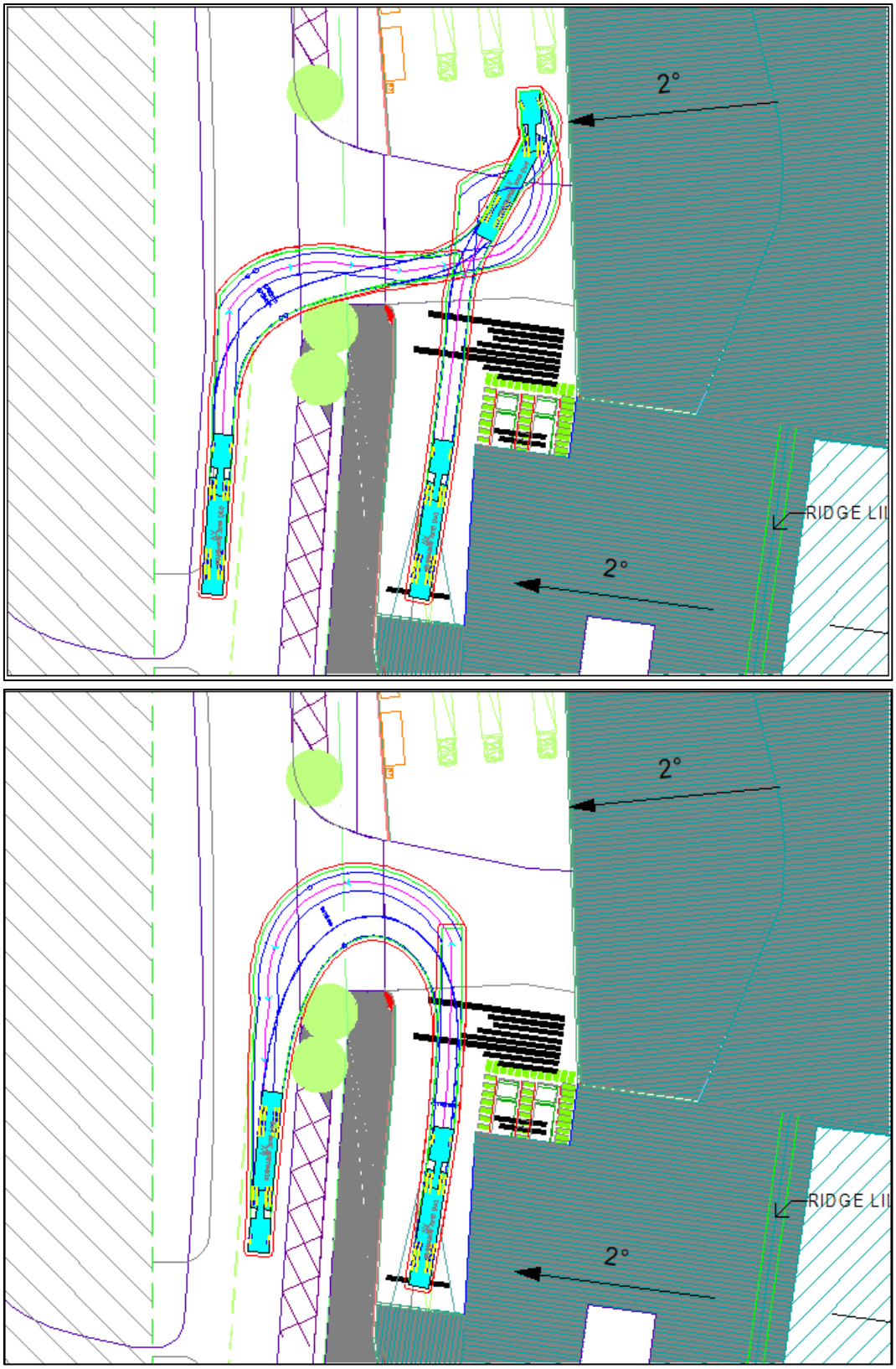


Exit Route – AV Left Turn Into Settlers Boulevard Successful



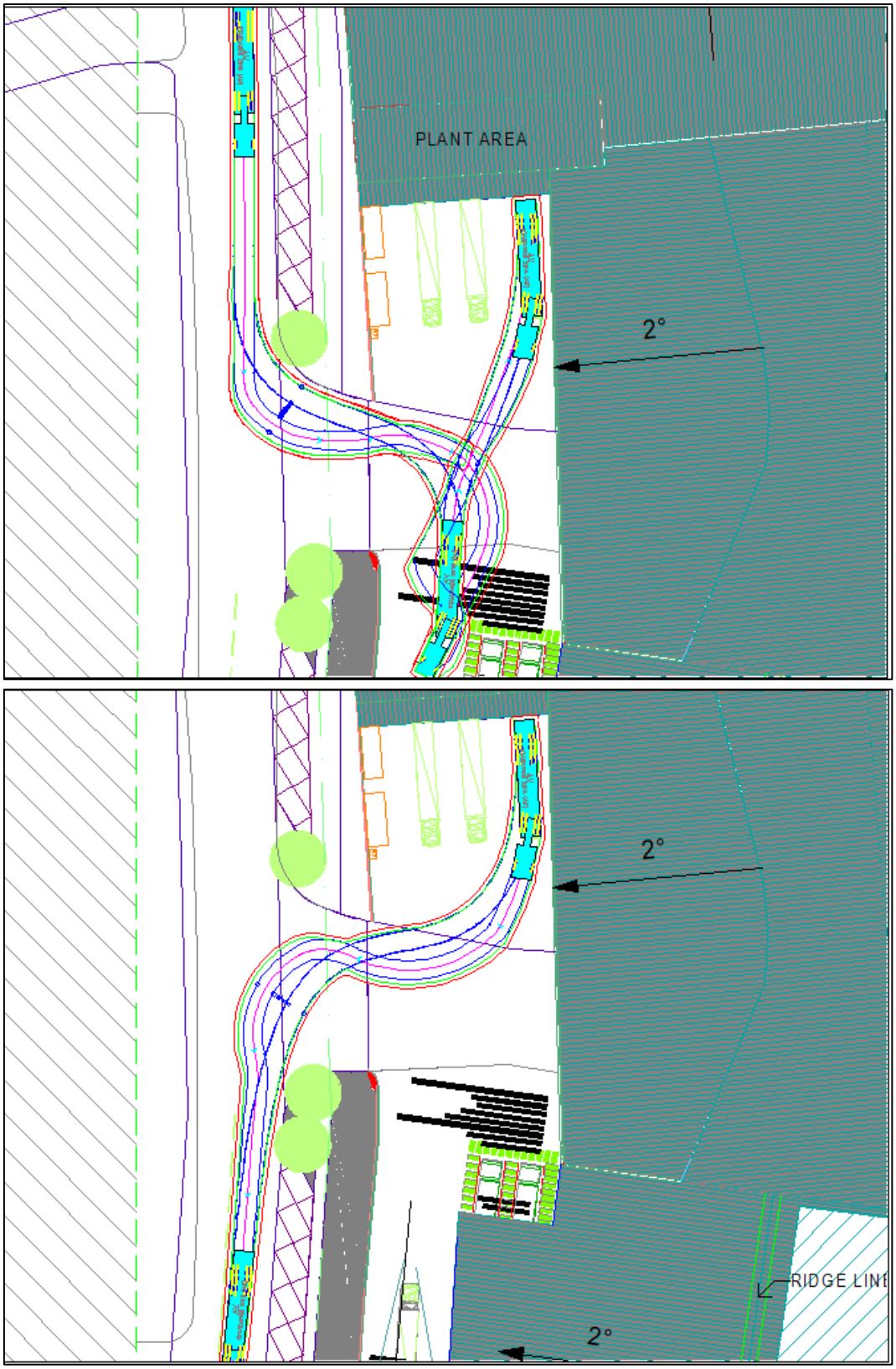
Exit Route – AV Right Turn Into Raymond Terrace Drive From Settlers Boulevard

Successful



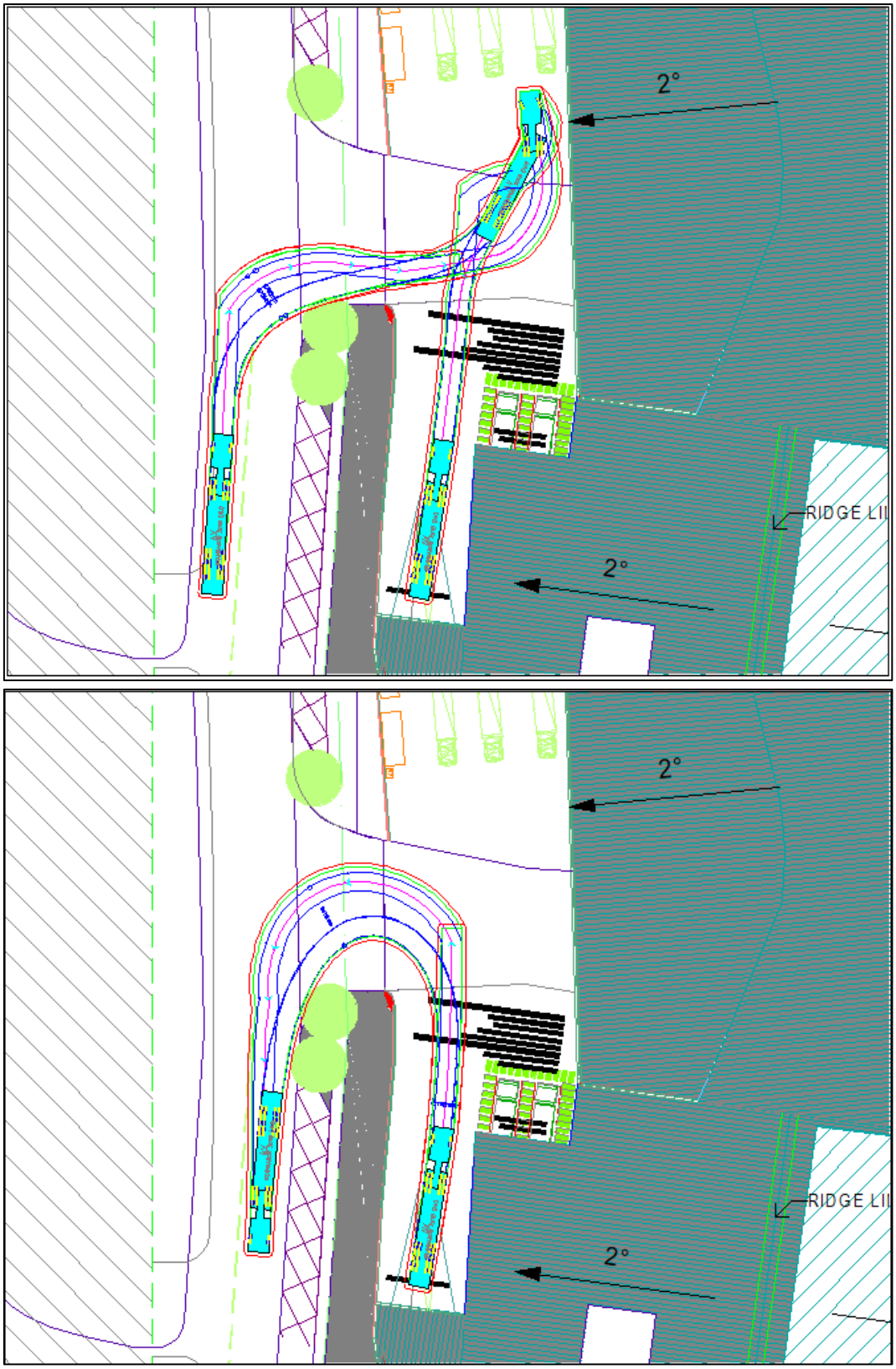
AV Entry and exit from New Link Road

Successful



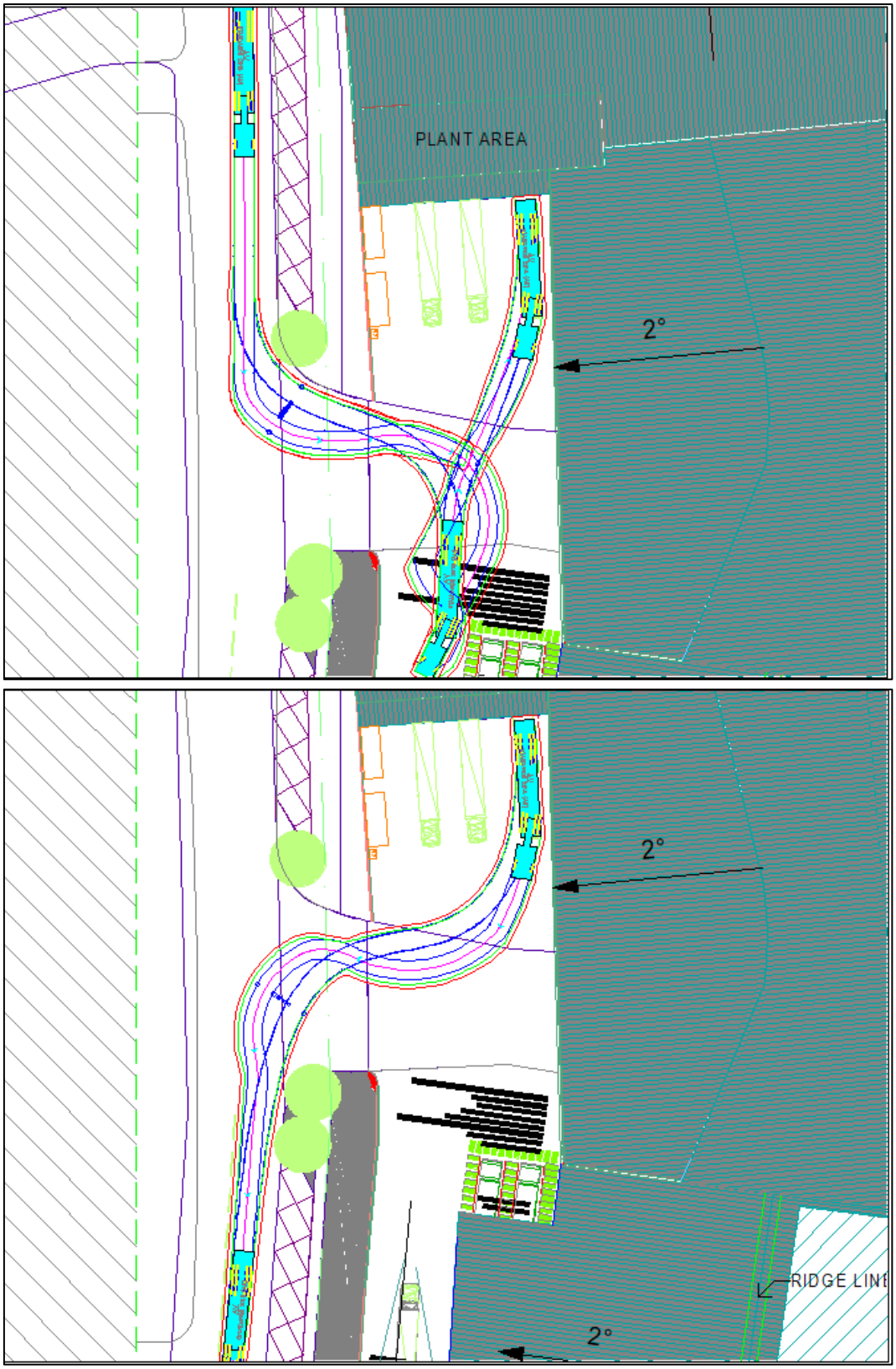
AV Entry and exit from New Link Road

Successful



AV Entry and exit from New Link Road

Successful



AV Entry and exit from New Link Road

Successful

mckenzie group

A Bureau Veritas Group Company

Regulatory Compliance Report

Chisolm Shopping Centre
Heritage Drive, Chisholm

Prepared for: **BN Group**
Date: **19/11/2021**
Revision: **02**

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Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
01/10/21	00	45	Preliminary	Joseph Decleva	Geoff Pearce	05/10/21
27/10/21	00	45	Final	Joseph Decleva	Geoff Pearce	27/10/21
08/11/21	01	46	Final	Joseph Decleva	Geoff Pearce	08/11/21
19/11/21	02	43	Final	Joseph Decleva	Michael Krogh	19/11/21

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1. Executive Summary

Development Overview

The proposed development is mixed use shopping centre development and associated car park.

Compliance Summary

As Registered Certifiers we have reviewed the concept architectural design documents prepared by BN Group for compliance with the current building assessment provisions, i.e. the Building Code of Australia 2019 Amendment 1 (BCA).

This report has been prepared to assess the project against the Building Code of Australia to enable issuance of construction approvals. Further assessment of the design will be undertaken as the design develops to ensure compliance is achieved prior to approval being issued

Deviations from the Deemed-to-Satisfy Provisions

The assessment of the schematic design documentation has revealed that the following areas deviate from the deemed-to-satisfy provisions of the BCA. These items are to be addressed to ensure compliance is achieved, either through design amendment to achieve compliance with the deemed-to-satisfy provisions, or through a performance solution demonstrating compliance with the Performance Requirements of the BCA:

No.	Description	DTS Clause	Performance Requirements
Fire Safety Items			
1	Justification of travel distances exceeding 30m to an exit from the retail tenancies and medical centres on the ground floor.	D1.4	DP4, EP2.2
2	Justification of alternate exits to be located within 9m of one another to the childcare building.	D1.5	DP4
3	Justification of the reduced exit and travel to exit widths to the supermarket, mini major and childcare tenancies to allow for increased patron capacity.	D1.6	DP6
4	Justification as to the exit doors to swing inward against the direction of egress.	D2.20	DP2
5	Justification as to any fire hose reel omissions to ground floor retail tenancies, childcare/pool/gym building and carpark.	E1.4	EP1.1
6	Justification of the smoke exhaust system to be rationalised throughout the development.	E2.2	EP2.2
7	Justification of any exit signs proposed to be above 2.7m from the ground.	E4.2	EP4.2
8	Justification of the minimum unobstructed width of 6m to allow emergency vehicular access located within 18m around the entire building perimeter.	C2.4	CP9
Accessibility Items The current plans are not developed to a stage where a full DDA review for compliance could be undertaken and further matters may be seen as the design further develops.			
9	Justification of the distance of landing intervals to the 1:14 ramps of the eastern side of the building.	D3.2	DP2
Miscellaneous Items			

No.	Description	DTS Clause	Performance Requirements
10	**Weatherproofing of External Walls** As there are no deemed to satisfy provisions relating to the weatherproofing of external walls, a performance solution is to be provided by the façade engineer/registered architect. Demonstrating that the external walls comply with the requirements of Performance Requirement FP1.4.	F1.1	FP1.4

The feasibility and any additional requirements that will apply as a result of the performance solution will need to be confirmed by the professional preparing the performance solution. Any performance solution will need to be prepared by a suitably qualified/accredited professional.

Fire Safety Services

The following key fire safety services are required to meet the minimum DTS requirements.

1.	Fire hydrant system throughout the buildings as per BCA E1.3 and AS2419.1-2005
2.	Fire hose reels throughout the buildings as per BCA E1.4 and AS2441-2005
3.	Automatic smoke detection and alarm system throughout as per BCA Specification E2.2a and AS1670.1-2018
4.	Carpark ventilation systems must comply with Clause 5.5 of AS/NZS1668.1-2015 except that fans with metal blades suitable for operation at normal temperature may be used and the electrical power and control cabling need not be fire rated as per BCA E2.2 and AS168.1-2015

Refer to part 7 of this report for further details regarding the required services.

The fire engineered solution relating to insert relevant CP9 and EP2.2 items will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process.

Further Assessment

The assessment of the design documentation has also revealed that the following additional information is required in order to complete the assessment, and/or the following areas need to be further reviewed.

No.	Further Information / Review Required	Report Reference
1	Owners confirmation of occupant numbers. Numbers can be adjusted as required however it may affect egress and sanitary facility requirements.	5.1
3	A full detailed disabled access review will need to be undertaken once all surfaces, levels, thresholds, dimensions, and door widths and locations re shown on the plans.	8
7	A full detailed review of the early childcare facilities will need to be undertaken once further detail has been provided.	10.1 & 10.2
8	Verification around the kids splash/fountain water depth to determine whether a AS1926.1 & 2 will be required.	11.1

Documentation to enable assessment and demonstrate compliance will be required to address the above items prior to approval.

The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended) and the Environmental Planning & Assessment Regulation 2000.

2. Introduction

The proposed development comprises of the construction of a new mixed shopping centre building including retail, medical centre and childcare tenancies ground floor and a basement carpark including access to above ground pool and gym.

The site is located on the Heritage Drive, Chisholm.

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

The version of the BCA applicable to the development, is version that in place at the time of the application to the Registered Certifier for the Construction Certificate. For the purposes of this Report, BCA 2019 Amendment 1 has been utilised as the version of the BCA applicable at the time of preparation this Report.

3. Compliance with the Building Code of Australia

The Building Code of Australia is a performance based document, whereby compliance is achieved by complying with the Governing Requirements and the Performance Requirements.

Performance Requirements are satisfied by one of the following:

1) A Performance Solution
2) A Deemed-to-Satisfy Solution
3) A combination of (1) and (2)

4. Documentation of Performance Solutions

A Performance Solution must demonstrate compliance with all relevant Performance Requirements, or the solution must be at least equivalent to the Deemed-to-Satisfy provisions.

Compliance with the Performance Requirements is to be demonstrated through one or a combination of the following:

a) Evidence of suitability in accordance with Part A5 of the BCA that shows the use of a material, product, plumbing and drainage product, form of construction or design meets the relevant Performance Requirements.
b) A Verification Method including the following:
    i. The Verification Methods provided in the NCC.
    ii. Other Verification Methods, accepted by the appropriate authority that show compliance with the relevant Performance Requirements
c) Expert Judgement
d) Comparison with the Deemed-to-Satisfy Provisions

Where a Performance Solution is proposed as the method to achieve compliance, the following steps must be undertaken:

a) Prepare a performance-based design brief in consultation with relevant stakeholders
b) Carry out analysis, using one or more of the assessment methods nominated above, as proposed by the performance-based design brief.

c) Evaluate results from (b) against the acceptance criteria in the performance-based design brief
d) Prepare a final report that includes:
   i. All Performance Requirements and/or Deemed-to-Satisfy Provisions identified as applicable
   ii. Identification of all assessment methods used
   iii. Details of required steps above
   iv. Confirmation that the Performance Requirement has been met; and
   v. Details of conditions or limitations, if an exist, regarding the Performance Solution.

This process will come into effect on 1 July 2021.

5. Preliminaries

5.1. Building Assessment Data

Summary of Construction Determination:

Part of Project	Building 1 Main Building Structure	Building 2 Childcare/Pool/Gym
Classification	5, 6, 7a	9b, 10b
Number of Storeys	2	2
Rise In Storeys	2	2
Type of Construction	B	B
Effective Height (m)	3.25	5.25

Note: The effective height of the project includes all stories included in the rise in stories of the project.

Summary of the floor areas and relevant populations where applicable: -

Building 1: Main Building Structure

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Assumed Population (D1.13)
WOW Supermarket (inc associated buildings)	6	4030	327
Medical Centre	5	412	28
Medical Centre	5	349	24
Tenancy 1	6	120	28
Tenancy 2	6	120	28
Tenancy 3	6	155	36
Tenancy 4	6	74	17
Tenancy 5	6	65	15
Tenancy 6	6	87	20
Tenancy 7	6	170	39

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Assumed Population (D1.13)
Tenancy 8	6	65	15
Tenancy 9	6	93	21
Tenancy 10	6	75	17
Tenancy 11	6	257	59
Tenancy 12	6	145	33
Tenancy 13	6	143	33
Tenancy 14	6	416	97
Tavern	6	889	173
Mini Major	6	1500	133
Kiosk	6	194	17
Car Park	7a	3750	125
Car wash area	6	473	20
EOT facilities	6	113	20
Store	7b	218	7
Total		13719	1,332

Building 2: Childcare & Gym/Pool Building

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Assumed Population (D1.3)
Childcare building	9b	1722	125
Gym/Pool/Change	9b	2083	150
Shade Sails	10	N/A	N/A
Total		3805	275

Notes:

- The above populations have been based on floor areas and calculations in accordance with Table D1.13 of the BCA, upon further detail of exit locations and widths the assumed population may be reduced (see D1.6).
- The floor areas to retail portions have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.
- The carpark areas have been considered ancillary to the use for the purposes of population numbers

6. Structure

6.1. Structural Provisions (BCA B1):

New structural works are to comply with the applicable requirements of BCA Part B1, including AS/NZS 1170.0-2002, AS/NZS 1170-1-2002, AS/NZS 1170.2-2011 and AS 1170.4-2007.

Depending on the importance level of the building as determined by AS/NZS 1170.0-2002, the non structural elements of the building, including partitions (and non-structural fire walls), ceilings, services and racking/shelving may be required to comply with the seismic restraint requirements of AS 1170.4-2007. Where this is required, certification will be required confirming that the design of the seismic restraints comply with AS 1170.4-2002. This may be provided by a specialist seismic consultant or by the architect and services design engineers.

It is noted that BCA 2019 introduced a new Verification Method, BV2, which is a pathway available to verify compliance with BCA Performance Requirement BP1.1(a)(iii).

Glazing is to comply with AS1288-2006, and AS2047-2014.

Prior to the issue of the Construction Certificate structural certification is required to be provided by a Professional Engineer registered on the National Engineering Register.

7. Fire Protection

7.1. Fire Compartmentation (BCA C1.1)

The BCA stipulates three levels of fire-resistant construction, which is based upon the rise in storeys and classification of the building. Each of these types of construction has maximum floor area and volume limitations as per BCA Table C2.2.

Based upon the rise in storeys and use of the building, it is required that the main structure building is to be constructed in accordance with the requirements of Type B Construction, the childcare and gym/pool building to be constructed in accordance with the requirements of Type B Construction and is to be constructed in accordance with Table 4 & 5 of Specification C1.1 of the Building Code of Australia 2019 Amendment 1.

The building has been assessed on the basis of the following fire separation / compartmentation within the development:

- The main structure building will be fire separated being seen as separate fire compartments not exceeding the maximum floor and volume limitations.
- The childcare and gym/pool building being seen as each storey having a separate fire compartment.

The maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

Classification		**Type of Construction**		
		A	**B**	**C**
5, 9b or 9c aged care building	max floor area—	8 000 m^2	5 500 m^2	3 000 m^2
	max volume—	48 000 m^3	33 000 m^3	18 000 m^3
6, 7, 8 or 9a (except for patient care areas)	max floor area—	5 000 m^2	3 500 m^2	2 000 m^2
	max volume—	30 000 m^3	21 000 m^3	12 000 m^3

7.2. Fire Resistance (BCA C1.1)

The building should be constructed generally in accordance with the relevant provisions of Specification C1.1 of the BCA applicable to Type B Construction.

Please refer to Appendix B which outlines the required fire rating to be achieved by the development.

The registered project structural engineer will need to be supply a signed consultant advice note confirming the above fire resistance levels are achieved to all loadbearing and non-loadbearing concrete and masonry elements.

Fire rated tested wall systems are to be chosen by the project architect for all non-loadbearing and lightweight partitions with references to AS1530.4 test reports or fire rated tested system reference numbers (i.e. CSR Redbook, Boral Selector, Knauf Blueprint).

Please note that with regards to fire separation, the provisions and required FRL's that apply to the building also apply to an occupiable outdoor space associated with the building.

7.3. Fire Hazard Properties (BCA C1.10 and BCA C1.9)

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to Specification C1.10 of the Building Code of Australia. The following requirements apply:

Sprinkler Protected Areas

a) Floor Coverings – Critical radiant Flux not less than 1.2 kW/m^2
b) Wall and Ceiling Linings – Material Group No. 1,2 & 3

Non-Sprinkler Protected Areas

a) Floor Coverings – Critical radiant Flux not less than 2.2 kW/m^{2}a maximum smoke development rate of 750 percent-minutes
b) Wall and Ceiling Linings – Material Group No. 1 & 2 and with a smoke growth rate index not more than 100, or an average specific extinction area less than 250m^2/kg
c) Other Materials – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8 (if Spread of Flame if >5)

Rigid and flexible air handling ductwork must comply with AS4254 Parts 1 & 2 2012.

Floor linings and floor coverings used in lift cars must have a critical radiant flux not less than 2.2, and wall and ceiling linings must be a Material Group No. 1 or 2.

External Wall Cladding

Since the manin structure and childcare/pool/gym building is of Type B construction, the following components are required to be completely non-combustible:

- External walls, including façade coverings, framing, insulation;
- Flooring and framing of lift pits;
- Non-loadbearing internal walls required to have an FRL;
- All non-loadbearing shafts since the building is a Class 9b building;
- All loadbearing internal walls and loadbearing fire walls, including those that are part of loadbearing shafts.

Please provide product specifications and test reports to AS 1530.1-1994 for all materials to demonstrate compliance

For materials and assemblies that are required to be non-combustible, the material or system must be not deemed combustible when tested in accordance with AS 1530.1-1994.

Combustible Materials

The following materials, though combustible or containing combustible fibres, may be used wherever a non-combustible material is required:

a) Plasterboard.
b) Perforated gypsum lath with a normal paper finish.
c) Fibrous-plaster sheet.
d) Fibre-reinforced cement sheeting.
e) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.
f) Sarking type materials that do not exceed 1mm in thickness and have a Flammability Index not greater than 5.
g) Bonded laminated materials where -

(i) each laminate is non-combustible; and
(ii) each adhesive layer does not exceed 1 mm in thickness; and
(iii) the total thickness of the adhesive layers does not exceed 2 mm; and
(iv) the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole does not exceed 0 and 3 respectively.

It is recommended that once material selections are made, copies of the fire test certificates/reports be provided for review and approval.

Any Aluminium Composite Panels must be labelled in accordance with SA TS 5344.
The BCA does nominate that ancillary elements may not be fixed to an external wall that is required to be non-combustible unless they comprise of the following:

a) An ancillary element that is non-combustible.
b) A gutter, downpipe or other plumbing fixture or fitting.
c) A flashing.
d) A grate or grille not more than 2 m² in area associated with a building service.
e) An electrical switch, socket-outlet, cover plate or the like.
f) A light fitting.
g) A required sign.
h) A sign other than one provided under (a) or (g) that—
   i) achieves a group number of 1 or 2; and
   ii) does not extend beyond one storey; and
   iii) does not extend beyond one fire compartment; and
   iv) is separated vertically from other signs permitted under (h) by at least 2 storeys.

Please provide fire hazard properties reports for any proposed signs and confirm their extent i.e. not spanning more than one storey or fire compartment:

7.4. Separation of equipment (C2.12)

Equipment listed below must be separated from the remainder of the building providing a FRL as required by Spec C1.1 but not less than 120/120/120 with a self-closing fire door with an FRL or not less than -/120/30. When separating a lift shaft and life motor room, an FRL of not less than 12/-/- is required.

a) Lift motors and lift control panels; or
b) Central smoke control plant; or

7.5. Protection of Openings fire rated building elements (BCA C3.5 and BCA C3.10)

The prescriptive provisions of the BCA stipulate that openings within building elements required to have an FRL shall be protected as follows:

a) Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL the same as the FRL of the floor it is passing through;
b) Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL the same as the FRL of the floor it is passing through; (or 120/120/120 where it is a room such as a substation);

Note that where fire dampers, fire collars, etc are utilised, allowance needs to be made for access hatches to be provided within the walls / ceilings to ensure that maintenance access is provided.

As the design develops, details will need to be included in relation to sealing of penetrations / construction of fire rated shafts.

8. Access and Egress

8.1. Provision for Escape (BCA D1)

The egress provisions for the proposed building are provided by the following:

- External perimeter doorways
- External Doors

The egress provisions that apply to the building also apply to any occupiable outdoor areas.

Every part of the class 9b childcare centre must be wholly within a storey which provides direct egress to a road or open space.

Detailing issues that will need to be addressed as the design develops include:

- Door Hardware
- Exit Door Operation
- Stair Construction
- Handrail and Balustrade construction
- Discharge from Fire Isolated Exits
- Details of the egress provisions to the Road.
- Door swings

The following matters have been noted and require further detailing and advice:

a) Alternate exit within 9m Childcare Building
Alternate exits are not permitted to be located within 9m of one another under the deemed-to-satisfy provisions of the BCA.

8.2. Exit Travel Distances (BCA D1.4)

The locations of the proposed exits would appear to indicate that the deemed to satisfy requirements in terms of travel distances, distances between alternative exits and egress widths would be satisfied.

The travel distances to exits should not exceed:

Class 5 to 9

- no point on the floor must be more than 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and
- exits shall be located to not be more than 60m apart and not closer than 9m
- in a class 5 & 6 building, the distance to a single exit serving a storey at the level of access to a road or open space may be increased to 30m

Once locations of all exits have been provided to the retail tenancies a further review can be carried out. The extended travel distances will need to addressed to comply with the requirements of the deemed to satisfy provisions noted above, or be assessed as a performance based design solution using BCA Performance Requirements DP4 & EP2.2.

The extended travel distances will need to addressed to comply with the requirements of the deemed to satisfy provisions noted above, or be assessed as performance solutions by the Fire Safety Engineer using BCA Performance Requirements DP4 & EP2.2

8.3. Dimensions of Exits (BCA D1.6)

Minimum dimensions of 1000mm and 2000mm height to be provided within exits, with the paths of travel should provide a minimum width of 1000mm (note that all maintenance access, cat walks, etc may comply with AS1657-2018 in which case a 600mm clear width is required).

Doorways are permitted to contain a clear opening width of the required width of the exit minus 250mm, with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e. minimum 920 mm doors).

If a tenancy is to accommodate more than 100 persons but not more than 200 persons, the aggregate unobstructed width, except for doorways must be not less than 1m plus 250mm for each 25 persons (or part) in excess of 100.

If a tenancy is to accommodate more than 200 persons, the aggregate unobstructed width except for doorways is to be 2m plus 500mm for every 75 persons (or part) in excess of 200.

Increased dimensions of exits and paths of travel to exits is to be considered by the design team and further review is to be undertaken to determine patron numbers achieve the patron number desired

The following table summarises the exit widths required by BCA Clause D1.6:

Tenancy	Assumed number of people	Exit Width Required	Exit Width Provided
WOW Supermarket	327	3.5m	1m
Medical Centre	28	1m	TBD
Medical Centre	24	1m	1m
Tenancy 1	28	1m	TBD
Tenancy 2	28	1m	TBD
Tenancy 3	36	1m	TBD

Tenancy	Assumed number of people	Exit Width Required	Exit Width Provided
Tenancy 4	17	1m	TBD
Tenancy 5	15	1m	TBD
Tenancy 6	20	1m	TBD
Tenancy 7	39	1m	1m
Tenancy 8	15	1m	TBD
Tenancy 9	21	1m	TBD
Tenancy 10	17	1m	TBD
Tenancy 11	59	1m	TBD
Tenancy 12	33	1m	TBD
Tenancy 13	33	1m	TBD
Tenancy 14	97	1m	TBD
Tavern	173	2m	TBD
Mini Major	133	1.5m	TBD
Kiosk	17	1m	1m
Childcare	125	1.25m	5m
Gym/pool/change	150	1.5m	3m

8.4. Egress from Early Childhood Centres (BCA D1.18)

Every part of a 9b early childhood centre must be wholly with a storey that provides direct egress to a road or open space.

Should the early childhood centre not provide direct egress to a road or open space a performance solution is to be used to demonstrate compliance.

8.5. Balustrades and Handrails (BCA D2.16 / BCA D2.17 / D2.24)

Generally

Balustrading to a minimum height of 1000mm with a maximum opening of 124mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm, or where it is possible to fall through an openable window located more than 4m above the surface beneath.

Where it is possible to fall more than 4m to the surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor.

Handrails should generally be provided at a minimum height of 865mm alongside of all ramps and stairs.

The public stairs and ramps located along an accessible path of travel should be designed in accordance with the requirements of AS1428.1 for persons with disabilities. This requires a handrail on each side of the stair and ramp and for the handrail to extend approximately 550mm – 600mm past the last tread / end of ramp.

In addition to the above, handrails are required to both sides of all stairs with a width of 2m or more.

Intermediate rails located between 665mm and 750 mm should be provided within Class 9b Primary Schools.

Openable Windows in Bedrooms & Early Childhood Centres

In Class 9b early childhood centres, where the distance from the floor level to the level below exceeds 2m, window openings shall be provided with protection in accordance with BCA Clause D2.24.

Where the lowest part of the window opening is less than 1.7m above a floor, the window opening must be:

a) Fitted with a device to restrict the opening; or
b) Fitted with a screen with secure fittings

The device or screen required must –

a) Not permit a 125mm sphere to pass through it; and
b) Resist an outward horizontal action of 250N; and
c) Have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden

Further review will be undertaken to ensure compliance as the design develops.

8.6. Slip Resistance

The adoption of BCA 2014 introduced a requirement for slip resistance of stairway treads and ramp surfaces. The requirements are as follows:

Table D2.14 SLIP-RESISTANCE CLASSIFICATION

Application	Surface conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

Confirmation of the method of meeting slip resistance will be required to all stairways and ramps used by pedestrians using either tread / surface materials or via a slip resistant luminance contrast nosing.

9. Services and Equipment

The following section of this report describes the essential fire safety measures and the minimum performance requirements of those measures.

It is noted that the provisions below also apply to occupiable outdoor areas.

9.1. Fire Hydrants (BCA E1.3)

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1.3 and AS2419.1-2005.

The building is required to be provided with a booster assembly as part of the fire hydrant requirements. The booster is required to be located attached to the building at the main entry. If remote from the building, the booster is to be located at the main vehicle entry or with sight of the main entry of the building within 20m of a hardstand area.

9.2. Fire Hose Reels

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441-2005.

Fire hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length and 4m of water spray. Where required, additional fire hose reels shall be located internally as required to provide coverage. These hose reels are to be located adjacent to internal hydrants.

Fire hose reel cupboards must not contain any other services such as water meters, etc., and doors to fire hose reel cupboards are not to impede the path of egress unless a performance solution is developed under BCA Performance Requirement EP1.1

9.3. Fire Extinguishers (BCA E1.6)

The provision of portable fire extinguishers is required to BCA Clause E1.6 and AS2444 - 2001 to provide coverage to all buildings.

Table E.6 details when portable fire extinguishers are required:

Occupancy Class	Risk Class (as defined in AS 2444)
General provisions – Class 2 to 9 buildings (except within sole-occupancy units of a Class 9c building)	a) To cover Class AE or E fire risks associated with emergency services switchboards. (Note 1) b) To cover Class F fire risks involving cooking oils and fats in kitchens. c) To cover Class B fire risks in locations where flammable liquids in excess of 50 litres are stored or used (not excluding that held in fuel tanks of vehicles). d) To cover Class A fire risks in normally occupied fire compartments less than 500m^2 not provided with fire hose reels (excluding open deck carparks). e) To cover Class A fire risks in classrooms and associated schools not provided with fire hose reels. f) To cover Class A fire risks associated with Class 2 or 3 building or class 4 part of building.

Fire extinguishers are to be located in accordance with AS 2444 – 2001.

The fire extinguisher locations are to be shown within either the fire service drawings or the architectural drawings for further review and approval by McKenzie Group.

9.4. Automatic Sprinkler Protection (BCA E1.5)

Automatic sprinkler protection is required to Specification E1.5 and AS2118.1-2017 to the following areas:

- Throughout any fire compartment containing Class 6 areas that exceeds 3,500m^2 in floor area or 21,000m^3 in volume;
- Throughout any fire compartment that exceeds 2,000m^2 in floor area or 12,000m^3 in volume where occupancies of excessive hazard are proposed

Details of the proposed sprinkler system design will need to be reviewed as the design develops.

9.5. Smoke Hazard Management (BCA E2.2)

Smoke hazard management shall be provided throughout the building by means of the following systems:

- Carpark ventilation systems must comply with Clause 5.5 of AS/NZS1668.1-2015 Amendment 1 except that fans with metal blades suitable for operation at normal temperature may be used and the electrical power and control cabling need not be fire rated

A fire indicator panel is required as part of the detection system.

9.6. Lift Services (BCA E3.4 and BCA E3.6)

The passenger lifts to be installed are to be:-

- Fitted with warning signs, fire service controls in accordance with Clauses E3.3, Figure E3.3, E3.7, E3.9 and E3.10 of the BCA.
- Stretcher facilities are to be provided within the lifts with minimum dimensions of 600m wide, 2000mm long and 1400mm high;
- Be provided with the following in order to satisfy accessibility requirements:
  - A handrail in accordance with AS1735.12-1999,
  - Minimum internal floor dimensions of 1400 x 1600mm for lifts which travel more than 12m, or 1100 x 1400mm for lifts which travel not more than 12m,
  - Fitted with a series of door opening sensory devices which will detect a 75mm diameter or across the door opening between 50mm and 1550mm above floor level,
  - Have a set of buttons for operating the lift located at heights above level complying with AS1735.12 - 1999
  - For lifts serving more than 2 levels, automatic audible information within the lift car identifying the level each time the car stops, and audible and visual indication at each lift landing to indicate the arrival of a car

9.7. Exit Signs and Emergency Lighting (BCA E4.2 and BCA E4.5)

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with BCA Part E4 and AS/NZS 2293.1-2018, including the potential use of photo luminescent exit signs.

Where exit signs are proposed to be above 2.7m to avoid potential damage by forklifts in the warehousing areas, this will need to be documented as a performance solution by an accredited fire safety engineer. This would need to be assessed to BCA Performance Requirement EP4.2.

Details are required to be provided for review.

10. Health and Amenity

10.1. Sanitary Facilities (BCA F2.2 and BCA F2.3)

Retail

Separate sanitary facilities are required to be provided for male & female employees. In relation to the public, sanitary facilities are required to be provided either where more than 600 persons can be accommodated (standard shops) or for café / restaurant where there are more than 20 seats.

The following table summarises the sanitary facilities provided:

Sanitary Facilities Provided			
	WC	Urinals	Basins
Male	4	9	7
Female	10	NA	7
Accessible	1	NA	1
The above facilities are adequate for 12,000 patrons servicing the shopping centre and department stores			

Early childhood centre

Facilities for use by children must have each sanitary compartment screened by a partition which, except the doorway, is opaque for a heigh of at least 900mm but not more than 1200mm above floor level.

The following table summarises the sanitary facilities provided:

Sanitary Facilities Provided			
	WC	Urinals	Basins
Children	9		9
The above facilities are adequate for 125 children servicing the childcare centre			

Detailed designs will need to be developed as to the layout, dimensions, etc of the sanitary facilities.

Note: The Unisex facilities provided for people with disabilities may be counted once for each sex. These facilities are to be provided in accordance with AS1428.1-2009.

Bathroom Construction

Where bathrooms or rooms containing water closets have the WC within 1200mm of the doorway, the door shall be either sliding, open outwards, or be provided with removable hinges.

10.2. Childhood Centre Facilities (F2.3)

Early childhood centres are to be provided with the following facilities in accordance with F2.3 (h):

- A kitchen or food preparation area with a kitchen sink, separate hand washing facilities space for a refrigerator and space for cooking facilities, with facilities protected by a door or gate with child proof latches to prevent unsupervised access to the facilities by children younger than 5 years old and the ability to facilitate supervision of children from facilities if the early childhood centre accommodates children younger than 2 years old,
- One bath, shower or shower-bath,
- If the centre accommodates children younger than 3 years old:
    - A laundry facility comprising a washtub and space in the same room for a washing machine,
    - A bench type baby bath, which is within 1m of the nappy change bench,
    - A nappy changing bench which is:
        - Within 1m of separate adult hand washing facilities and bench type baby bath,
        - Must be not less than 0.9m in area and at a height of not less than 850mm, but not more than 900mm above the finished floor level,
        - Must have a space not less than 800mm high, 500mm wide and 800mm deep for the storage of steps,
        - Is positioned to permit a staff member changing a nappy to have visibility of the play area at all times.

10.3. Light and Ventilation (BCA Part F4)

9b early childhood centre natural light:

Natural light is required to be provided by windows (excluding roof lights) that have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 10% of the floor area of all playrooms or the like for the use of children.

The sills of 50% of windows in children's rooms must be located not more than 500 mm above the floor level.

Class 5, 6, 7, 8 & 9:

Natural Ventilation is required to be provided to rooms at a rate of 5% of the floor area in openings. Alternatively, mechanical ventilation is required in accordance with AS1668.2-2012

Artificial lighting complying with AS/NZS1680.0-2009 is to be incorporated with the final detailed design to be developed to confirm this.

These provisions also apply to areas considered as occupiable outdoor areas.

10.4. Room Heights (BCA F3)

The following room heights are applicable to the project and are to be documented in the reflective ceiling plans or similar:

Classification	Room Type	Room height
Office,Retail, Childcare, Pool & Gym (Class 5, 6 & 9b)	General area	2.4m
	Corridors, toilets	2.1m
	Commercial Kitchen	2.4m
Carpark (Class 7a)	General area	2.1m
	Path to accessible space	2.2m
	Above accessible space	2.5m

The architect is to advise if there is any area where the above head height clearances are not available so that options can be explored in relation to compliance or a performance based solution.

10.5. Condensation management (BCA Part F6)

Pliable building membranes installed to an external wall must:

- achieve compliance with AS 4200.1, and
- be installed in accordance with AS4200.2, and
- be a vapour permeable membrane (applicable as the development is in climate zone 7); and
- be located on the exterior side of the primary insulation layer or the wall assembly and except for the single skin mason and single sin concrete be separated from water sensitive materials.

Exhaust systems must achieve a minimum flow rate of 25L/s for bathrooms and sanitary compartments must discharge directly or via a duct to outdoor air or to a roof space that is ventilated.

Kitchens and laundries to achieve a minimum flow rate 40L/s and discharge directly or via a shaft or duct to outdoor air.

Exhaust systems discharging directly or via a shaft or a duct to a roof space must be through evenly distributed systems. Openings for minimum flow requirements must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is greater than 22º. 30% of the total unobstructed area required for exhaust being discharged directly or via a shaft or duct to outdoor air must be located not more than 900 mm below the ridge or highest point of the roof space.

10.6. Waterproofing (BCA FP1.4)

Performance Requirement FP1.4 which relates to the prevention of the penetration of water through external walls, must be complied with. It is noted that there are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.

As such, a performance solution is to be prepared by a suitably qualified professional that demonstrates that the external walls of the proposed building complies with Performance Requirement FP1.4 which reads as follows:

A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—

a) unhealthy or dangerous conditions, or loss of amenity for occupants; and
b) undue dampness or deterioration of building elements.

External above Ground Membranes

All external above ground areas (roof slabs, balconies etc.) shall be protected by a waterproofing system in accordance with AS4654 Parts 1 and 2 – 2012.

For external balconies the waterproofing membrane must have a vertical upward termination height in accordance with the table below dependant on the wind class of the site. The wind class is determined by the structural engineer.

Wind Class Regions A & B	Wind Class Regions C & D	Ultimate Limit State Wind Speed	Termination Height (mm)
N1	-	34	40
N2	-	40	50
N3	C1	50	70
N4	C2	61	100
N5	C3	74	150
N6	C4	86	180

Wet Areas

Internal wet areas throughout the development (e.g. bathrooms, laundries) shall be waterproofed in accordance with AS3740 - 2010 requirements.

Further review will be undertaken as the design develops with respect to the specification of waterproofing membrane, provision of water-stops at doorways etc.

10.7. Stormwater Drainage

Stormwater drainage systems serving the building are to comply with AS3500.3 - 2018.

The use of a syphonic stormwater drainage system is not covered by Australian Standards and any design incorporating one would need an appropriate performance solution will need to be documented by the hydraulic consultant addressing the system compliance against BCA Performance Requirements FP1.2 & FP1.3.

11. Ancillary Provisions

11.1. Swimming Pools (G1.1)

A swimming pool with a depth of water more than 300mm must have suitable barriers constructed is to be in accordance with AS1926 Parts 1 & 2.

Further review of the swimming pool will be undertaken when further design has been provided.

Further verification will be required as to the depth of the water to the kids water splash/fountain playground to verify whether suitable barriers are required.

11.2. Cool Rooms (G1.2)

Refrigerated or cooling chambers which is sufficient size for a person to enter is to be designed in accordance with G1.2.

11.3. Outdoor Play Spaces

Any outdoor play spaces in an early childhood centre must be enclosed on all sides with a barrier which complies with AS 1926.1 & 2.

12. Energy Efficiency

12.1. SECTION J (Transition Period)

The commentary below is an assessment based on the provisions included in BCA 2019 Amendment 1.

12.2. SECTION J (JP1 Energy Use)

Efficient energy use must be achieved appropriate to the function and use of the building, level of human comfort, solar radiation, energy source of the services and sealing of the building envelope. To achieve this JV1, JV2, JV3 and JV4 verification methods have been introduced as options available to achieve compliance.

It is noted that a deemed to satisfy pathway is still available.

Access for maintenance is to be provided to the building in accordance with the requirements of BCA Part J8.

The proposed site will be located in a climate zone 5.

Certification from an appropriately qualified engineer should be provided for either option with a report / computations outlining how compliance is achieved.

Verification Methods

The Verification Methods available to demonstrate compliance with the BCA on a performance basis are as follows:

<u>JV1 NABERS Energy for Offices</u>

- To achieve compliance with JP1 a class 5 building must achieve a minimum of 5.5 NABERS Energy for Offices Base Building Commitment Agreement and comply with ANSI/ASHRAI Standard 140.

- To achieve the energy model for (JP1 (i)) solar radiation the base buildings greenhouse gas emissions are not more than 67% of the 5.5 star level when excluding:
  - Tenant supplementary heating; and
  - Cooling systems; and
  - External lighting; and
  - Car park services.
  - A thermal comfort level between predicted mean vote of -1 to +1 is achieve across not less than 95% of the floor area of all occupied zones for not less than 98% f annual hours of operation.
- The building also need to comply with additional requirements of Spec JVa.

JV2 Green Star

- To achieve compliance with JP1 for Class 3,4,5,6, 7, 8, 9 and common area of Class 2 buildings Green Star can be used as a verification method when the calculation method complies with ANSI/ASHRAE Standard, Specification JVb and when:
  - The building complies with simulation requirements and is registers for a Green Star – Design & As-Built rating; and
  - The annual greenhouse gas emissions of the proposed building are less than 90% of the annual greenhouse gas emissions of the reference building; and
  - In the proposed building, a thermal comfort level of between predicted mean vote of -1 to +1 is achieve across not less than 95% of the floor area of all occupied zones for not less than 98% of the annual hours of operation of the building; and
  - The building complies with the additional requirements of Specification JVa.

JV3 Verification Using a Reference Building

- To achieve compliance with JP1 for Class 3,4,5,6, 7, 8, 9 and common area of Class 2 buildings verification using a reference building can be used when the calculation method complies with ANSI/ASHRAE Standard, Specification JVb and when:
  - It is determined that the annual greenhouse gas emissions of the proposed building are not more than the annual greenhouse gas emissions of a reference building when the proposed building is modeled with the proposed services and the proposed building is modelled with the same services as the reference building. The proposed building thermal comfort level is to be between predicted mean vote of -1 to +1 across not less than 95% of the floor area of all occupied zones for not less than 98% of the annual hours of operation; and
  - The building achieves the additional requirements in Specification JVa; and
  - The greenhouse gas emissions of the proposed building may be offset by renewable energy generated and use on site and another process such as reclaimed energy used on site.

JV4 Building Envelope Sealing

- Compliance with sealing of the building against air leakage is verified when the envelope is sealed at an air permeability rate tested in accordance with Method 1 of AS/NZS ISO 9972, of not more than –
  - For a class 2 building or a class 4 part of a building, 10m³hr.m² at 50 Pa reference pressure; or
  - For a class 5, 6, 8, 9a or 9b building other than a ward area in climate zones 1, 7 and 8, 5 m³/hr.m² at 50 Pa reference pressure; or
  - For class 3 or 9c building, or a class 9a ward area in climate zones 1, 3, 4, 6, 7 and 8 5m³/hr.m² at 50 Pa reference pressure.
- Part J3 and performance solution that uses on of the other NCC assessment Methods which verifies that compliance with JP1 (e) will be achieve can also be used as verification methods.

12.3. Building Fabric (Part J1)

Roof and Ceiling Construction (Part J1.3)

For a deemed-to-satisfy solution roofs and or ceilings are to be constructed to provide a total R-Value greater than or equal to-

(i) in climate zones 1, 2, 3, 4 and 5, R3.7 for a downward direction of heat flow; and
(ii) in climate zone 6, R3.2 for a downward direction of heat floor; and
(iii) in climate zone 7, R3.7 for an upward direction of heat flow; and
(iv) in climate zone 8, R4.8 for an upward direction of heat flow;

In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.

Where the layer of insulation is penetrated by the percentages as tabled below, additional upgrading of the remainder of the insulation level is required.

To achieve compliance with J0.2 (c) a roof that has a metal sheet roofing fixed to metal purlins, metal rafters or metal battens and does not have a celling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens must have a thermal break. The thermal break to be consisting of a material with a R-Value of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

Roof lights (Part J1.4)

Where roof lights are installed they must have :-

(a) a total area of not more than 5% of the floor area of the room or space served; and
(b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of:-
  (i) for Total system SHGC, in accordance with the below table; and
  (ii) for Total system U-value, not more than U3.9;

Roof light shaft index (see Note 1)	Total area of roof lights up to 3.5% of the floor area of the room or space	Total area of roof lights more than 3.5% and up to 5% of the floor area of the room or space
Less than 1.0	Not more than 0.45	Not more than 0.29
1.0 to less than 2.5	Not more or equal to than 0.51	Not more than 0.33
Greater than 2.5	Not more than or equal to 0.76	Not more than 0.49

External Walls and Glazing (Part 1.5)

For walls and glazing construction the total system U-value must not be greater than-

(i) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building other than a ward area, U2.0; and
(ii) for a Class 3 or 9c building or a Class 9a ward area –
  (a) in climate zones 1, 3, 4, 6 or 7, U1.1; or
  (b) in climate zones 2 or 5, U2.0; or
  (c) in climate zones 8, U0.9;

The total system U-value of wall-glazing construction should be calculated in accordance with Specification J1.5a.

Wall components of the wall-glazing construction must achieve a minimum total R-Value of R1.0 where the wall is less 80% if the area and reflect the value specified in Table J1.5a where the wall is *0% or more of the area.

There are further design parameters for display glazing and solar admittances for wall-glazing construction, both of which should comply with the relevant provisions of J1.5.

To achieve compliance with J0.2 (c) a wall that does not have a wall lining or has a wall lining that is fixed directly to the same metal frame and has a lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal frame must have a thermal break. The thermal break is to consist of a material with an R-Value of not less than R.02, installed at all points of contact between the external cladding and metal frame.

Floors (Part J1.6)

Floors are to achieve an R rating of 2.

12.4. Building sealing (Part J3)

Windows and Doors (Part J3.4)

a) A door, openable window or the alike must be sealed –
   (i) When forming part of the envelope; or
   (ii) In climate zones 4,5,6,7 or 8
b) The requirements of (a) do not apply to –
   (i) A window complying with AS2047; or
   (ii) A fire door or smoke door; or
   (iii) A roller shutter door, roller shutter grille or other security door or device installed only for out of house security
c) A seal to restrict air infiltration –
   (i) For the bottom edge of a door, must be draft protection device; and
   (ii) For the other edged of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.
d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than –
   (i) When the conditioned space has a floor area of not more than 50m²; or
   (ii) Where a café, restaurant, open front shop or the like has –
      (A) A 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
      (B) At all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
   (iii) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like

Exhaust fans (Part J3.5)

An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space or a habitable room in climate zones 4, 5, 6, 7, or 8.

Construction of ceilings, walls and floors (Part J3.6)

A seal to restrict air infiltration must be fitted to each edge of the external doors and openable windows. The seals may be foam or compressible strip, fibrous seal or the like. The main entry doors must have either an airlock, or self-closing doors, or a revolving door.

Ceilings, walls, floors and any openings such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with the below when forming part of –

(i) The envelope; or
(ii) In climate zones 4, 5, 6, 7 or 8

Construction required by above must be –

(iii) Enclosed by internal lining systems that are close fittings at ceiling, wall and floor junctions; or
(iv) Sealed at junctions and penetrations with –
  (A) Close fitting architrave, skirting or cornice; or
  (B) Expanding foam, rubber compressible strip, caulking or the like

The above does not apply to openings, grilles or the like required for smoke hazard management.

Evaporative coolers (Part J3.7)

An evaporative cooler must be fitted with a self-closing damper or the like –

(a) When serving a heated space; or
(b) In climate zones 4,5,6,7 or 8.

12.5. Air Conditioning and Ventilation systems (Part J5.0)

Air conditioning and ventilation systems must be designed to comply with the following provisions:

- Be capable of being deactivated when the building or part of a building being served by that system is not occupied;
- Where motorised dampers are in place, they should close when the system is deactivated
- Where serving a sole-occupancy unit in a Class 3 building, must not operate when any external door of the sole-occupancy unit that opens to a balcony or the like, is open for more than one minute;
- Time switches should be provided to control an air-conditioning system of more than 2kWr and a heater of more than 1kW $_{heating}$ used for air-conditioning, and be capable of switching electric power on and off at variable pre-programmed times on variable pre-programmed days.
- Ductwork and fittings in an air-conditioning system should have insulation complying with AS/NZS 4859.1 and have an insulation R-Value greater than or equal to:-
  - for flexible ductwork R1.0; or
  - for cushion boxes, that of the connecting ductwork; or
  - That specified in Table J5.5

Table J5.5

Location of ductwork and fittings	Climate zone 1, 2, 3, 4, 5, 6 or 7	Climate zone 8
Within a conditioned space	1, 2	2.0
Where exposed to direct sunlight	3.0	3.0
All other locations	2.0	3.0

Mechanical:

- Be capable of being deactivated where the building or part of the building served by that system is not occupied
- Time switches must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s, capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days;

Heaters

A heater used for air-conditioning or as part of an air-conditioning system must be a either a solar heater, gas heater, heat pump heaters, a heater using reclaimed heat or an electric heater.

A gas water heater, that is used as part of an air-conditioning system must:-

(i) if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86% ; or
(ii) If rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%

Refrigerant chillers

An air-conditioning system refrigerant chiller must comply with MEPS and the full load operation energy efficiency ratio and integrated part load energy efficiency ratio laid out under clause J5.10 of the BCA when determined in accordance with AHRI 551/591

Unitary air-conditioning equipment

Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS and for a capacity greater than or equal to 65 kWr –

(a) Where water cooled, have a minimum energy efficiency ratio of 4.0 W_r/ $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or
(b) Where air cooled, have a minimum energy efficiency ratio of 2.9 W_r / $W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.

12.6. Artificial Lighting and Power (Part J6)

Interior Artificial Lighting and Power Control (Part J6.2 & 6.3)

In a building other than a sole-occupancy unit of a Class 2 building or a Class 4 building for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density below:-

The maximum illumination power density;

Common rooms, spaces and corridors in a Class 2 building	4.5W/m^2
Stairways, including fire-isolated stairways	2W/m^2
Toilet, locker room, staff room, rest room or the like	3W/m^2
Lift cars	3W/m^2
Service area, cleaner's room and the like	3W/m^2
Control room, switch room or the like	
(A) intermittent monitoring	3W/m^2
(B) Constant monitoring	4.5W/m^2

Plant room:	
(A) Where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	4W/m^2
(B) With a horizontal illuminance target of 80 lx	2W/m^2
Library:	
(A) Stack & shelving area	2.5W/m^2
(B) Reading room & general areas	4.5W/m^2
Office:	
(A) Artificially lit to an ambient level of 200 lx or more	4.5W/m^2
(B) Artificially lit to an ambient level of less than 200 lx	2.5W/m^2
Museum & gallery	2.5W/m^2
Retail:	14W/m^2
Corridors:	5W/m^2
Common rooms, spaces & corridors in a Class 2 building	4.5W/m^2
Lounge area for communal use in a Class 3 or 9c building	4.5W/m^2
Dormitory of Class 3 building:	
(A) Used for sleeping only	3W/m^2
(B) Used for sleeping & study	4W/m^2
Storage	1.5W/m^2
School:	4.5W/m^2
Health Care:	
(A) Infants & children's wards & ED	4W/m^2
(B) Exam room	4.5W/m^2
(C) Exam room in intensive care & high dependency ward	6W/m^2
(D) All other patient care areas inc wards & corridors	2.5W/m^2
Kitchen and food preparation area:	4W/m^2
Car parks:	
(A) General	2W/m^2
(B) Entry zone (first 15m of travel during the daytime	11.5W/m^2
(C) Entry zone (next 4m of travel) during the day	2.5W/m^2
(D) Entry zone (first 20m of travel) during nighttime	2.5W/m^2
Auditoriums, church and public hall :	8W/m^2
Restaurant, café, bar:	14W/m^2

Artificial Lighting must be controlled by a time switch, other control device or a combination of both.

Each light control in a building must not operate lights within an area of more than;

- 250m^2 if in a Class 6 building or Class 8 laboratory
- Not operate lighting for an area more than -
  a) 250m^2 for a space of not more than 2000m^2;
  b) 1000m^2 for a space of more than 2000m^2
  if in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building;
- 1000m^2 for a space of more than 2000m^2

Interior decorative and display lighting

Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled -

- Separately from other artificial lighting; and
- By a manual switch for each area other than when operating times of the displays are the same in a number of areas (e.g. where in a museum) in which case they may be combined; and
- By a time switch in accordance with Specification J6 where the display lighting exceeds 1 kW

Window display must be controlled separately from other display lighting exceeds 1kW.

Exterior artificial lighting

Artificial lighting attached to or directed at the façade of the building if it exceeds a total of 100W must;

- Use LED luminaires for 90% of the total lighting load; or
- Be controlled by a motion detector in accordance with Specification J6 of the BCA;
- When used for decorative purposes, such as façade lighting or signage lighting, have a separate switch in accordance with Specification J6.

Lifts (Part 6.7)

Lifts must be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes and achieve the idle and standby energy performance level required, and the energy efficiency class under J6.7 of the BCA.

Escalators and moving walks (Part J6.8)

Escalators and moving walkways must have the ability to slow to between 0.2 m/s and 0.05 m/s when unused for more than 15 minutes.

12.7. Heated Water Supply and Swimming Pool and Spa Pool Plant (Part 7)

Heated water supply (Part J7.2)

A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia.

Swimming Pool & Spa Pool Heating and Pumping (J7.3 & J7.4))

J7.3(b)(i) Where some or all of the hearting required by (a) is by a gas heater or a heat pump, the swimming pool must have a cover with a minimum R-Value of 0.50 and in time switch to control the operation of the heater.

J7.4(b)(i) Where some or all of the heating required by (a) is by a gas heater or heat pump, the spa pool must have a cover with a minimum R- Value of 0.50 and a push button and a time switch to control the operation of the heater.

13. Access for People with Disabilities

The development is required to comply with the accessibility provisions contained within:

- The Building Code of Australia 2019 Amendment 1;
- Disability (Access to Premises – Buildings) Standards 2010;
- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4.1 -2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

Note: With the introduction of the Commonwealth *Disability Discrimination Act (DDA)* in 1992 (enacted in 1993), all organisations have a responsibility to provide equitable and dignified access to goods, services and premises used by occupants. Organisations and individuals since its introduction, are required to work to the objects of the Act which are to eliminate, as far as possible, discrimination against persons on the ground of disability in the **areas of work, accommodation, education, access to premises, clubs and sports, and the provision of goods, facilities, services and land, existing laws and the administration of Commonwealth laws and programs.**

This report assesses against the requirements contained with the Building Code of Australia (and documents referred to therein) and is not considered to be a full assessment against the Disability Discrimination Act.

13.1. General Building Access Requirements (BCA D3.1)

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2019 Amdt 1 and AS 1428.1. Parts of the building required to be accessible shall comply with the requirements of:-

- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4.1 -2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

Access for persons with a disability is to be provided as follows:

Office/shops (Class 5/Class 6 buildings)

To and within all areas normally used by the occupants

Car parks (Class 7a buildings)

To and within any level containing accessible car parking spaces.

Early childhood centres

To and within all areas normally used by the occupants.

Where a ramp or a lift complying withAS1428.1 is provided, to and within all areas of the level served by the lift or ramp.

Where a group of sole occupant units or individual units are provided, the following ratio is required.

1 to 10 single occupancy units	To and within 1 accessible sole occupancy units
11 to 40	To and within 2 accessible sole occupancy units
41 to 60	To and within 3 accessible sole occupancy units

61 to 80	To and within 4 sole occupancy units
81 to 100	To and within 5 sole occupancy units
101 to 200	To and within 5 sole occupancy units and 1 for every 25 sole occupancy units over 100 or part thereof in excess of 100.
201 to 500 single occupancy units	To and within 9 accessible sole occupancy units, plus 1 for every 30 units in excess of 200 units or part thereof in excess of 200.
More than 500	To and within 19 accessible sole occupancy units plus 1 for every 50 units in excess of 500 units

Where more than 2 single occupancy units are required to be accessible they must be indicative of the range of units/rooms available.

Swimming Pools (Class 10b)

To and into swimming pools with a total perimeter greater than 40 m, associated with a Class 1b, 2, 3, 5, 6, 7, 8 or 9 building that is required to be accessible.

13.2. Provision for Access to Buildings

The BCA prescribes access to be provided to and within the building as follows:

- Via the principle pedestrian entry and at least 50% of all other entrances from the allotment boundary
- From designated car parking spaces for the use of occupants with a disability.
- From another accessible building connected by a pedestrian link.
- All areas used by the occupants.

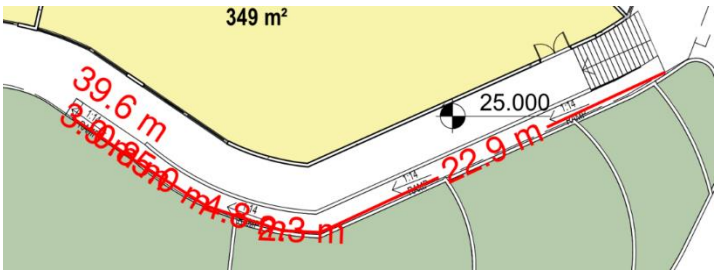
In buildings over 500m^2 in floor area, a non-accessible entrance must not be located more than 50m from an accessible entrance.

Where a pedestrian entry contains multiple doors, the following is required;

- Entrance containing not more than 3 doors, at least one of the doorways must be accessible.
- Where an entrance contains more than 3 doors, not less than 50% of the doorways must be accessible.

A door is considered to be accessible if it is automatic (open and closing) or is more than 850mm in clear opening width and contains the required door circulation space.

Ramps with gradients of 1:14 are to be provided with landing intervals not greater than 9m.



13.3. Accessibility within Building (BCA D3.3)

A building required to be accessible is required to be equipped with either a AS 1428.1 compliant lift or AS 1428.1 compliant ramp, (but the maximum vertical rise of a ramp must not exceed 3.6m).

An exemption to not provide either a lift or ramp exists for class 5, 6, 7b, or 8 buildings, where a building contains;

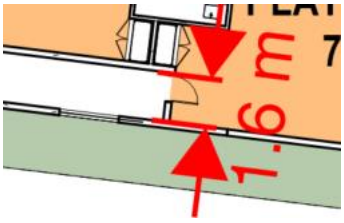
a) Less than 3 storeys; and
b) Floor area of each storey (excluding the entrance level) is not more than 200m^2.

Within the building the following are required;

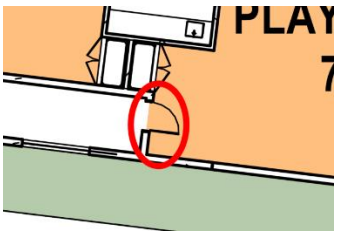
- Door circulation space as per AS1428.1 Clause 13.3
- Doorways must have a clear opening of 850mm;
- Passing spaces (1.8m wide passages) must be provided at maximum of 20m intervals
- Within 2.0m of end access ways/corridors, turning areas spaces are required to be provided.
- Carpet pile height of not more than 11mm to an adjacent surface and backing <4mm
- Any glazing capable of being mistaken for a doorway or opening must be clearly marked (or contain chair rail, hand rail or transom as per AS 1288 requirements)

The following has been noted and requires review:

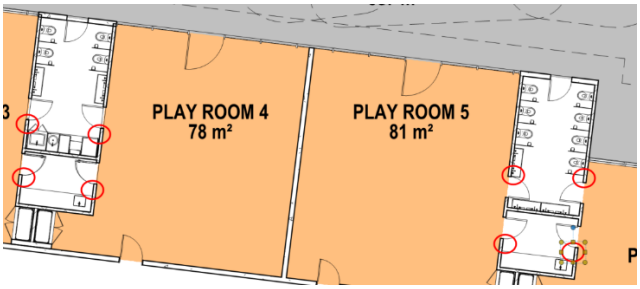
a) *Childcare building turning space*
Verification as to how the 180° turning space has been achieved to the ground floor corridor



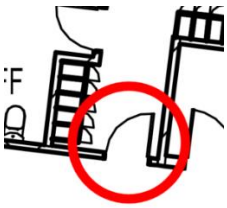
b) *Childcare building doorway circulation*
Verification as to how door circulation spaces have been achieved to the ground floor corridor doorway



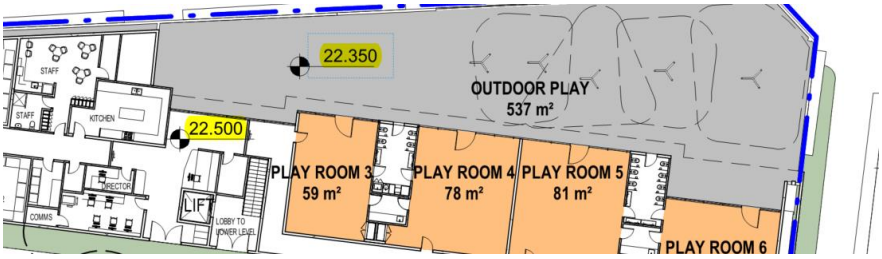
c) *Childcare building facilities doorways circulation*
Verification as to how door circulation spaces have been achieved to the ground floor staffroom doorway



d) *Childcare building doorway circulation*
Verification as to how door circulation spaces have been achieved to the ground floor staffroom doorway



e) *Childcare outdoor play access*
Verification as to how the outdoor play area achieves accessible access from the main building with the change of floor level



The design would generally comply with the prescriptive provisions of the BCA with additional ongoing review being undertaken as to door widths, circulation, etc. Further details are to be provided or access to these areas is to be assessed by an access consultant.

13.4. Car Parking (BCA D3.5)

Accessible car parking spaces are required to comply with AS 2890.6-2009 at the rate of:

a) 1 per 50 (or part thereof) for retail spaces; and
b) 1 per 100 (or part thereof) for office spaces, childcare/gym/pool

The development is proposed to contain 536 car parking spaces on the ground floor and 129 car spaces to the above ground basement.

Consideration will need to be taken in providing the childcare building access from accessible car parking spaces due to the change of finished levels.

A ‘shared zone’ of minimum 5400mm x 2400mm is required adjacent to accessible car parking spaces, protected with a bollard.

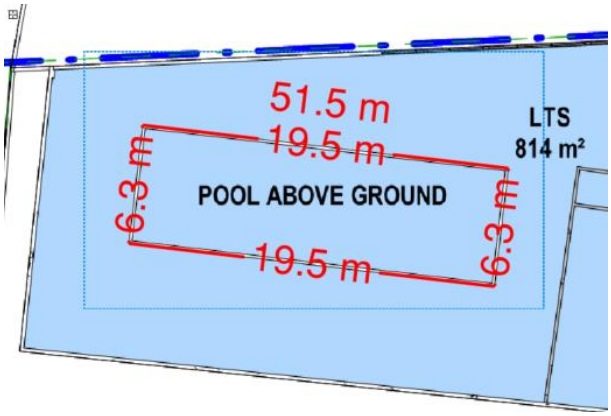
13.5. Tactile Indicators (BCA D3.8)

Tactile indicators are required to be provided to warn occupants of all stairs, escalators/travelators (except Fire Isolated stairs) and ramps regardless of public nature or private environment and where an overhead obstruction occurs less than 2.0m above the finished floor level.

13.6. Swimming Pools (BCA D3.10)

Where pools exceed 40m in total perimeter, at least 1 means of accessible entry in the form of the following is required.

a) Fixed or movable ramps (and an aquatic wheelchair) or
b) Zero depth entry at a maximum gradient of 1:14 (and an aquatic wheel chair)
c) Platform swimming pool lift (and an aquatic wheelchair) or
d) A sling style swimming pool lift



13.7. Stairs (BCA D3.3 inter Alia AS1428.1)

Stairs shall be constructed as follows:

a) Where the intersection is at the property boundary, the stair shall be set back by a minimum of 900mm so that the handrail and TGSIs do not protrude into the transverse path of travel.
b) Where the intersection is at an internal corridor, the stair shall be set back one tread width plus 300mm (nominally 700mm as per AS 1428.1-2009 Fig 26(b)), so the handrails do not protrude into transverse path of travel.
c) Stairs shall have opaque risers.
d) Stair nosing shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25mm.
e) Stair nosing profiles shall;
   - Have a sharp intersection;
   - Be rounded up to 5mm radius; or
   - Be chamfered up to 5mm x 5mm
f) All stairs, including fire isolated stairs shall, at the nosing of each tread have a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing. The strip shall have a minimum luminance contrast of 30% to the background. Where the luminous contrasting strip is affixed to the surface of the tread, any change in level shall not exceed a difference of 5mm.

Consistent height of handrails at landings (staggered treads):
To ensure a continuous internal handrail is supplied at a consistent height it generally requires a staggered tread as per AS1428.1-2009. Further detailed review of the stairs is required to verify if compliance is achieved.

13.8. Accessible Sanitary Facilities (BCA F2.4)

Unisex Accessible Sanitary Facilities

An accessible unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only and provided in accordance with AS 1428.1-2009 and must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary products and as per following.

Building Type	Minimum accessible unisex sanitary compartments to be provided
Office, industrial, assembly building, schools, health care except for within a ward area of a Class 9a health-care building	a) 1 on every storey containing sanitary compartments; and b) Where a storey has more than 1 bank of sanitary compartments containing male and female sanitary compartments, at not less than 50% of those banks.

Ambulant Facilities

At each bank of toilets where there is one or more toilets in addition to an accessible unisex sanitary compartment, a sanitary compartment suitable for a person with an ambulant disability in accordance with AS 1428.1-2009 must be provided for use by males and females.

Where male sanitary facilities are provided at a separate location to female sanitary facilities, accessible unisex sanitary facilities are only required at one of those locations.

An accessible unisex sanitary compartment or an accessible unisex shower need not be provided on a storey or level that is not provided with a passenger lift or ramp complying with AS 1428.1-2009

Accessible unisex showers

Accessible unisex showers must be provided in accordance with AS 1428.1 and at the following rates;

Building	Minimum accessible unisex showers to be provided
Bed & Breakfast, holiday house, hostel, Boarding house	a) Not less than 1; and b) Where private accessible unisex showers are provided for every accessible bedroom, common accessible unisex showers need not be provided.
Residential apartments	Where showers are provided in common areas, not less than 1
Hotels and Class 9c aged care building	a) In every accessible sole – occupancy unit provided with showers within the accessible sole-occupancy unit, not less than 1; and b) 1 for every 10 showers or part thereof provided in common areas
Theatres, sporting venues or gyms	1 for every 10 showers or part thereof provided

13.9. Accessible adult change facility (F2.9)

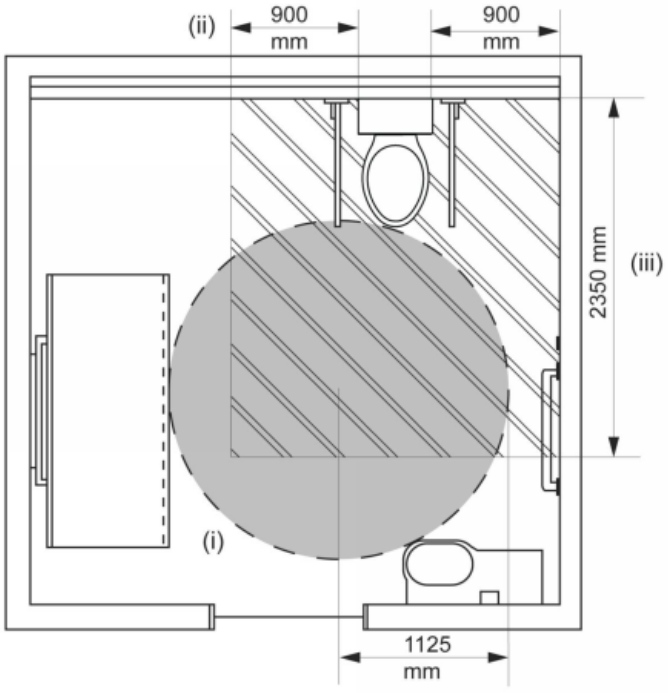
Accessible adult change facilities are required where:

a) a class 6 building that is a shopping centre having an design occupancy of not less than 3,500 persons allowed and contains a minimum of 2 SOU's; or

b) Class 9b sporting venue with a design occupancy of not less than 35,000 spectators or contains a swimming pool with a perimeter not less than 70m
c) Museum, art gallery, theatre with a design occupancy of not less than 1,500 patrons
d) A domestic or international airport terminal.

General requirements for the accessible adult change facility include:

a) All required equipment and fixtures to be contained within the same room
b) If it is to be a unisex facility, it must be located so that it can be entered without crossing an area reserved for one sex only.
c) Room height of 2.4m minimum
d) A hoist
e) Toilet pan, seat, backrest, grab rails
f) Washbasins and tap
g) Fixture and fittings
h) Change table
i) Changing rails
j) Automated entrance door
k) Signage
l) Operating instructions for hoist and change table
m) Circulation spaces



13.10. Signage (BCA D3.6)

As part of the detailed design package, specifications will need to be developed indicating:

- Sanitary Facility Identification Signs (note that they are to comply with BCA Specification D3.6 and include the use of Braille, Tactile, etc and be placed on the wall on the latch side of the facility);

- Directional / Way Finding signs to the Lifts, Sanitary Facilities, etc;
- Hearing Augmentation System;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating 'EXIT' and 'Level" number
- Braille and tactile signs must be illuminated to ensure *luminance contrast* requirements are met at all times during which the sign is required to be read.

13.11. Hearing Augmentation (BCA D3.7)

A hearing augmentation system shall be installed throughout the building in accordance with the requirements of Clause D3.7 of the BCA, where ever in a 9b building, auditorium conference room, meeting room etc. contain a PA system not used for emergency purposed or any ticket office or teller's booth or reception where the public is screened from the service provider.

13.12. Lifts (BCA E3.6)

Lifts compliant to BCA E3.6 and BCA E3.7 must be provided, where required to be provided, with a minimum size of 1400 x 1600mm or 1100mm x 1400mm (whichever is appropriate) in size – with appropriate handrails and auditory commands.

14. Appendix A - Reference Documentation

The following documentation was used in the assessment and preparation of this report:

Title	Issue	Date
A00.01 - Title sheet, Location Plan & Drawing List	D	21.09.2021
A00.05 – Site Analysis	B	14.09.2021
A00.20 – Glar & Carparking Analysis	C	21.09.2021
A00.80 – Solar Study	C	21.09.2021
A02.01 – Proposed Site Plan	C	21.09.2021
A06.01 – Proposed Basement Floor Plan And Mezzanine Floor Plan	G	08.11.2021
A06.02 – Proposed Ground Floor Plan	G	08.11.2021
A06.03 – Proposed Roof Plan	C	21.09.2021
A06.04 – Proposed Childcare Plan	B	21.09.2021
A10.01 – North Elevation	C	21.09.2021
A10.02 – South Elevation	C	21.09.2021
A10.03 – East Elevation	C	21.09.2021
A10.04 – West Elevation	C	21.09.2021
A10.05 – Tigerhawk Drive Street View	C	21.09.2021
A10.09 – Elevation Childcare	B	21.09.2021
A11.01 – Section 1	B	21.09.2021
A11.02 – Section 2	C	21.09.2021
A11.03 – Section 3	B	14.09.2021

Title	Issue	Date
A11.04 – Sections Childcare	B	14.09.2021
A80.01 – 3D Visualization	C	21.09.2021
A80.02 – Perspective Sheet 1	C	21.09.2021
A80.03 – Perspective Sheet 2	C	21.09.2021

15. Appendix B - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2019 Amendment 1:

Table 4 TYPE B CONSTRUCTION: FRL OF BUILDING ELEMENTS	**Class of building—FRL: (in minutes)**			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	**5, 7a or 9**	**6**	**7b or 8**
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is—				
For *loadbearing* parts—				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 30	120/ 90/ 60	180/120/ 90	240/180/120
3 to less than 9 m	90/ 30/ 30	120/ 30/ 30	180/ 90/ 60	240/ 90/ 60
9 to less than 18 m	90/ 30/–	120/ 30/–	180/ 60/–	240/ 60/–
18 m or more	–/–/–	–/–/–	–/–/–	–/–/–
For non-*loadbearing* parts—				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 30	–/ 90/ 60	–/120/ 90	–/180/120
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90 / 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS—				
Fire-resisting lift and stair *shafts*—				
Loadbearing	90/ 90/ 90	120/120/120	180/120/120	240/120/120
Fire-resisting stair *shafts*				
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
OTHER LOADBEARING INTERNAL WALLS and COLUMNS—	60/–/–	120/–/–	180/–/–	240/–/–

ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

Table 4.2 **REQUIREMENTS FOR CARPARKS**	FRL (not less than) *Structural adequacy*/*Integrity*/ *Insulation* ESA/M (not greater than)
Wall	
(a) *external wall*	
(i) less than 3 m from a *fire-source feature* to which it is exposed:	
Loadbearing	60/60/60
Non-*loadbearing*	–/60/60
(ii) 3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b) *internal wall*	
(i) *loadbearing*, other than one supporting only the roof (not used for carparking)	60/–/–
(ii) supporting only the roof (not used for carparking)	–/–/–
(iii) non-*loadbearing*	–/–/–
(c) *fire wall*	
(i) from the direction used as a *carpark*	60/60/60
(ii) from the direction not used as a *carpark*	as *required* by Table 4
Column	
(a) supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b) steel column, other than one covered by (a)	60/–/– or 26 m^2/tonne
(c) any other column not covered by (a) or (b)	60/–/–
Beam	
(a) less than 3 m from a *fire-source feature*:	
(i) steel floor beam in continuous contact with a concrete floor slab	60/–/– or 30 m^2/tonne
(ii) any other beam	60/–/–
(b) 3 m or more from a *fire-source feature*	–/–/–
Lift shaft	–/–/–
Fire-resisting stair shaft (within the *carpark* only)	60/60/60
Roof, floor slab and vehicle ramp	–/–/–
Note: ESA/M means the ratio of exposed surface area to mass per unit length.	

CHISHOLM SHOPPING CENTRE
CONSTRUCTION MANAGEMENT PLAN

1 BACKGROUND

1.1 INTRODUCTION

The project consists of the bulk excavation, new structure, fit-out and commissioning of the proposed new supermarket, retail spaces, medical centre, restaurant and associated external works.

Early works will commence after DA approval. Given the proximity to the St. Aloysius Primary School, The Principal Contractor will implement a strategic plan to minimise the impact on the school and surrounding residents. Careful coordination of access and traffic management will be a priority in liaison with adjacent landowners and other community stakeholders.

1.2 BACKGROUND

The Initial Development Application plan of the site was lodged on 10th July 2018. The site is located in Chisholm. The shopping centre was identified as part of the initial planning adopted by the council in 2003 of the Chisholm Urban Release Area. The overall design has been enhanced, and Revelop is undertaking a new planning approval.

1.3 SITE DESCRIPTION

The site is located within the Waterford County precinct within the newly created suburb of Chisholm. The site is legally described as Part of Lot 1 DP 1224700. (Recently registered as LOT 11 & 12 DP1280255)

The site slope is between 3.6% and 5.2%, generally sloping in a northwesterly direction and has a total area of 42,287.6m^2 (4.23ha) and has the following frontages and dimensions:

- Heritage Drive – 240.3m
- Tigerhawk Drive – 199.5m
- Settlers Boulevard – 173.5m

The site comprises mainly cleared grassland with some existing trees. The surrounding road network has been constructed, which includes the recently completed Settlers Boulevard frontage.

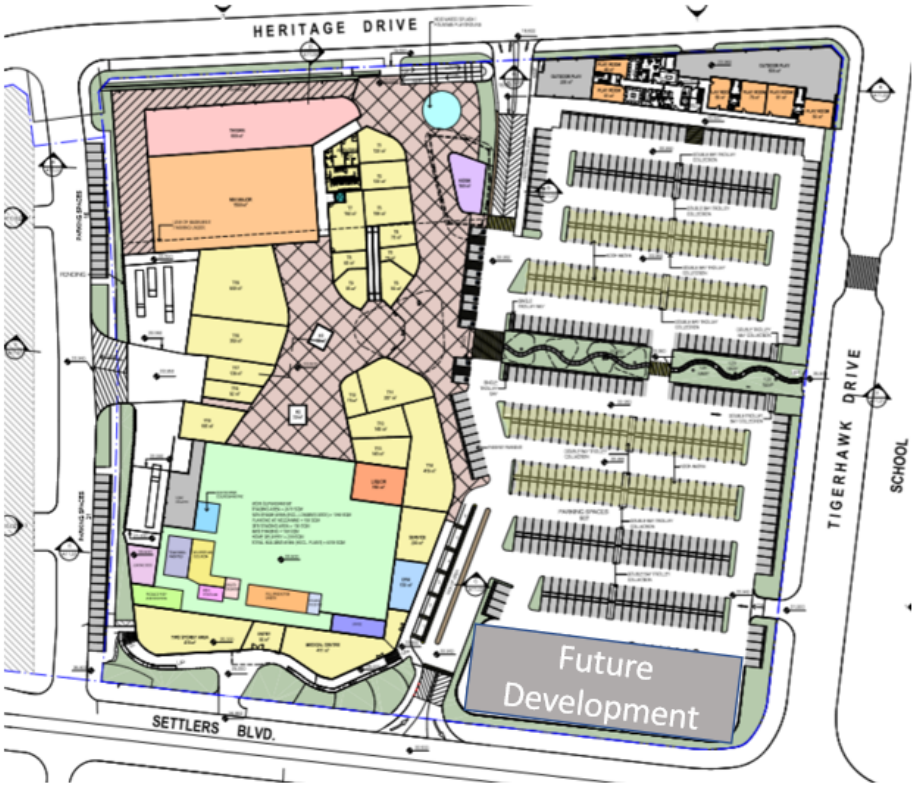
The site is currently vacant.

Figure 1: Site Location

1.4 OVERVIEW OF PROPOSED WORKS

The proposed works include a full-service Supermarket, Swim School, Medical/Allied Health Centre, Tavern, Childcare Centre, and 20+ Speciality Shops. Carparking for 640 cars.

The Fast Food outlets indicated on the drawings are excluded from this stage of the works.



1.5 CONSTRUCTION MANAGEMENT PLAN

This Construction Management Plan (CMP) outlines the approach to construction management of the Chisholm Shopping Centre. The CMP will be updated by the appointed contractor, engaged for the works and prior to works commencing.

All tasks are undertaken concerning the project, whether they be physical construction activities, office duties or procedural tasks. Tasks are to be undertaken in accordance with the following:

1. Suppliers and contractors shall provide assurance of the quality of all goods, materials, and services to be provided; and
2. All materials and works are to be undertaken to the manufacturer's specification or industry standards.

A liaison will be established with relevant authorities to coordinate the works.

The Client has engaged various consultants to assist in the Relevant Planning process. Those relevant to the CMP may include:

- Noise and Vibration Impact Assessment
- Construction Pedestrian & Traffic Management Plan
- Air Quality
- Infrastructure Servicing Strategy
- Aboriginal Cultural Heritage Assessment Report
- Environmentally Sustainable Design Strategy
- Stormwater and Flooding Assessment
- Arboricultural Impact Assessment
- Geotechnical
- Environmental incl Hazardous Material

The contractor will adhere to the Protection of the Environment Operations Act 1997 (POEO Act). The principles that underpin the POEO Act are:

- To protect, restore and enhance the quality of the environment in New South Wales, having regard for the need to maintain ecologically sustainable development
- To provide increased opportunities for public involvement and participation in environmental protection
- To ensure that the community has access to relevant and meaningful information about pollution;
- Pollution prevention and cleaner production; Reduction to harmless levels of the discharge of substances likely to cause harm to the environment;
- Reduction in the use of materials and the reuse or recycling of materials;
- Making progressive improvements, including the reduction of pollution;
- To rationalise, simplify and strengthen the regulatory framework for environmental protection;
- To improve the efficiency of administration of the environment protection legislation; and
- To assist in the achievement of the objectives of the Waste Minimisation and Management Act 1995.

2 HOURS OF WORK

All work on-site will only occur between:

7am to 6pm Monday to Friday, and 8am to 5pm Saturday

Unless otherwise approved in writing by Consent Authority due to extenuating circumstances, the extension of works outside of standard hours (i.e. 1pm - 5pm Saturday) is proposed in order to:

- Maximise productivity on Saturdays to offset losses in productivity due to the COVID-19 situation, WH&S and social distancing requirements; and
- Take advantage of reduced road traffic on Saturdays for truck routes and deliveries.

3 INVESTIGATION

3.1 INFRASTRUCTURE SERVICES

- Infrastructure services are provided to the perimeter of the site as part of the Subdivision generally. The site is serviced by
    - Potable Water (Settlers Boulevard & Heritage Drive)
    - Natural Gas (Boulevard & Heritage Drive)
    - Stormwater (Boulevard & Heritage Drive)
    - Waste Water (Heritage Drive)

Ausgrid provides electricity to the site

Any services diversion or removal will need to consider impacts on neighbouring properties.

4 SITE ESTABLISHMENT

Before commencement of works on site, the site will be formally established. This includes addressing the following areas:

- Temporary site fencing to secure areas not already secured by fencing
- Onsite storage, compounds, site office etc.
- Connection to temporary services
- Site amenities
- Sediment & erosion control measures
- Identification and marking of trees to be retained and removed
- Protection of trees that are to be kept.
- Statutory and contact signage.

The contractor will ensure the security of all active work areas, including the car park, to ensure the public's safety and protection of the works.

Early site establishment will take approximately two weeks and will be maintained for the duration of the works. Refer to below.

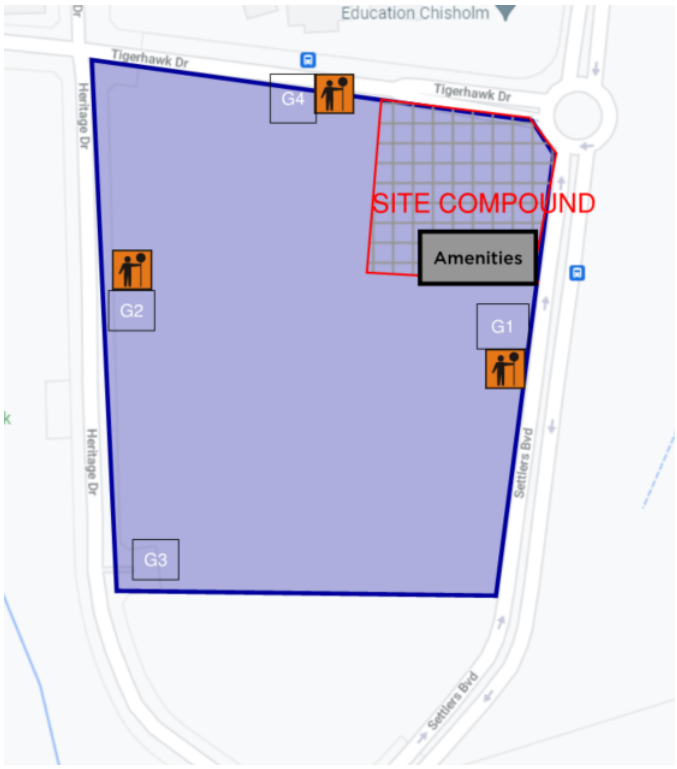


Figure 2: Site Establishment Area

Construction personnel will be advised that there will be limited vehicle parking on the site. Parking in the surrounding streets will be coordinated with the adjacent school to limit congestion. Site establishment, including hoarding installation, is likely to occur in multiple phases to limit disruption to adjoining properties. Temporary fencing and usage of movable barricades would be utilised as required to works along the boundary.

5 PUBLIC & PROPERTY PROTECTION

Before the commencement of works, a dilapidation survey will be undertaken involving all public and private roadways, adjoining and adjacent paving, structures, buildings and residences. Temporary hoarding and fencing will be installed to delineate the site boundary and protect the general public from activities occurring on the site/s. The building site/s will be kept neat and tidy to maintain public safety and local amenity.

Adequate protective perimeter signage will be installed as required. This signage will be needed to identify construction contact points and ensure no unauthorised entry to the site.

5.1 HOARDINGS, FENCES AND BARRIERS

Areas of the Site where works will be undertaken should be securely fenced off using best practice methodology to protect the public. The following indicative issues will be considered concerning site hoarding, fencing and barriers:

- Where possible, maintain the existing perimeter fencing and attach shade cloth, or erect hoardings, to control views and manage dust;
- The site hoardings, perimeter fencing or other site barrier systems will be kept tidy throughout the programme of works;
- Before and during building work, all excavations below 1m in height will have safety barriers delineating potential fall areas;

- Hoardings, barriers, and other perimeter fencing will be suitably lined to limit public viewing to designated viewing areas. This will ensure pedestrian flow is not impeded;
- The hoarding/fences may be adjusted to suit the phases of the development

The fencing for the construction works for each stage of construction will be defined in a Fencing and Security Plan prepared by the contractor. The Fencing Plan will look to identify all access points to the site/s.

Vehicular access/egress gates are proposed through access points off Settlers Boulevard and Heritage Drive. Qualified traffic supervisors will operate these gates during major vehicular access and egress to the site.

These public and property protection measures will be reviewed at the time of commencing works to ensure alignment with proposed preferred methodologies and sequencing developments and ensure that the general public's safety is maintained at all times.

Roads, paths and kerbs likely to be damaged by construction or worker traffic are to be protected by temporary overlays and ramps.

5.2 WORKS IN THE PUBLIC DOMAIN

Works associated with the development/s may occur outside of the main site footprint, such as road works and site services. The contractor will consider the following indicative issues with regards to local authority assets:

- Local authority assets such as roads, kerbing and channels etc., stormwater drains and street furniture will be protected and made good if damaged as a direct result of the building work;
- Priority repair will be given to those areas relied upon by pedestrians, cyclists and motorists' safety; and
- Any services installation such as electrical, drainage that extends over footpaths will be temporarily covered over and pedestrian and disability access facilitated by a ramp until such time as full reinstatement is complete.

5.3 SIGNAGE

The following indicative issues will be considered with regards to signage:

- Signs will be displayed in several areas around the site advising of the 24hr contact details for the site (the phone number may be for a security company or a communications agency);
- All works related signage (including particularly safety-related signage) will comply with the relevant WorkCover NSW Codes of Practice;

6 ENVIRONMENTAL

The contractor shall install environmental and safety controls before the commencement of any onsite works. These will include but not be limited to:

- Security measures (fencing and gate access)
- Occupational health and safety measures (personal protective equipment, first aid supplies, signage and barriers where required; and
- Environmental management measures (spill kits, booms, stormwater control, dust control, silt control)

6.1 NOISE DUST AND VIBRATION PRINCIPAL MEASURES

The impact on adjoining facilities can be extensive, especially during demolition and excavation. It can be a brief intrusion or long term background noise. A systematic approach working closely with the acoustic consultant will establish and monitor noise levels to comply with strict parameters. The use of dust monitors, water suppression and water carts as required will manage dust and maintain a clean site.

6.2 HAZARDOUS MATERIALS

Should site investigation reveal there to be hazardous materials in the existing building or infill ground, formal procedures for specific substances will identify:

- Type of substance
- Location of the substance
- Additional work and resources required to deal with the substance so that the neighbours, members of the public and construction workers may move safely in adjacent areas and without risk to health

6.3 DUST AND AIR CONTROL MEASURES

Dust control measures for site preparation which will remain in place for the duration of the Works, will include:

- Erection of site fencing to provide appropriate barriers at the site boundary
- Erection of effective screens and barriers around dusty activities. Cleaning of the screens and barriers should be completed as necessary.
- Communication with neighbouring properties before undertaking works in proximity to their premises.
- Establishment of a complaints management system to record details of any reason for air quality-based complaints.
- Avoidance of dry sweeping in large areas
- Use of effective water suppression where necessary
- Covering of stockpiles
- Trucks to have payload covered
- Wheel washing system for trucks if necessary
- Limiting plant and equipment idling
- Implement speed limits on site.
- Implementation of a Dust Management Plan by the Contractor

Should these measures be undertaken, it is expected that dust impacts can be kept at acceptable levels throughout the Works.

6.4 STORAGE OF DANGEROUS GOODS

The contractor will minimise the use of hazardous materials stored on site. In the event liquid and gas fuels are needed, they will be instructed to be stored in a segregated, well-ventilated, secure

enclosure with a surrounding fully closed watertight bund to ensure that contamination of the surrounding ground does not occur. Spill kits and appropriate hazmat signage is to be located at the materials stores and project office in the event of spillage. The most commonly required items are:

- Diesel: Limited quantities for onsite portable power generators and portable fuel-powered plant, e.g., handheld concrete saws, compactors and compressors
- Oxy/Acetylene: Limited cylinders for plumbing works and steel cutting, stored in purpose-built racks
- Propane/Butane: Limited quantities for pipe and cable soldering, welding, and gas-charged fastening devices
- Mobile mini-tanker facilities carry out major plant refuelling within an isolated dedicated area to avoid stockpiling and cartage of bulk fuels on site

6.5 EROSION AND SEDIMENT CONTROL

Appropriate erosion and sediment (ERSED) controls shall be in place before starting Works and maintained throughout construction activities until the site is landscaped or suitably revegetated.

The site would be managed under the protection of the Environment Operations Act 1997 (PoEO Act) by implementing appropriate measures to prevent sediment run-off, erosion and excessive dust emanating from the site during construction.

Erosion and sediment control measures will be implemented and maintained throughout the construction period, following the details of the erosion and sediment control details and to the satisfaction of the principal certifying authority. All necessary erosion and sediment control devices will remain in place until the site has been stabilised.

7 TRAFFIC MANAGEMENT

7.1 CONSTRUCTION VEHICLE ACCESS/EGRESS MANAGEMENT

The nominated Traffic consultant will complete a formal Traffic Management plan before the commencement of works on the site. RCC's recommendation for traffic management is an approach route to the site that utilises Raymond Terrace Road, operated by a Roundabout. Vehicles will then turn Right at Settlers Boulevard roundabout that provides a Left turn entry to the site, then Left Turn exit from site departure via alternative exit gate on to Heritage Drive Boulevard, subject to Council approval.

Construction access and interfaces to Tigerhawk Drive will be required, and the principal contractor will coordinate with the council and school along this boundary.

7.2 CONSTRUCTION VEHICLE TRANSPORT ROUTES

It is anticipated that bogie tippers, semi-tippers and truck and trailer type heavy vehicles would be used in undertaking the Works. All trucks will be loaded to their prescribed weight limits within the site boundary and be covered with a tarp (rubbish loads only) before exiting the Site/s.

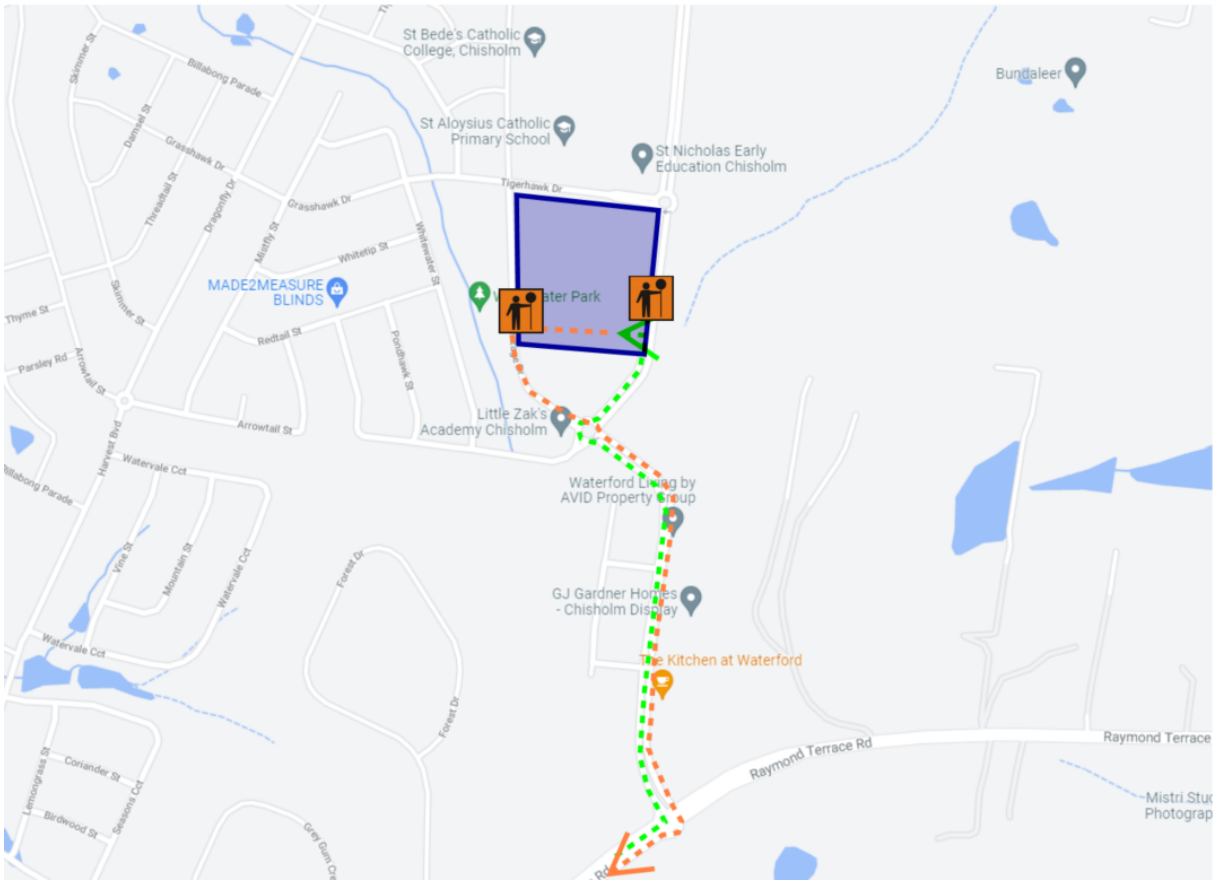


Figure 3: Vehicle transport routes

Vehicles entering and exiting the construction zones will do so in a controlled and planned manner with minimal disruption to local vehicular and pedestrian traffic. The contractor will manage construction, pedestrian and vehicular interactions on all public roads with traffic and pedestrian control to sustain this focus. At all times, the contractor will be mindful of any work being undertaken by local authorities adjacent to and surrounding the site

8 CIVIL & INFRASTRUCTURE WORKS

8.1 INFRASTRUCTURE SCOPE OF WORKS

Civil Infrastructure will include connections to the existing road networks and connections to the Stormwater System. The Service road Connecting Heritage Drive and Settlers Boulevard is highlighted below.

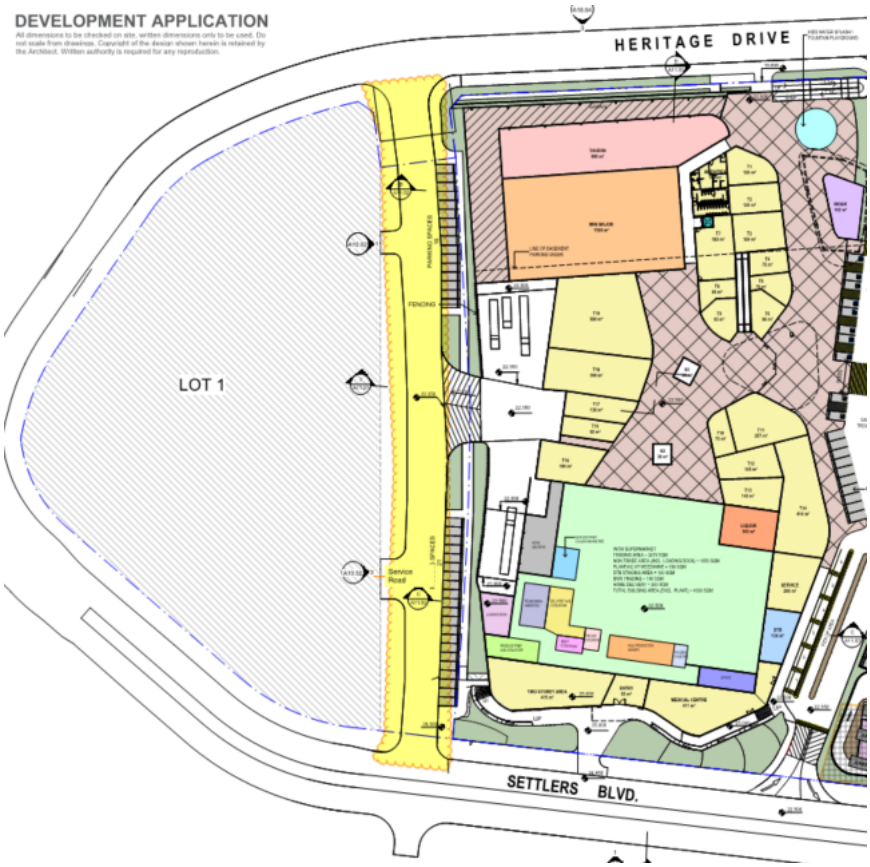


Figure 4: Service Road

8.2 BULK EXCAVATION

Bulk excavation will be as per the civil design documentation, including site preparation for building footprint, foundations and piling. The following Scope of Works would likely take place:

- Scrapping, stockpiling and removal of site topsoil (subject to landscaping design)
- Bulk earthworks cut and fill, including excavation in preparation to 'box' out to building footprint.
- Removal and replacement of any soft spot material
- Compaction of material (subject to further Geotechnical testing)
- Preparation of Piling mats
- Benching and grading of site levels to approx. heights before detailed site grading.

8.2.1 DETAIL EXCAVATION AND SHORING

Detail excavation and shoring/ retaining walls will be required to the Heritage Drive Elevation and Basement. Previous works in the vicinity indicate (St Bede's School) there is high-level weather Sandstone which may require the use of Ripper buckets and Rock Hammers.

8.2.2 DETAIL SITE GRADING

Once the majority of bulk earthworks and excavation works are completed, detailed site grading would take place in preparation for laying the building foundations and footprint. This will include

using smaller plant equipment utilising finely tuned survey equipment to adjust the final subgrade levels in anticipation of foundation preparation.

8.2.3 PILING FOUNDATIONS

Subject to further Geotechnical investigation, foundation design, in particular, proposed piling type and methodology, would be finalised by the contractor.

9 CONSTRUCTION WORKS/ MANAGEMENT

9.1 SCOPE OF WORKS

The Scope includes the construction of single-storey retail and two-storey commercial spaces, swimming and childcare centres. On grade and basement car parking are also included in the scope.

9.2 SITE ACCOMMODATION & AMENITIES

Site establishment will include establishing site contractor's offices, tea rooms and toilet facilities, vehicle access, vehicle loading and unloading, lay down areas, establishment and maintenance of onsite work areas.

The contractor will ensure the security of all active work areas, including the building, to ensure the public's safety and protection of the works.

9.3 CRANES

Mobile cranes will be utilised intermittently throughout construction, with material hoists being utilised for specific trades

9.4 MATERIALS HANDLING AND DELIVERIES

Materials will predominantly be delivered via the dedicated site entrances, managed by the contractor and their traffic control systems.

A detailed CTPMP by the contractor will be prepared before construction. Traffic will generally be managed in the following way:

- Designated transport routes will be communicated to all personal and enforced.
- Designated non-peak hour deliveries.
- Strict scheduling of vehicle movement will occur to minimise off-site waiting times. Minimal onsite parking would be envisaged with site workers encouraged to utilise existing public transport and car-sharing wherever possible.
- Vehicle movements will be compliant with Conditions of Consent and broader road-use regulations, particularly concerning hours of work, materials loading and unloading.
- Stakeholder feedback, especially with adjoining neighbours (Schools) and relevant Authorities.

The predominant means of materials deliveries to the project will be via Heritage Drive, supervised by Traffic controllers holding appropriate RTA accreditations, OH&S White Card, and Traffic Controllers Blue Card.

A manitu or all-terrain forklift will be available to off-load materials delivered to the site, resulting in a cut down on the number of visits from mobile cranes and other heavy vehicles entering the site.

9.5 CONCRETE PUMPING

Mobile concrete boom pumps and associated concrete delivery trucks will frequent the project as required following the construction program.

Locations for concrete pumps will be determined based on the construction programme however will be positioned within the site at all times to service individual buildings as required suitably.

9.6 WASTE MINIMISATION AND MANAGEMENT PLAN

All waste collected from the site during construction will be removed and processed by an accredited contractor responsible for improving waste separation and recycling efficiencies. Waste reports will be produced monthly, and reuse and recycle volumes will be tracked.

9.7 STRUCTURE/S

The Structures will likely include

- Reinforced concrete piles and capping foundations
- Precast/ tilt panel walls
- Structural steel and metal deck roofs
- Glazed and FC panel facades

Given the overall footprint of the development, there would be concurrent activities undertaken across the different construction Zones

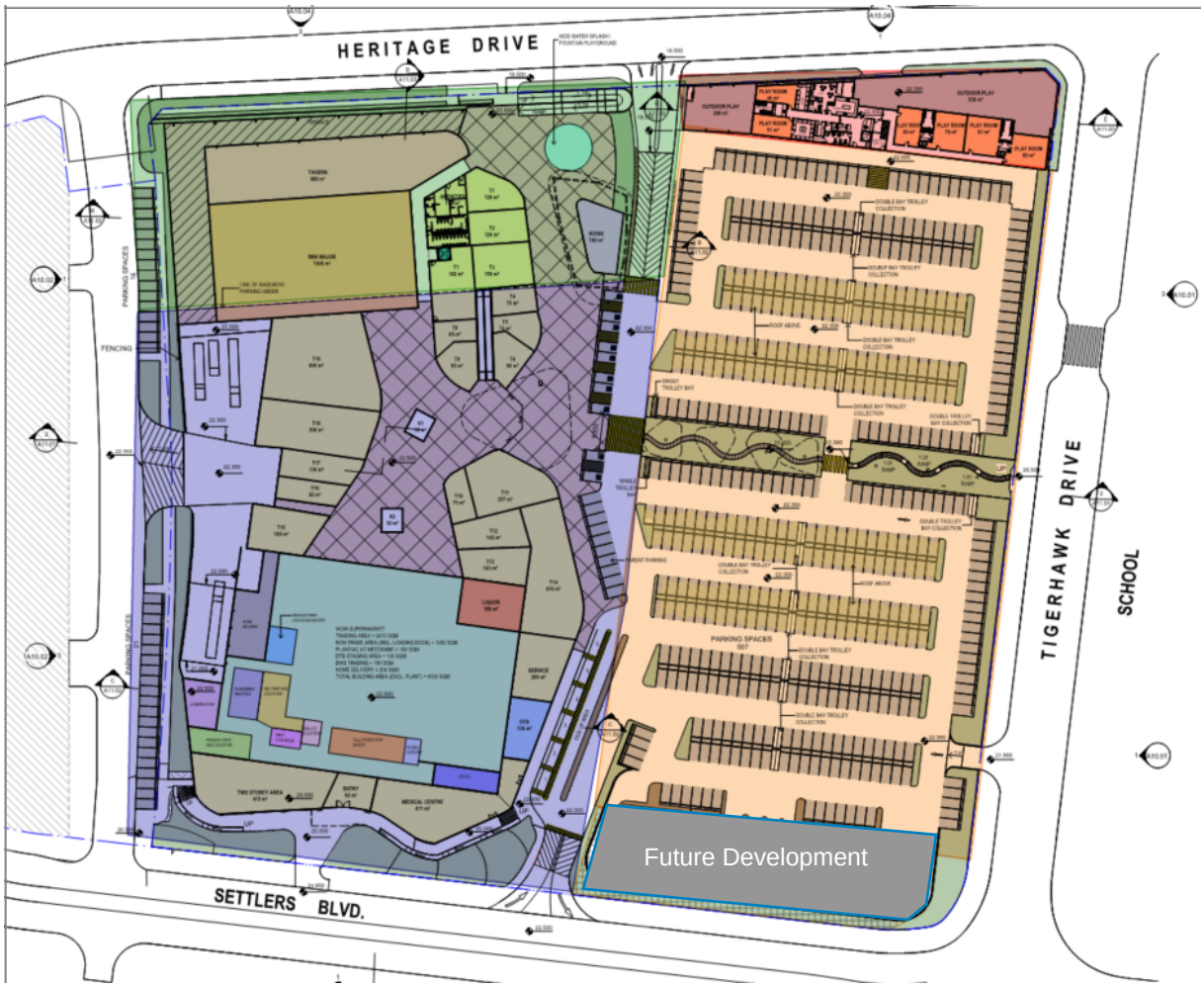


Figure 5: Zones

9.8 SCAFFOLDING

Scaffolding is likely to be erected to the perimeter of all buildings for the staged erection of the typical floor structures and façade elements. The extent and time at which it is erected will be at the discretion of the Construction Manager.

Scaffolding will provide access, fall protection and working platforms for the erection and completion of walls, facades, roofing and fit off.

9.9 SERVICES

9.9.1 WATER

A formal application to Hunter Water will need to be submitted to assess the detailed servicing requirements for the site.

9.9.2 WASTEWATER

A formal application to Hunter Water will need to be submitted to assess the detailed servicing requirements for the site.

9.9.3 POWER

Design and construction details will be prepared and formal applications made to Ausgrid following receipt of DA consent.

9.9.4 GAS

Design and construction details will be prepared and formal applications made to Jemena following receipt of DA consent.

9.9.5 TELECOMMUNICATIONS

Design and construction details will be prepared, and formal applications made to the appropriate carrier/s following receipt of DA consent.

9.9.6 COMPLETION

Completion of the works will include but not be limited to:

- Removal of all Plant, Machinery, Equipment, Storage, Amenities etc
- Removal of temporary Stormwater Management Controls
- Removal of temporary Fencing, shade-cloth and signage
- Make-good of any damaged Public or Private Infrastructure as a result of the works
- Obtain Occupation Certificate
- Landscaping (both internal and Public Domain area

10 OTHER SPECIFIC MANAGEMENT PLAN PRINCIPLES

10.1 WORK OCCUPATIONAL HEALTH & SAFETY MANAGEMENT PRINCIPLES

A project-specific WHS Management Plan will be developed for the project before commencing site works. The WHSMP will address the following:

- Safety in Design
- Management of WHS including the roles and responsibilities of all workers, training requirements, incident reporting and corrective actions
- Management of site safety, including the risk assessment process,
- induction requirements
- Safe work method statements and compliance processes
- Management of project hazards

10.2 ENVIRONMENTAL MANAGEMENT PRINCIPLES

The Environmental Management Plan (EMP) will establish procedures, guidelines and controls for all activities on the project. The EMP will encompass activities that may impact the immediate and

surrounding environment. These may include air, water, land, natural resources, flora, fauna, and humans and interrelation.

The importance of implementing environmental management procedures is recognised to preserve the immediate and surrounding environment during construction, especially the environment for residents, staff and students at the nearby schools.

These procedures shall include all controls, inductions and training, incident response, monitoring and reporting processes.

A project-specific EMP will be developed for the project before commencing site works.

10.3 QUALITY MANAGEMENT PRINCIPLES

The Quality Management Plan (QMP) will set out how to manage the quality of work by the various trades and to ensure that the end product meets the requirements of:

- Statutory Regulations
- The Building Code of Australia
- Australian Standards

11 CONCLUSION

This Construction Management Plan has been produced for Revelop Plt Ltd to support the Development Application and outline the general approach to construction management of the Chisholm Shopping Centre. A detailed and comprehensive Project Management Plan will be produced for the relevant stage of the project covering the entire Management of the project, including:

- Site Inductions
- Safety Work Method Statements where construction methodology and its potential effect on the surrounding properties will be detailed and addressed
- Traffic Management during construction
- Risk Management with a view of the impact on neighbours
- Change Management again addressing possible interaction with neighbours

ETHOS URBAN

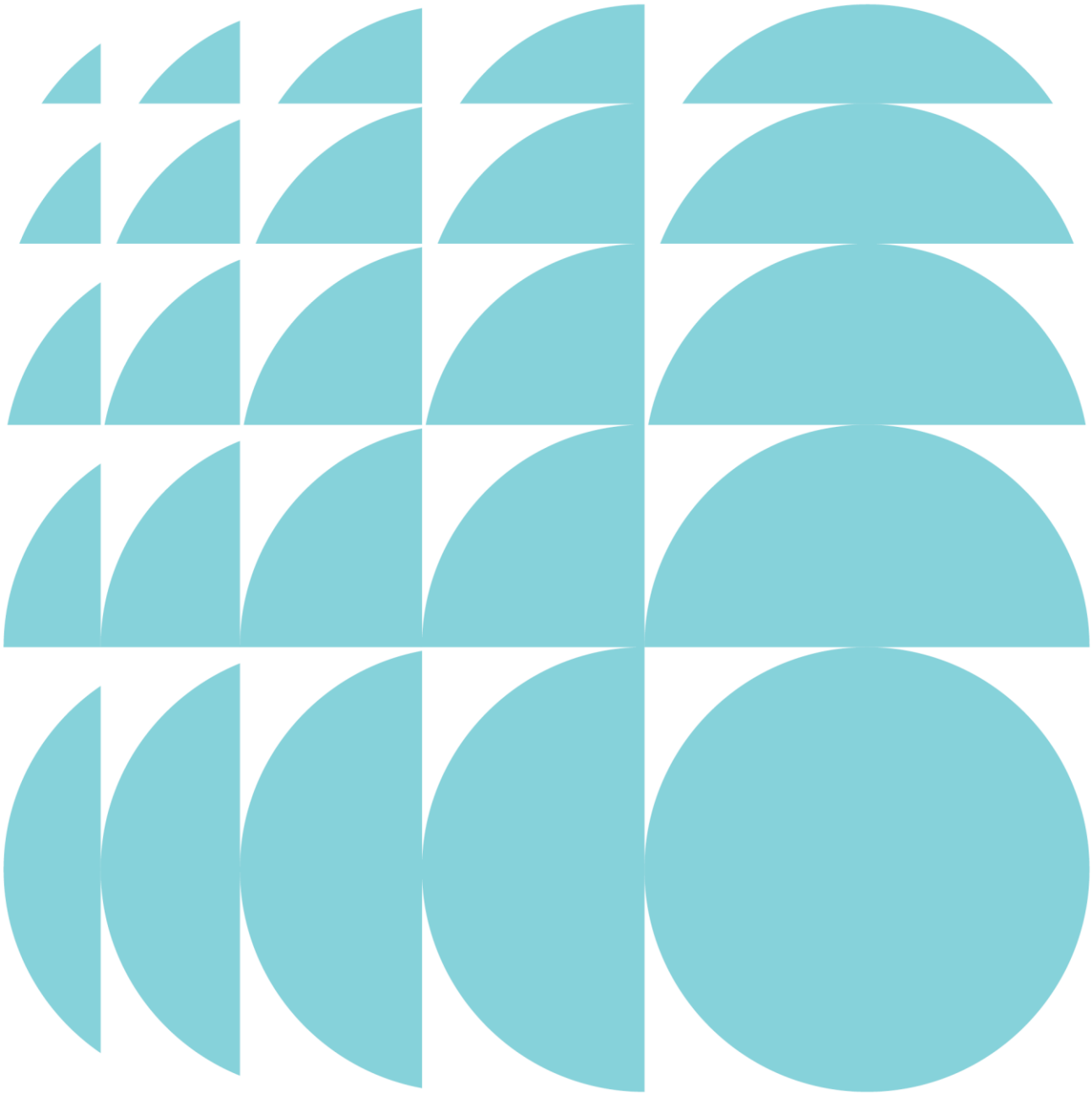
Chisholm Plaza

Economic Impact Assessment

FINAL

Prepared for Revelop

November 2021 | 3210279



Authorship

Report stage	Author	Date	Review	Date
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Final report	Ellis Davies	19 November 2021		

Disclaimer

Every effort has been made to ensure the accuracy of the material and the integrity of the analysis presented in this report. However, Ethos Urban Pty Ltd accepts no liability for any actions taken on the basis of report contents.

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Executive Summary

Site Context and Proposed Development

The Subject Site, which is located at 20 Heritage Drive, Chisholm and bordered by Tigerhawk Drive and Settlers Boulevard, is Zone B1 - Neighbourhood Centre under the Maitland Local Environment Plan. The centre is proposed include a full-scale supermarket anchor of 3,809 sq.m, a mini-major tenant of 1,500 sq.m, a range of specialty shops and several non-retail/community uses such as a gymnasium, a tavern, a Learn to Swim (LTS) facility, a childcare centre, a medical centre, and a car wash outlet.

Catchment Analysis

A trade area has been defined for the centre which covers Chisholm and the surrounding suburbs. In mid-2021, the population of the trade area is estimated at 26,730 including 4,400 residents in the primary sector. Strong growth is projected to result in the population reaching approximately 35,800 residents by 2036 including 11,000 in the primary sector. This reflects an average annual growth rate of 2% across the main trade area and a very strong 6.3% in the primary sector over the forecast period.

Competitive Context

Within the defined main trade area there are three shopping centres with a notable food offering – Thornton, Tenambit and Morpeth. Thornton Shopping Centre is a Coles anchored neighbourhood centre, located approximately 3km south of the Subject Site, while a cluster of retail shops are provided on Maize Street in Tenambit as well as along Swan Street in Morpeth.

Stockland Green Hills is the only regional shopping centre in the broader Maitland region and contains approximately 67,000 sq.m of retail floorspace. The Maitland City Centre, which serves the retail and commercial needs of the wider Maitland region, includes the shopping centres of Riverside Plaza and Pender Place. A number of smaller retail centres are also provided in the region such as the East Maitland Town Centre, the Beresfield Town Centre, and the Lorn Local Centre.

Retail Floorspace Demand Analysis

A retail floorspace demand analysis indicates that currently a neighbourhood centre type offer anchored by at least one supermarket is clearly supportable at the Subject Site, with the demand for retail floorspace to increase over time. By 2026, the amount of retail floorspace considered supportable is estimated at approximately 9,000 sq.m, including 5,700 sq.m of FLG floorspace. The level of supportable food, liquor and grocery (FLG) floorspace would easily accommodate a full-line supermarket (including liquor), as well as potentially a smaller supermarket or large fresh produce store and a provision of supporting fresh food specialties.

Economic Impacts and Benefits

A range of economic benefits are likely to arise as a result of the subject development, which includes serving the growing food and grocery needs of trade area residents; improving shopping choice and convenience for local residents; creating a focal point for the community; and creating local employment opportunities. The development may have some trading impacts on existing facilities, however, any adverse impacts will not be such as to threaten any existing facility's ability to continue operating successfully. Consequently, in weighing the benefits and impacts, the analysis in this report demonstrates that a net community benefit will result from the proposed neighbourhood centre development at the Subject Site.

Introduction

Background

Chisholm Plaza is a neighbourhood centre proposed at 20 Heritage Drive, Chisholm. This site is located within the Waterford Country precinct of the Thornton North Urban Release Area, approximately 10km east of the Maitland City Centre. The site is B1 - Neighbourhood Centre zone.

Objective

The purpose of this report is to provide an independent assessment of the potential economic benefits and trading impacts which may arise from the development of Chisholm Plaza.

Report Structure

This report contains the following chapters:

Chapter 1: Context Overview

Chapter 2: Catchment Analysis

Chapter 3: Competitive Context

Chapter 4: Retail Floorspace Analysis

Chapter 5: Assessment of Centre Potential

Chapter 6: Economic Impact and Benefit Analysis

1 Context Overview

The context relevant to the proposed development of Chisholm Plaza is outlined in this Chapter including an overview of the Subject Site, the regional context, the proposed development and the planning context.

1.1 Site and Regional Context

The Subject Site is located at 20 Heritage Drive, Chisholm, approximately 10km east of the Maitland City Centre and 30km north-west of Newcastle (refer Figure 1.1). Regional accessibility to the area is provided by New England Highway, which links to Newcastle to the south-east and extends north through Queensland.

Figure 1.2 illustrates the local context, showing that the site fronts Heritage Drive, Settlers Boulevard and Tigerhawk Drive. Immediately to the north of the Subject Site is St. Aloysius Catholic Primary School and St. Bede's Catholic College. Adjacent to the site on the western side of Heritage Drive is Whitewater Park, a significant open green space in the locality.

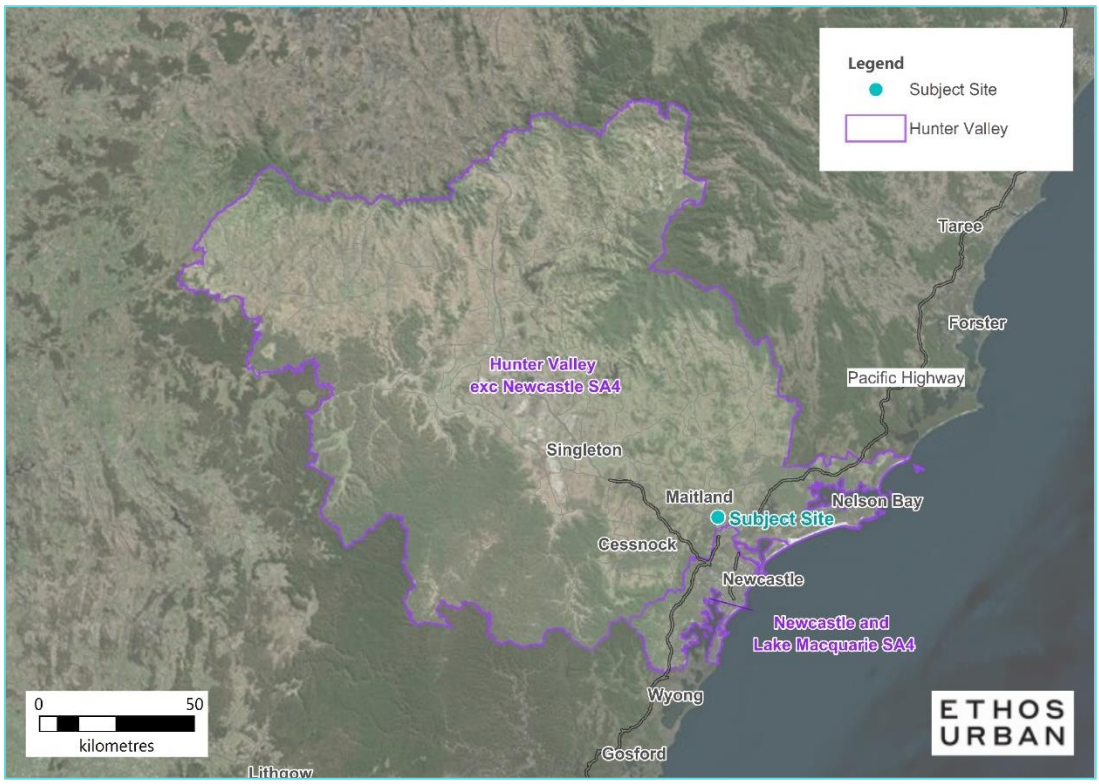
The Subject Site is located within the Waterford Country precinct of the Thornton North Urban Release Area (TNURA), which is projected to yield up to 5,000 lots at capacity. It is one of the few remaining broadhectare development opportunities for a significant amount of residential subdivision and development in the Lower Hunter region.

Figure 1.3 shows the vision for the area, including an indication of the preferred major road network, sourced from the Thornton North Master Plan (2003). The greenfield growth area is well-connected to the broader region, served by the New England Highway as well as Raymond Terrace Road and Mcfarlanes Road. Metford railway station is located a short distance south-west of the Subject Site, which is on the Main Northern railway line.

As residential development continues to progress in Chisholm, the local network of roads will continue to be expanded and improved, providing convenient access to the Subject Site. Settlers Boulevard is a divided collector road that intersects with Tigerhawk Drive on the north-eastern corner of the site via a 2-lane roundabout. Settlers Boulevard extends north and will eventually connect through to Mcfarlanes Road, which will provide convenient access to the site from the north and east.

Figure 1.4 provides the masterplan for the Waterford residential estate, which shows the location of the Chisholm Plaza site as well as the existing and future road network in the local area.

Figure 1.1: Regional Context

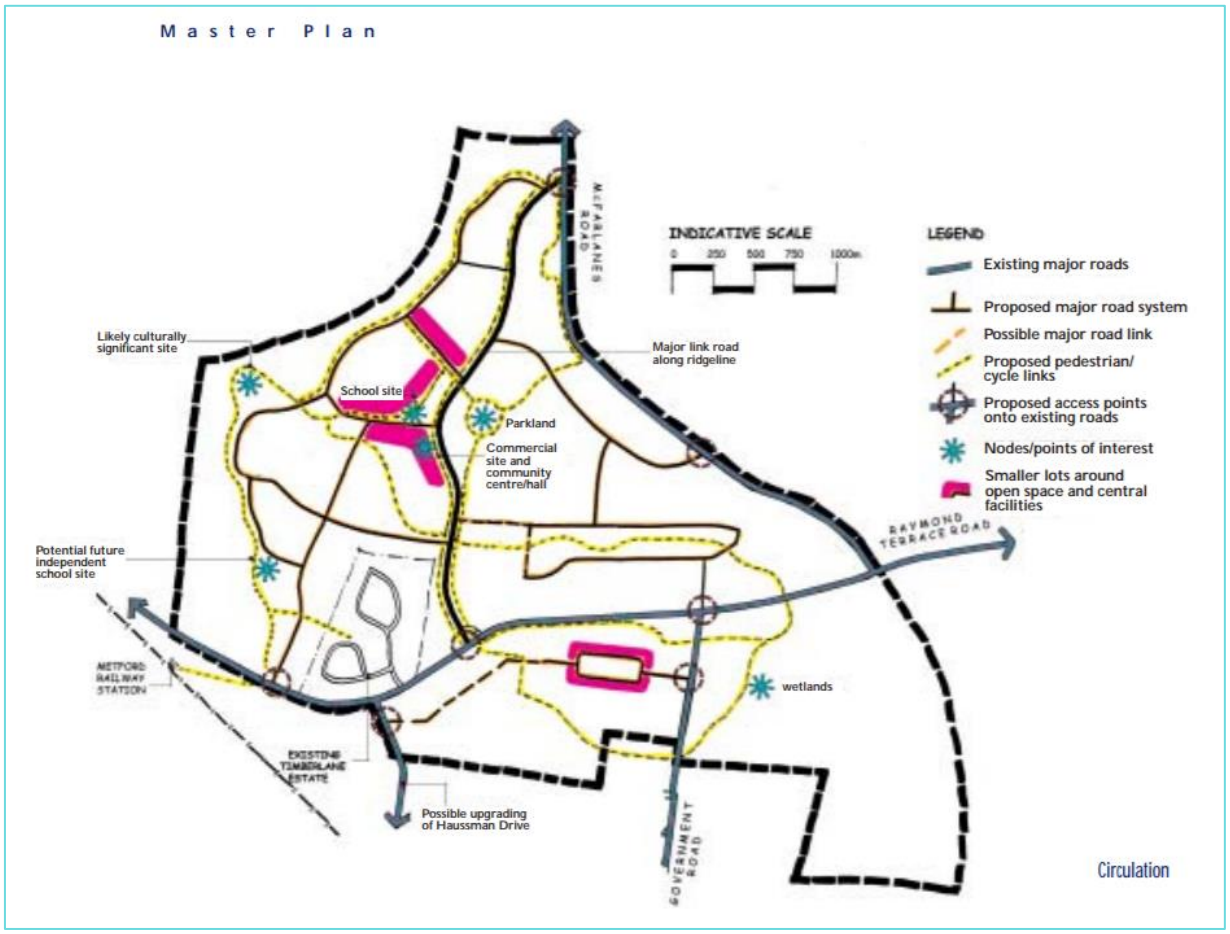


Source: Ethos Urban with MapInfo

Figure 1.2: Subject Site and Local Context

Source: Ethos Urban with MapInfo

Figure 1.3: Thornton North Master Plan



Source: Thornton North Master Plan (2003)

Figure 1.4: Waterford Estate Masterplan

1 Proposed Chisholm Plaza*
2 Schools
3 Pre-Schools
4 Future sports fields
5 Billabongs
6 Dragonfly Adventure Park
7 Whitewater Park
8 Arrowtail Park
9 Display Village
10 Sales Centre & Café

Source: AVID Property Group

1.2 Proposed Development

Chisholm Plaza is proposed to occupy the northern part of the block bordered by Heritage Drive, Tigerhawk Drive and Settlers Boulevard. The ground floor plan for the centre is provided as Figure 1.5 while Table 1.1 summarises the proposed uses. The key components of the development include the following:

- A full-scale supermarket of 3,809 sq.m (including a 'Direct to Boot' area) together with an adjoined 180 sq.m liquor store;
- A mini-major tenant of 1,500 sq.m;
- 3,638 sq.m of specialty shops as well as 233 sq.m of kiosk space;
- A range of non-retail/community facilities including a gymnasium; a tavern; a Learn to Swim (LTS) facility; a childcare centre; a medical centre; and a car wash outlet.

Carparking for the centre is to be provided at the northern part of the site fronting Tigerhawk Drive, with access to be provided from each of the streets that surround the centre.

The scale of centre proposed would be well placed to serve the daily/weekly food, grocery and convenience-oriented needs of residents in the trade area. It would also provide a focal point for the local community given the range of non-retail and community facilities proposed. In particular, the proposed gymnasium would cater to the growing health and wellbeing sector. Such a facility would greatly add to the offer at the proposed neighbourhood centre and would be used by a variety of residents in the surrounding area. A gymnasium would also contribute to the overall amenity of the development.

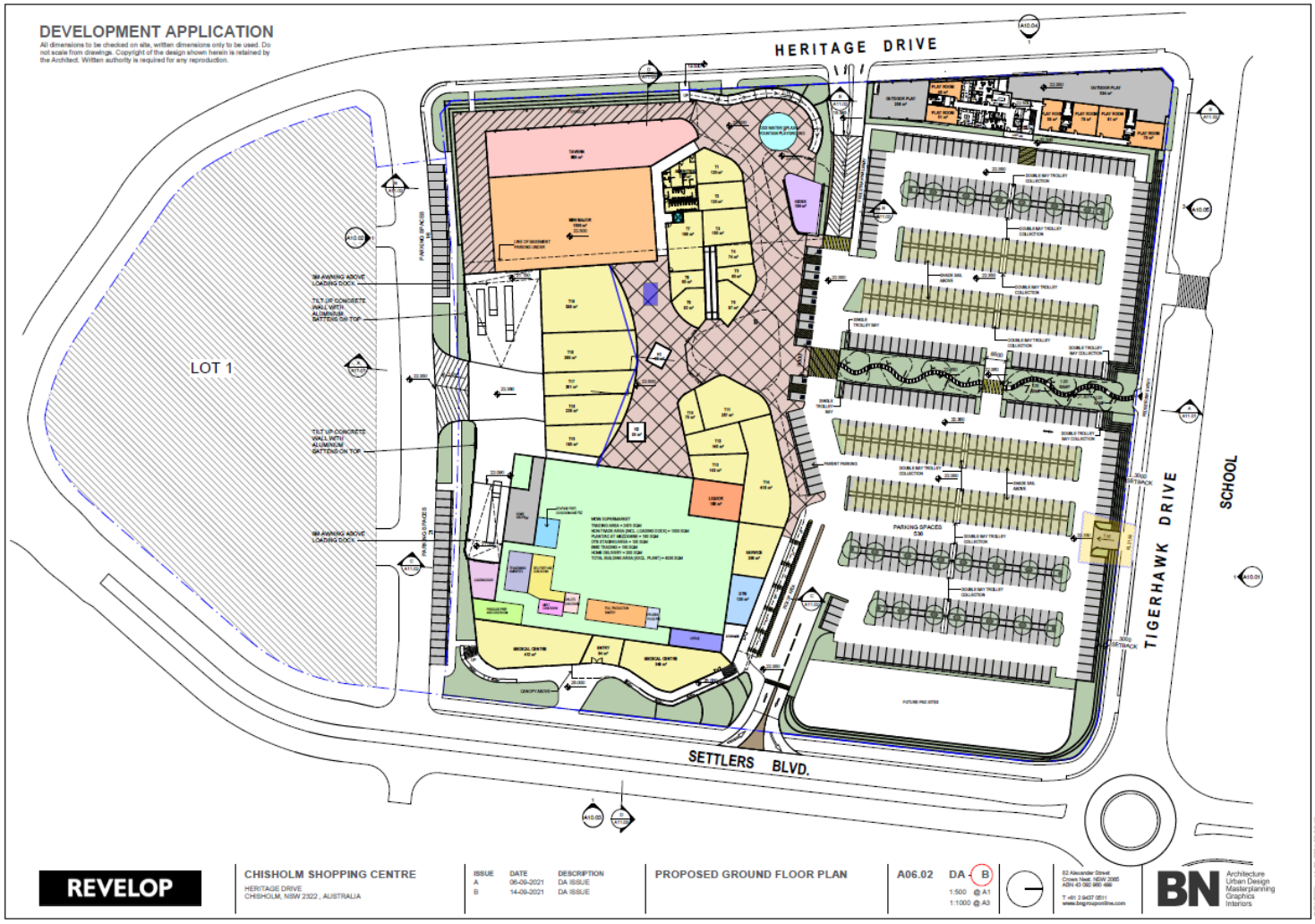
The planned medical centre would serve an important community service. Medical centres serve all population segments, though the key customer groups served are elderly residents and young children. Medical centres are an increasingly common use in shopping centres and reflect the preference of community for medical centres which are convenient to access. A medical hub at the centre could also include some allied health uses such as a dental clinic, a podiatrist, a chiropractor, an osteopath, a psychologist and/or a physiotherapist.

Table 1.1: Chisholm Plaza – Proposed Composition

Category/use	GLA (sq.m)
Major tenants	
Supermarket	3,809
Mini-major	1,500
Specialty shops	
Shops & liquor	3,818
Kiosks	233
Non-retail uses	
Gymnasium	1,057
Tavern	878
Learn to Swim	816
Childcare centre	890
Medical centre / allied health	763
Car Wash	473
Total	**14,237**

Source: Revelop; Ethos Urban

Figure 1.5: Chisholm Plaza – Ground Floor Plan



Source: Revelop

1.3 Planning framework

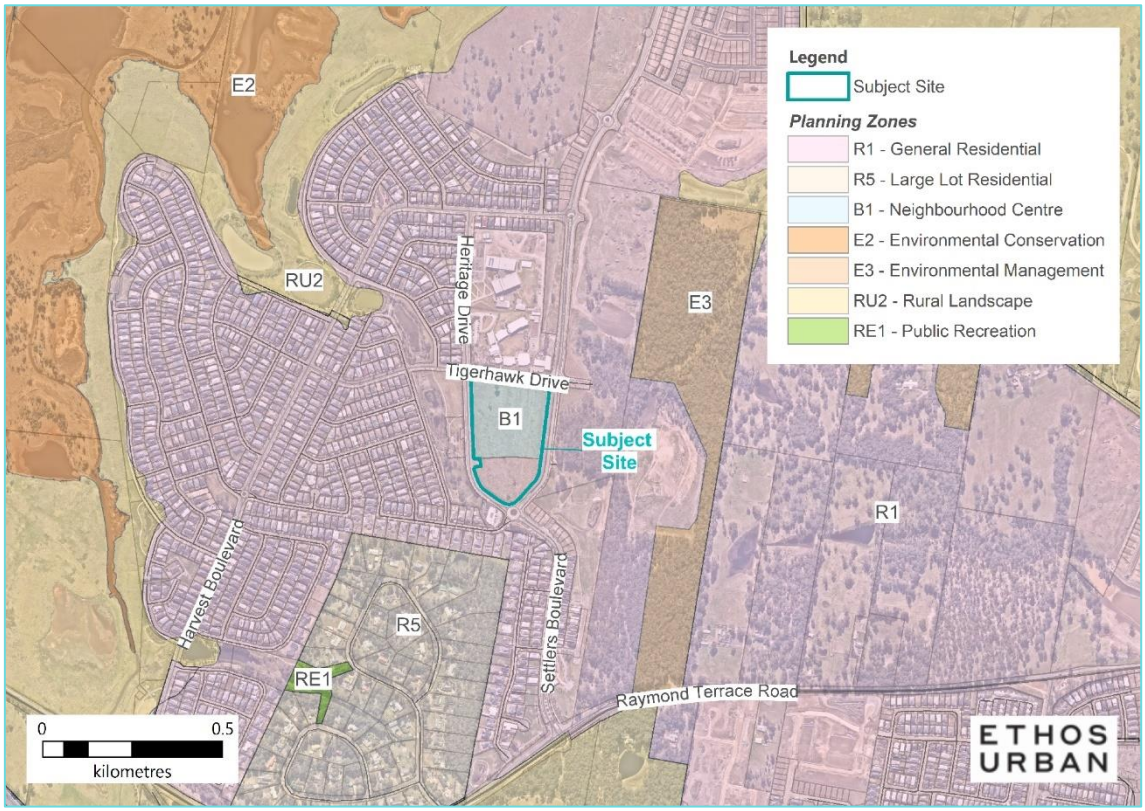
Under the Maitland Local Environment Plan the Subject Site is Zone B1 - Neighbourhood Centre, refer Figure 1.6. It is the only site zoned B1 in the Thornton North Urban Release Area.

The Maitland Local Environment Plan outlines that the objectives of the zone are as follows:

- "*To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood.*
- *To provide retail, business and community facilities to meet the needs of a growing population."*

The proposed development aligns with the objectives of the Zone B1 - Neighbourhood Centre.

Figure 1.6: Land Zones



Source: Maitland Local Environment Plan

1.4 COVID-19 and Local Property Market Trends

The COVID-19 pandemic has significantly impacted many aspects of the lives of people in Australia and throughout the world, with varying implications for different industries and for different locations. For the retail sector, supermarkets have experienced an uplift in overall sales, while cafés and restaurants have suffered significantly (source ABS Retail Trade data). Many retailers have limited the potential impacts by greatly increasing their online sales capabilities.

Smaller local shopping centres have performed relatively well during the pandemic. Centres serving local communities play an important role in catering to the essential shopping needs of residents in a local area. As COVID-19 restricted the freedom of movement of residents, whether by law or by

personal preference to not travel too far from home, the importance of local neighbourhood centres increased significantly, as residents shun larger centres in favour of shopping local. It is unknown if this change in consumer preference will continue in the long term, though some research suggests consumers intent to shop more locally in the future.

The impacts of the COVID-19 pandemic on the residential property market in the local area has been relatively minor, underpinned by favourable macro-economic conditions. While COVID-19 has restricted freedom of movement, leading to a significant reduction in net overseas migration which had been the key component driving Australia's population growth, Chisholm is a regional tree-change destination whose growth has been driven by intra-state migration. Demand for property in Chisholm remains strong, as city dwellers have sought to escape the densification of urban landscapes in Australia's capital cities during the pandemic. This has led to increased demand for larger blocks in regional locations underpinned on one hand by lifestyle considerations, while on the other, the ability to work remotely.

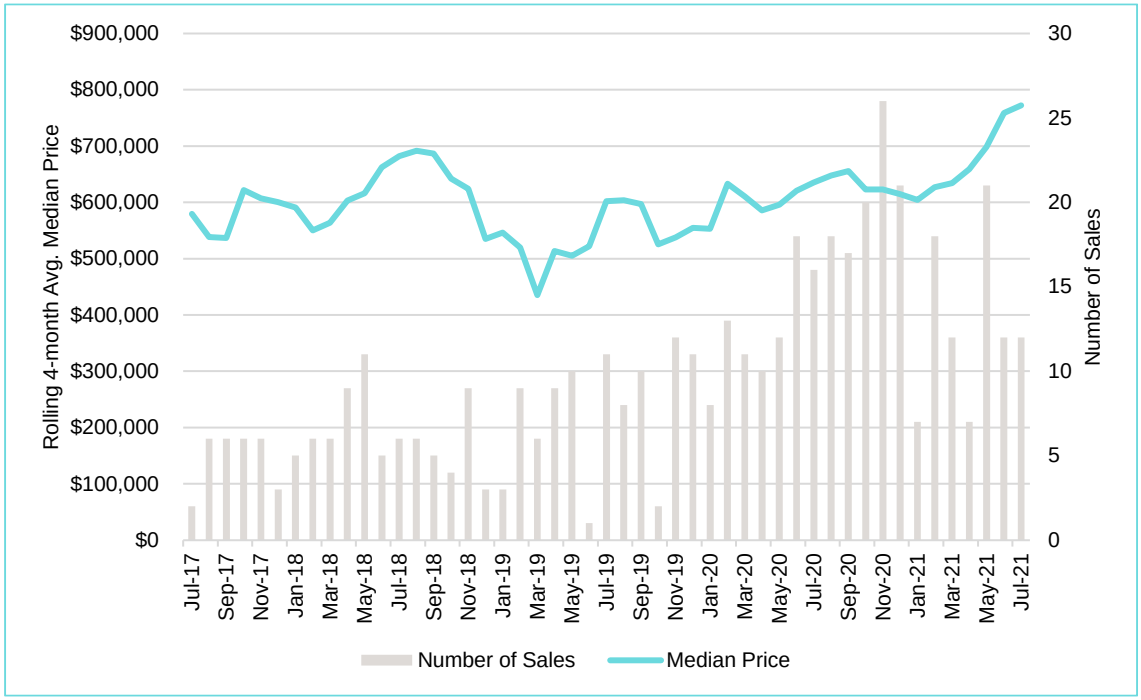
On a macro level, favourable borrowing conditions, with historically low interest rates expected to persist until at least the medium term, as well as Federal and State Government incentives, such as the First Home Owner Grant (New Homes) scheme, the First Home Buyer Assistance scheme and the HomeBuilder scheme, have heightened demand for residential stock in many parts of regional NSW. This trend of heightened demand is expected to contribute to ongoing demand for new residential housing in the area, driven in part by an exodus from major metropolitan areas such as Sydney.

Over the period from March/April 2020 (considered the start of the COVID pandemic in Australia) until July 2021, median house prices in the suburb of Chisholm have increased from around $600,000 to $800,000 (refer Figure 1.7). The volume of house sales in the area is also trending upwards, with this trend commencing from early 2020.

The demand for housing in the local area has resulted in a shortage of rental stock. Residential vacancy rates in the postcode of 2322 have averaged around 0.5% since August 2020 and was just 0.3% in September 2021 (refer Figure 1.8). The Postcode of 2322 covers the suburbs of Chisholm, Thornton, Beresfield, Black Hill, Hexham, Lenaghan, Stockrington, Tarro, Tomago and Woodberry.

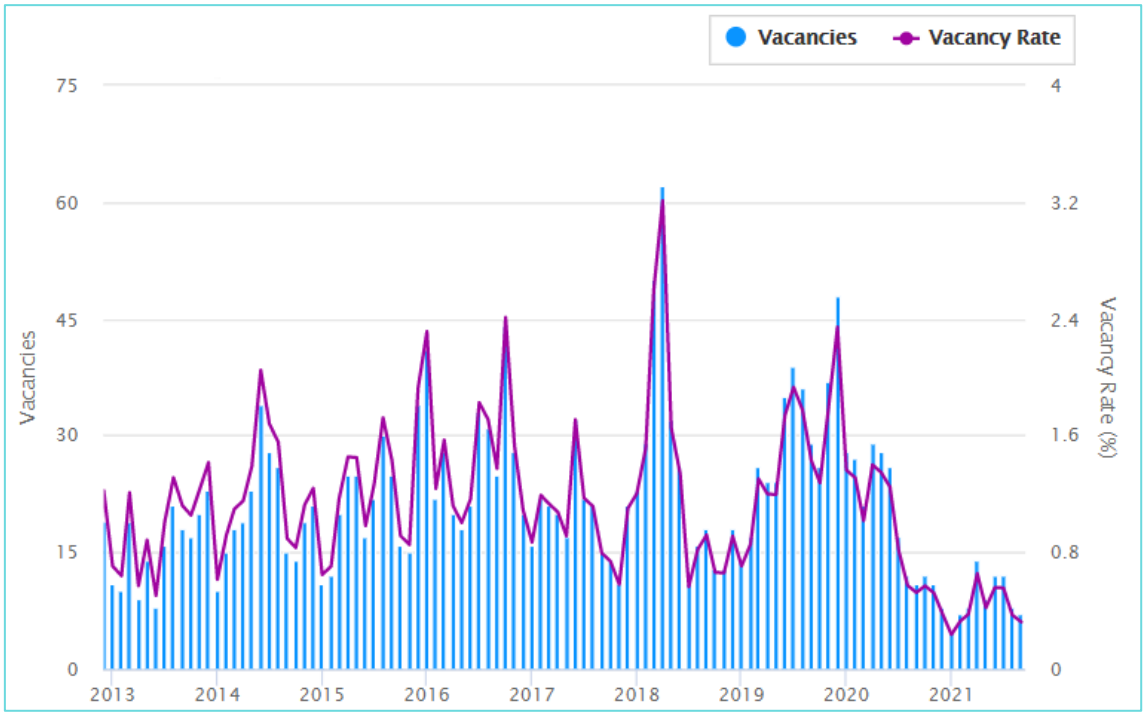
The change in preferences of where people wish to live borne by the pandemic, together with the ability to work remotely and favourable borrowing conditions, are expected to underpin ongoing strong population growth in the area over the medium-term.

Figure 1.7: Median House Price – Chisholm Jul 2017 – Jul 2021



Source: CoreLogic

Figure 1.8: Residential Vacancy Rates – Postcode 2322



Source: SQM Research

2 Catchment Analysis

This Chapter provides analysis of the catchment or trade area expected to be served by the proposed Chisholm Plaza shopping centre.

2.1 Trade Area Definition

The extent of a trade area or catchment for any facility is shaped by a number of factors such as the following:

- The relative attraction of the facility in question as compared with alternative facilities including its scale and composition, as well as easy of access and provision of carparking at the subject facility.
- The surrounding competitive context, particularly the location, scale and quality of competing facilities.
- The available road network and public transport service and how they operate to effect ease of use and access to the site in question.
- Significant physical barriers which are difficult to cross, which can act to delineate the boundaries of a trade area.

The trade area defined for the proposed Chisholm Plaza particularly reflects the following factors:

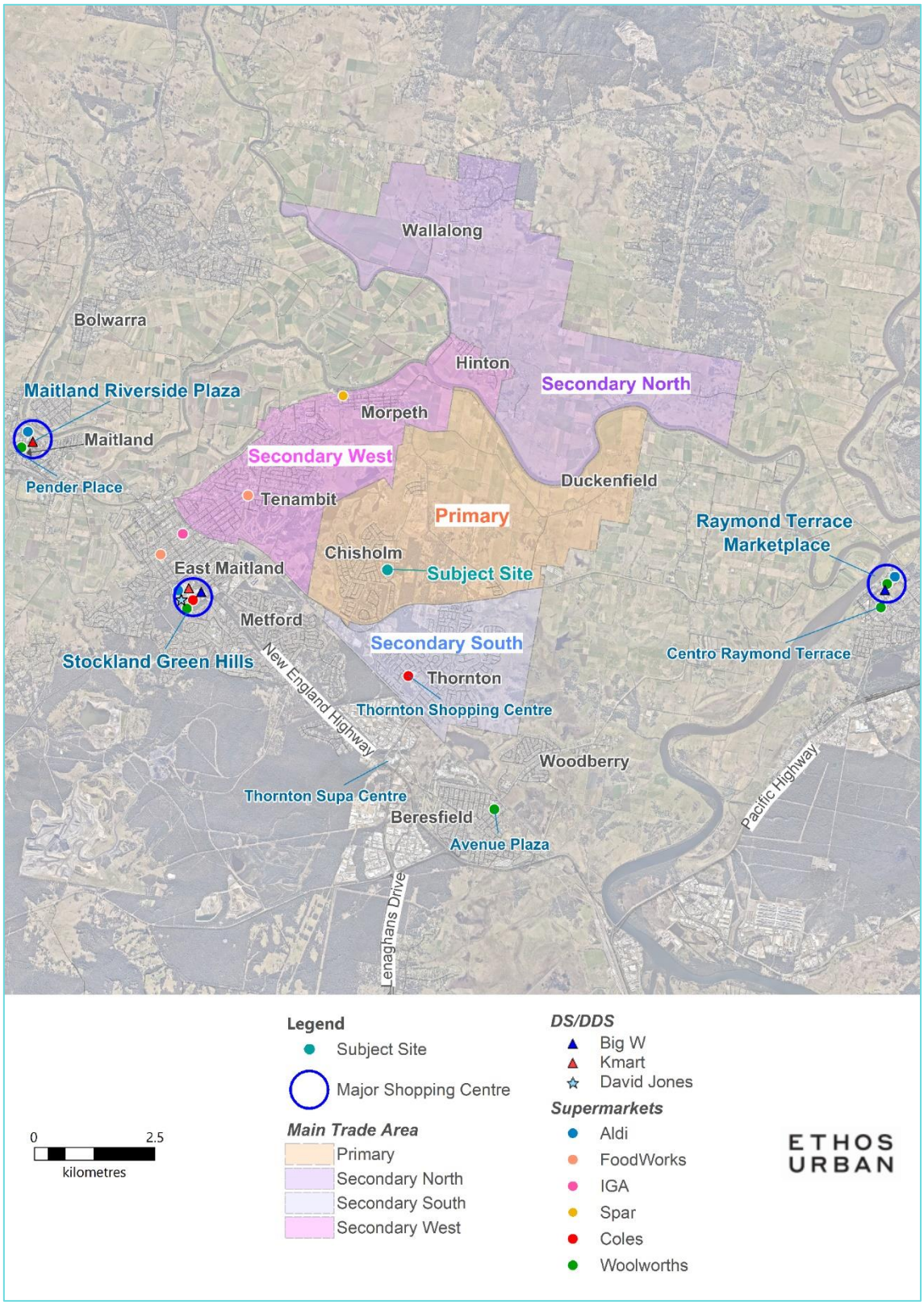
- The role of the centre, which is to serve the daily/weekly food, grocery and convenience-oriented needs of residents in the surrounding area.
- The locations of existing competitive supermarket facilities, particularly at Thornton, Stockland Green Hills and the Maitland City Centre.
- The ease of local access within Chisholm, as well as future linkages which will allow for convenient access to the Subject Site from the surrounding area.

Based on all of the above, the trade area is defined to include a primary sector and three secondary sectors, as illustrated in Figure 2.1 and described as follows:

- The **primary sector** contains the Chisholm and the adjoining suburbs of Berry Park and Duckenfield, and is generally bound by Raymond Terrace Road to the south.
- The **secondary north** sector encompasses the rural suburbs of Wallalong, Osterley and parts of Hinton.
- The **secondary south** sector contains the majority of Thornton, north of the railway line.
- The **secondary west** sector encompasses the suburbs of Tenambit, Morpeth, parts of Raworth and Hinton, as well as the northern part of East Maitland

Throughout the remainder of this report the combination of the primary and secondary sectors is referred to as the main trade area.

Figure 2.1: Chisholm Plaza Main Trade Area and Retail Competitive Context



Source: Ethos Urban with Mapinfo

2.2 Population Trends and Forecasts

Historic population levels for the trade area have been estimated by using ABS estimated resident population (ERP) data, which is considered the most accurate and up-to-date population data available in Australia. Population estimates to 2036 have been forecast using a range of sources including ABS New Dwellings Approval data; population projections produced by the NSW Department of Planning, Industry and Environment, 2019; Nearmap images; and other investigations of residential development undertaken by this office.

Table 2.1 details the historic, current and projected population for the trade area from 2011 to 2036. In mid-2021, the population of the trade area is estimated at 26,730 residents, including 4,400 residents in the primary sector. Strong growth is projected to result in the population reaching approximately 35,800 residents by 2036 including 11,000 residents in the primary sector. This reflects an average annual growth rate of 2% across the main trade area and a very strong 6.3% in the primary sector over the forecast period.

The Thornton North Urban Release Area is projected to be fully developed by around 2036, accommodating a capacity population of close to 15,000 residents. Approximately 70-75% of these residents are to reside in the primary sector, while the remaining 25-30% are to reside in the secondary south sector south of Raymond Terrace Road. It is estimated that approximately 2,300 dwellings of the Thornton North Urban Release Area have been developed. The remaining 2,700 dwellings are expected to be developed over the next 12-15 years.

Table 2.1: Trade Area Population Estimates and Projections, 2011-2036 (as at June)

	2011	2016	2021	2026	2031	2036
Primary						
Population (no.)	560	1,500	4,400	7,300	10,000	11,000
Annual Growth (no.)		188	580	580	540	200
Annual Growth (%)		21.8%	24.0%	10.7%	6.5%	1.9%
Secondary North						
Population (no.)	1,220	1,240	1,290	1,340	1,390	1,440
Annual Growth (no.)		4	10	10	10	10
Annual Growth (%)		0.3%	0.8%	0.8%	0.7%	0.7%
Secondary South						
Population (no.)	7,600	7,840	10,540	11,740	11,990	12,040
Annual Growth (no.)		48	540	240	50	10
Annual Growth (%)		0.6%	6.1%	2.2%	0.4%	0.1%
Secondary West						
Population (no.)	9,210	9,900	10,500	10,900	11,100	11,300
Annual Growth (no.)		138	120	80	40	40
Annual Growth (%)		1.5%	1.2%	0.8%	0.4%	0.4%
Main Trade area						
Population (no.)	**18,590**	**20,480**	**26,730**	**31,280**	**34,480**	**35,780**
Annual Growth (no.)		**378**	**1,250**	**910**	**640**	**260**
Annual Growth (%)		**2.0%**	**5.5%**	**3.2%**	**2.0%**	**0.7%**

Source: ABS; NSW Department of Planning, Industry and Environment, 2019; Nearmap; Ethos Urban

2.3 Socio-Economic Characteristics

Table 2.2 compares the socio-economic profile of residents in the trade area with the Hunter Valley and regional NSW, as sourced from the 2016 ABS Census. The main points drawn from the data are as follows:

- **Higher incomes**. Average income levels across the main trade area are above the regional NSW average on both a per capita and per household basis.
- **Younger age profile**. The primary and secondary south sectors population have younger age profiles reflecting the high number of young families in the area. The age profile of the secondary north and west sectors are most aligned with the overall Hunter Valley region.
- **Predominantly Australian-born**. The overwhelming majority of residents in the trade area are Australian born.
- **Family-orientated household composition** Traditional families, i.e. couples with children, account for over 50% of household in the primary and secondary south sectors, highlighting the attractiveness of Chisholm as a place to raise a family.

As development in Chisholm continues to gather pace, the key socio-demographic segment which will underpin population growth in Chisholm are young traditional families, who are attracted to the regional lifestyle and relative affordability of the area, as well as potentially city dwellers seeking a tree-change destination.

Table 2.2: Socio-Economic Characteristics, 2016

Category	Primary	Secondary North	Secondary South	Secondary West	Hunter Valley*	Regional NSW
Income						
Median individual income (annual)	$46,150	$39,530	$35,930	$32,130	$32,090	$30,420
Variation from Regional NSW median	51.7%	29.9%	18.1%	5.6%	5.5%	na
Median household income (annual)	$111,800	$103,550	$82,740	$64,730	$68,840	$61,200
Variation from Regional NSW median	82.7%	69.2%	35.2%	5.8%	12.5%	na
Age Structure						
0-4 years	11.1%	5.1%	7.2%	6.4%	6.2%	5.9%
5-19 years	20.2%	25.4%	22.1%	19.3%	18.6%	18.5%
20-34 years	26.7%	13.1%	18.9%	18.0%	19.0%	16.6%
35-64 years	35.0%	45.4%	41.4%	37.7%	38.1%	38.5%
65 years and older	7.0%	11.1%	10.4%	18.6%	18.1%	20.5%
Median Age (years)	30.5	39.0	36.1	39.5	39.5	42.0
Country of Birth						
Australia	91.7%	94.5%	93.4%	94.2%	90.5%	89.3%
Other Major English Speaking Countries	4.0%	4.4%	3.7%	4.0%	4.9%	5.5%
Other Overseas Born	4.2%	1.1%	2.8%	1.8%	4.6%	5.2%
Household Composition						
Couple family with no children	33.4%	27.9%	27.5%	28.4%	27.6%	29.2%
Couple family with children	50.9%	52.1%	43.6%	29.4%	30.0%	27.4%
Couple family – total	84.3%	80.0%	71.1%	57.8%	57.6%	56.6%
One parent family	7.5%	7.4%	11.9%	13.6%	12.4%	11.9%
Family households – total	91.8%	87.4%	83.9%	72.5%	70.9%	69.2%
Lone person household	7.2%	12.6%	14.8%	25.3%	25.6%	27.6%
Group Household	1.1%	0.0%	1.3%	2.2%	3.6%	3.2%
Dwelling Structure (Occupied Private Dwellings)						
Separate house	100.0%	100.0%	95.5%	84.1%	82.7%	82.9%
Semi-detached, townhouse etc.	0.0%	0.0%	4.0%	13.2%	11.0%	9.2%
Flat, unit or apartment	0.0%	0.0%	0.5%	2.3%	5.6%	6.4%
Average household size	3.0	3.1	2.8	2.5	2.5	2.4
Tenure Type (Occupied Private Dwellings)						
Owned outright	23.8%	37.2%	29.1%	33.8%	35.0%	38.7%
Owned with a mortgage	46.5%	55.5%	51.3%	34.4%	35.1%	31.6%
Rented	29.1%	6.6%	19.5%	30.4%	29.2%	28.9%
Housing Costs						
Median monthly mortgage repayment	$2,300	$1,980	$1,670	$1,710	$1,750	$1,600
Variation from Regional NSW median	43.8%	23.8%	4.4%	6.9%	9.4%	na

**Includes the ABS Statistical Area 4 (SA4) of Hunter Valley exc Newcastle and Newcastle & Lake Macquarie*

Source: ABS Census of Population and Housing 2016; Ethos Urban

2.4 Retail Spending Analysis

The following provides an analysis of the expected retail spending behaviour of trade area residents. Estimates of retail spending by trade area residents have been prepared with reference to the MarketInfo retail spending model. MarketInfo is a micro-simulation model which uses data from the ABS Household Expenditure Survey (HES), the ABS 2016 Census of Population and Housing, ABS Australian National Accounts, and other relevant sources.

The retail spending data is presented across four major spending categories:

- **Food, Liquor and Groceries (FLG)**, which includes fresh food, groceries and take-home liquor, including supermarkets.
- **Food Catering**, which includes cafes, restaurants and takeaway food.
- **Non-Food**, which includes apparel, homewares, bulky merchandise and general merchandise.
- **Retail Services**, including hairdressers, beauty salons etc.

Estimates of average per capita retail spending in FY2021 for trade area residents are shown in Table 2.3, and are compared with the regional NSW averages. Average per capita total retail spending by trade area residents is estimated at $15,510, which is 3.7% above the regional NSW average. Per capita spending on FLG, the key category for supermarkets, by trade area residents is 1.2% above average for regional NSW. All spending estimates in this report are expressed including GST.

Table 2.3: Average Per Capita Retail Spending, 2020/21

Trade Area	Food, Liquor & Groceries	Food Catering	Non-Food	Retail Services	Total Retail
Primary Trade Area	$6,240	$2,050	$6,440	$530	$15,270
Secondary North Trade Area	$6,650	$2,040	$6,920	$540	$16,140
Secondary South Trade Area	$6,600	$1,970	$6,450	$480	$15,510
Secondary West Trade Area	$6,610	$2,020	$6,380	$540	$15,540
Total Secondary Trade Area	$6,610	$2,000	$6,440	$510	$15,560
Main Trade Area	**$6,550**	**$2,010**	**$6,440**	**$520**	**$15,510**
Regional NSW	*$6,470*	*$1,870*	*$6,090*	*$510*	*$14,950*
Variation from Regional NSW average					
Primary Trade Area	-3.6%	9.6%	5.7%	3.9%	2.1%
Secondary North Trade Area	2.8%	9.1%	13.6%	5.9%	8.0%
Secondary South Trade Area	2.0%	5.3%	5.9%	-5.9%	3.7%
Secondary West Trade Area	2.2%	8.0%	4.8%	5.9%	3.9%
Total Secondary Trade Area	2.2%	7.0%	5.7%	0.0%	4.1%
Main Trade Area	**1.2%**	**7.5%**	**5.7%**	**2.0%**	**3.7%**

Source: MarketInfo; Ethos Urban

The total retail spending capacity of the trade area population is detailed in Table 2.4. It is calculated by multiplying the current and future population forecasts, with the per capita retail spending estimates outlined above. The spending forecasts are presented in constant $2020/21, i.e. excluding the effects of price inflation, though do include an allowance for real growth in per capita spending assumed to average around 0.8% per annum.

The total retail spending capacity of the main trade area population is estimated at $415 million in 2021, including $175 million of FLG spending. Retail spending by trade area residents is projected to increase very strongly over the forecast period to reach $625 million at 2031, including $266 million of FLG spending. Food catering spending, another key expenditure category for the neighbourhood shopping centres, is projected to reach $84 million at 2036, reflecting an average annual growth rate of 3% over the forecast period.

The retail spending capacity of the primary sector population is projected to grow strongly from $67 million at 2021 to reach $190 million at 2036, an increase of more than $120 million over the next 15 years.

Table 2.4: Trade Area Retail Spending Capacity, 2021 - 2036 (Constant $2020/21)

Retail Category	2021	2026	2031	2036
Primary Trade Area				
FLG	$27.5m	$47.7m	$68.3m	$78.6m
Food Catering	$9.0m	$15.7m	$22.6m	$26.2m
Non-Food	$28.4m	$48.6m	$68.7m	$78.1m
Services	$2.3m	$4.1m	$5.9m	$6.8m
Total Retail	**$67.2m**	**$116.1m**	**$165.5m**	**$189.6m**
Secondary North Trade Area				
FLG	$8.6m	$9.3m	$10.1m	$11.0m
Food Catering	$2.6m	$2.9m	$3.1m	$3.4m
Non-Food	$8.9m	$9.6m	$10.3m	$11.0m
Services	$0.7m	$0.8m	$0.8m	$0.9m
Total Retail	**$20.8m**	**$22.5m**	**$24.3m**	**$26.2m**
Secondary South Trade Area				
FLG	$69.6m	$81.1m	$86.6m	$90.9m
Food Catering	$20.8m	$24.4m	$26.2m	$27.6m
Non-Food	$68.0m	$78.2m	$82.5m	$85.5m
Services	$5.1m	$6.0m	$6.4m	$6.7m
Total Retail	**$163.5m**	**$189.6m**	**$201.6m**	**$210.8m**
Secondary West Trade Area				
FLG	$69.4m	$75.3m	$80.2m	$85.4m
Food Catering	$21.2m	$23.1m	$24.7m	$26.5m
Non-Food	$66.9m	$71.8m	$75.5m	$79.3m
Services	$5.7m	$6.2m	$6.6m	$7.1m
Total Retail	**$163.2m**	**$176.4m**	**$187.0m**	**$198.3m**
Main Trade Area				
FLG	$175.0m	$213.4m	$245.2m	$265.8m
Food Catering	$53.6m	$66.1m	$76.6m	$83.6m
Non-Food	$172.2m	$208.1m	$237.0m	$253.9m
Services	$13.8m	$17.0m	$19.7m	$21.5m
Total Retail	**$414.7m**	**$504.6m**	**$578.5m**	**$624.9m**

Source: MarketInfo; Ethos Urban

3 Competitive Context

This Chapter reviews the relevant retail facilities in the surrounding region. Table 3.1 provides a summary of the key retail facilities in the surrounding area, while the previous Figure 2.1 illustrates the locations of the shopping centres relative to the Subject Site.

Table 3.1 Schedule of Major Retail Precincts in Surrounding Area

Centre	Retail GLA (sq.m)	Major traders	Dist. by Road from Subject Site (km)
Within trade area			
Thornton Shopping Centre	5,000	Coles	3.0
Tenambit	1,300	FoodWorks	6.0
Morpeth	3,000	Spar Express	8.0
Beyond trade area - higher-order centres			
Green Hills			6.0
Stockland Green Hills	67,000	David Jones, Kmart, Big W, Coles, Woolworths	
ALDI Green Hills	1,760	ALDI (under redevelopment)	
Maitland City Centre			10.0
Riverside Plaza	13,000	Kmart, ALDI	
Pender Place SC	5,000	Woolworths	
Other	20,000		
Beyond trade area - convenience-oriented centres			
East Maitland Town Centre	5,000	IGA	6.1
High St, East Maitland	250	FoodWorks	6.7
Beresfield	3,000	Woolworths	7.4
Lorn Local Centre	2,000		12.2

Source: Property Council of Australia; Ethos Urban

Within the defined main trade area there are three centres with a notable food offering – Thornton, Tenambit and Morpeth.

Thornton Shopping Centre is a Coles anchored neighbourhood centre, located approximately 3km south of the Subject Site in the secondary south sector. The centre includes around 5,000 sq.m of floorspace. It contains a provision of food outlets (such as pizza, fish & chips, Chinese, noodles, café), convenience-oriented specialties (such as butcher, bakery, newsagent, pharmacy, hairdresser), as well as a number of commercial/non-retail uses (such as dental, Australia Post, real estate agent and a building society). Adjacent to the centre is the Thornton Library.

A small cluster of retail shops are provided on Maize Street in Tenambit including a small FoodWorks supermarket, a butcher, a pharmacy, a liquor shop, an Asian restaurant, a fish & chips outlet, a café, a bakery, a chocolate shop, a podiatry clinic and Australia Post.

A number of shops and services are located along Swan Street in Morpeth. Some of the shops in the strip centre include a Spar Express outlet, a toy shop, a deli, a liquor shop, a bakery, a pharmacy, and several food & beverage outlets as well as a brewery.

Stockland Green Hills, located some 6km south-west of the Subject Site, is the only regional shopping centre in the broader Maitland region. The centre contains approximately 67,000 sq.m of retail floorspace, having completed an expansion in 2018 which doubled the size of the centre. Stockland Green Hills is anchored by a David Jones department store; Big W and Kmart discount department stores; as well as Coles and Woolworths supermarkets. A Target discount department store previously tenanted the centre, however, was one of 92 stores rebranded as Kmart in 2020 following a strategic overhaul undertaken by its parent company Wesfarmers. A Harris Scarfe similarly closed in 2019, with its vacant floorspace backfilled by Cotton On and TK Maxx.

As Stockland Green Hills is the main higher-order centre in the region it plays a key role in serving the discretionary non-food (such as apparel and fashion), dining (having introduced 'the Courtyard' – an outdoor restaurant precinct as part of its expansion) and entertainment (anchored by a 7-screen Hoyts cinema, while also containing Timezone, bowling and laser tag facilities) needs of the surrounding population.

A free-standing ALDI supermarket, located close to Stockland Green Hills, is currently undergoing a $7 million redevelopment which will expanded the store to around 1,760 sqm.

The Maitland City Centre, which serves the retail and commercial needs of the wider Maitland region, is located 10km west of Chisholm. The key retail centres in the City Centre include Maitland Riverside Plaza (a sub-regional centre encompassing 13,000 sq.m of floorspace, anchored by Kmart, ALDI and Best&Less) and Pender Place shopping centre (which is anchored by a Woolworths supermarket and is proposed to be refurbished in 2022). A range of shops are also provided along High Street with a focus on retail services, cafes, restaurants and convenience-oriented uses.

A number of smaller retail centres, such as the East Maitland Town Centre, the Beresfield Town Centre, and the Lorn Local Centre, are located beyond the trade area and are anchored by a small supermarket or convenience food store. The centres serve the everyday top-up food and convenience-oriented needs of residents in their respective localised catchments and are not likely to compete directly with the retail offer planned to be provided at Chisholm Plaza.

Also in East Maitland are a small FoodWorks supermarket on High Street, Organic Feast on Lawes Street, and a range of retail and commercial facilities (such as car dealers) located on Melbourne Street. Chisholm Plaza would not compete with these facilities, which serve different markets.

4 Retail Floorspace Analysis

This Chapter provides a retail floorspace analysis for the trade area and an analysis of the scale of retail floorspace supportable at the Subject Site.

4.1 Retail Floorspace Demand

The following provides an analysis of the expected demand for retail floorspace generated by the main trade area population. It is noted that modelling retail demand for a given area can be imprecise and depends on a range of factors. Therefore, the floorspace demand analysis should be viewed as indicative. Throughout this report floorspace refers to gross leasable area (GLA).

The estimated level of retail floorspace demand generated by main trade area population over the forecast period to 2036 is detailed in Table 4.1 This indicative retail floorspace demand would be served by retail facilities located both within the trade area (such as Thornton Shopping Centre) and beyond the main trade area (such as Stockland Green Hills and retail facilities within the Maitland City Centre).

The retail floorspace demand figures are calculated by applying an average Retail Turnover Density (RTD) to the estimated available retail spend volume by category (as detailed in Chapter 2). The RTD is simply the average level of sales per sq.m which retailers in each category typically achieve. Adopted RTD levels are as follows:

- $10,000 per sq.m for food, liquor & groceries (FLG) retailers, which is the key expenditure category for supermarkets;
- $7,000 per sq.m for food catering, which covers cafes, restaurants and takeaway food stores;
- $5,500 per sq.m for all non-food stores; and
- $6,000 per sq.m for retail services such as hairdressers and beaty salons.

The average across all retail categories equates to approximately $7,000 per sq.m.

The retail floorspace demand analysis also allows for the increasing amount of retail spending being directed online. The ABS collects information of online sales as part of its Retail Trade survey. As of June 2021, the data indicates that 5.4% of food sales were made online and 16.3% of non-food sales. However, it is important to note that increasing online sales does not necessarily result in a decline in physical retail floorspace. For example, a proportion of online food sales would be served by existing local supermarkets. Nevertheless, the following analysis allows for around 8% of total retail spending demand to be served by businesses not requiring physical retail floorspace in the local area. This proportion is assumed to increase over the forecast period to around 12% by 2036.

The analysis in Table 4.1 illustrates how strongly the retail floorspace demand of main trade area residents will increase over the forecast period, particularly as residential development continues in the primary sector. The retail floorspace demand generated by the main trade area population is forecast to increase by from 53,500 sq.m at 2021 to 67,400 sq.m by 2036.

Table 4.1: Estimated Retail Floorspace Demand – Main Trade Area, 2021-2036 (sq.m)

Retail Category	2021	2026	2031	2036
Primary Trade Area				
FLG	2,660	4,410	6,030	6,590
Food Catering	1,290	2,160	2,990	3,320
Non-Food	4,380	7,010	9,210	9,650
Retail Services	380	640	880	970
Total Retail	**8,710**	**14,220**	**19,110**	**20,530**
Secondary North Trade Area				
FLG	830	860	890	920
Food Catering	380	390	410	430
Non-Food	1,380	1,380	1,370	1,360
Retail Services	110	120	120	130
Total Retail	**2,700**	**2,750**	**2,790**	**2,840**
Secondary South Trade Area				
FLG	6,750	7,500	7,640	7,630
Food Catering	2,970	3,340	3,450	3,500
Non-Food	10,510	11,290	11,060	10,580
Retail Services	830	930	950	960
Total Retail	**21,060**	**23,060**	**23,100**	**22,670**
Trade Area				
FLG	16,980	19,750	21,640	22,310
Food Catering	7,660	9,070	10,110	10,600
Non-Food	26,620	30,040	31,760	31,390
Retail Services	2,250	2,660	2,950	3,070
Total Retail	**53,510**	**61,520**	**66,460**	**67,370**

** Figures are rounded*

Source: MarketInfo; Ethos Urban

4.2 Supportable Retail Floorspace

This section presents an assessment of the level of retail floorspace expected to be supportable at the Subject Site having regard to the available market and competing retail facilities.

The amount of retail floorspace expected to be supportable at Chisholm Plaza is estimated based on the level of retail expenditure which the centre is likely to capture from the main trade area population, as detailed Table 4.2.

The role of Chisholm Plaza is to provide a neighbourhood centre offer, serving the daily/weekly food, grocery and convenience-oriented shopping needs of local residents. Therefore, the centre would be able to retain a substantial proportion of the fresh food, take-home liquor and grocery (FLG) spending in the trade area, particularly from the primary sector.

The proportion of available FLG expenditure which Chisholm Plaza has the potential to retain from the primary sector is estimated at 50%. At this retention rate, the Chisholm Plaza will function as the main food and grocery shopping destination for residents of the primary sector. The remaining FLG spend would be directed to other competitive supermarket facilities in the main trade area, such as the Coles supermarket at Thornton Shopping Centre, or to supermarkets at higher-order centres beyond the trade area. These centres, such as Stockland Green Hills and the Maitland City Centre,

currently serve the FLG needs of local residents, particularly reflecting instances where weekly food and grocery shopping is combined with shopping for more higher-order non-food/discretionary needs.

A shopping centre at the Subject Site is likely to capture a moderate level of food-catering (e.g cafes/restaurants) and retail services (e.g. hair and beauty) spend. These retail uses are typically provided at neighbourhood centres and greatly add to the offer of the centre.

For neighbourhood centres, non-food retention rates are projected to be far lower than those expected to be captured in the other retail categories. For more discretionary categories such as apparel, household goods and leisure, the expected retention rates for the subject centre are likely to be minimal, given that these types of uses typically tenant sub-regional or regional centres. Though neighbourhood centres do include some outlets that serve the convenience-oriented non-food needs of residents, such as pharmacies.

Across the total retail spectrum, the proportion of available expenditure retained from primary sector residents is estimated to be in the order of 24%, which is in line with the average retention rates of supermarket-based centres at between 20% to 25% for the primary sector. Retention rates are expected to be lower in the secondary sectors, given the availability/proximity of existing supermarkets and retail facilities in these areas.

Across the main trade area, the overall retention of retail expenditure is estimated at approximately 11%, which is reflective of the share which a typical neighbourhood centre captures in its catchment. The analysis also allows for some of the retail floorspace demand to be generated by residents living beyond the defined main trade area, such as workers and visitors to the area, which is estimated to account for 15% of the total retail floorspace demand.

Our analysis indicates that currently a neighbourhood centre type offer anchored by at least one supermarket is clearly supportable at the Subject Site, with the demand for retail floorspace to increase over time. By 2026, the amount of retail floorspace considered supportable is estimated at approximately 9,000 sq.m, including 5,700 sq.m of FLG floorspace. The level of supportable FLG floorspace would easily accommodate a full-line supermarket (including liquor), as well as potentially a smaller supermarket or large fresh produce store and a provision of supporting fresh food specialties.

The analysis also shows that the planned centre can support a mix of convenience-oriented retail specialty shops and services, which reflects the expected role of Chisholm Plaza as a key neighbourhood shopping destination serving the food, grocery and convenience shopping needs of residents in the local area.

Table 4.2: Chisholm Plaza – Estimated Retail Floorspace Supportable (sq.m)

Retail Category	Est. % Retained	2021	2026	2031	2036
Primary Trade Area					
FLG	50%	1,530	2,540	3,470	3,790
Food Catering	30%	450	750	1,030	1,150
Non-Food	6%	310	500	660	690
Retail Services	35%	150	260	350	390
Total Retail	**24%**	**2,440**	**4,050**	**5,510**	**6,020**
Secondary Trade Area					
FLG	18%	2,960	3,170	3,230	3,250
Food Catering	11%	800	850	880	900
Non-Food	2%	580	600	590	560
Retail Services	13%	270	290	300	310
Total Retail	**9%**	**4,610**	**4,910**	**5,000**	**5,020**
Main Trade Area					
FLG	23%	4,490	5,710	6,700	7,040
Food Catering	14%	1,250	1,600	1,910	2,050
Non-Food	3%	890	1,100	1,250	1,250
Retail Services	16%	420	550	650	700
Total Retail	**11%**	**7,050**	**8,960**	**10,510**	**11,040**

** Figures are rounded*

Source: Ethos Urban

5 Assessment of Centre Potential

In order to be able to consider the question of potential economic benefits and impacts that might arise from the planned development of Chisholm Plaza, the first step is to quantify the level of sales which the proposed retail uses at the centre can reasonably expect to achieve.

The potential sales achieved of any particular retail facility, be it an individual store or a collection of stores provided in a shopping centre or precinct, is determined by a combination of the following factors:

- The quality of the facility, with particular regard to the major trader/traders that anchor the centre; the strength of the tenancy mix relative to the needs of the catchment which it seeks to serve; the physical layout and ease of use; the level of accessibility and ease of parking; and the atmosphere/ambience of the centre.
- The size of the available catchment which the centre seeks to serve.
- The location and strength of competitive retail facilities and the degree to which those alternative facilities are able to effectively serve the needs of the population within the relevant trade area.

The key factors considered when assessing the sales potential of the proposed Chisholm Plaza shopping centre include the following:

- The location of the subject site at the intersection of Heritage Drive and Settlers Boulevard, ensuring it is easily accessible from the surrounding area.
- The available population within the catchment, which is to increase strongly in the future.
- The socio-demographic profile of the area, and in particular the primary sector which contains a large proportion of young families.
- The scale and quality of existing retail facilities in the surrounding area, and particularly the lack on any competitive retail facilities within the primary sector.

5.1 Supermarket Sales Potential

The population of the primary sector is estimated at 4,400 residents at 2021 and is projected to increase rapidly to 10,000 by 2031, which is a substantial core catchment population for a neighbourhood shopping centre to serve. Given the site aspects and competitive context, the proposed supermarket anchor at Chisholm Plaza would be excellently placed to serve the day-to-day food and grocery needs of existing and future residents in the surrounding area.

A number of key points have been taken into consideration when assessing the sales potential for the proposed full-scale supermarket at the Subject Site.

Supermarkets generate almost all their sales from the take-home food, grocery and packaged liquor (FLG) retail expenditure category. As detailed in Chapter 2 of this report, the available FLG spending generated by the main trade area population is estimated at $175 million at 2021, and is projected to increase to $213 million at 2026 (in constant dollars terms).

Typically, Australians direct around 65% – 80% of food, grocery and liquor spending to supermarkets and major foodstores (i.e. grocery stores greater than 500 sq.m). This ratio can vary from location to location and is dependent on the provision of supermarkets and foodstores within the particular area or region, as well as the socio-demographic profile of the population. The likely share directed to supermarkets in this area is expected to be at the higher end of this range as there is a lower provision of fresh food options, such as major fresh food markets, in the trade area.

Another key consideration when estimating the sales potential is the fact that there are currently no supermarkets located in the primary sector and there is only one major supermarket in the main trade area, at Thornton Shopping Centre. Therefore, a full-scale supermarket at the Subject Site will be well placed to become the main destination for food and grocery shopping for primary sector residents.

The estimation of sales potential for the proposed supermarket also allows for some sales to come from customers living outside the main trade area, including workers and visitors, and factors in a proportion of sales from general merchandise items.

The market shares for the supermarket anchor are estimated to be the highest in the primary and secondary north sectors, where there are no other supermarkets, and lowest in the secondary south sector which contains a major supermarket. For the for purposes of this report, the first year of trade of the centre is assumed to be FY2024.

The estimated sales potential for the proposed full-scale supermarket at Chisholm Plaza in 2024 is detailed in Table 5.1.

Table 5.1: Major Supermarket Estimated Sales Potential - 2024

Category	2024
Available FLG spend in main trade area	$197.7m
FLG spend directed to supermarkets (@ 75%)	$148.2m
Est. spend retained by subject supermarket (@ 18%)	$26.6m
Plus sales from beyond MTA (@ 15% of total)	$4.7m
Total potential FLG sales	$31.3m
Plus non-FLG sales (@ 6% of total)	$2.0m
Est. total sales potential	**$33.3m**
Estimated average trading level ($ per sq.m)	$8,750

**Constant $2020/21 and including GST*

Source: MarketInfo; Ethos Urban

5.2 Centre Retail Sales Potential

Together with the supermarket anchor, Chisholm Plaza is planned to provide a wide range of fresh food, food & beverage and convenience-orientated specialty stores, as well as a range of non-retail and community uses.

Based on the current plans for the site, together with the range of retail shops and services typically provided at neighbourhood shopping centres, and particularly centres in major growth areas, Table 5.2 provides an indicative tenancy mix that is expected to be best suited for the proposed neighbourhood centre.

The planned mini-major at Chisholm Plaza would be suited to a large fresh produce store or a small supermarket, to cater to the growing demand for FLG facilities in the local area.

In addition to a mix of retail specialty shops tailored to the needs of the local catchment, the centre is expected to be able to support a range of non-retail shopfronts. Neighbourhood shopping centres typically contain a number of shops and services which are not categorised as retail and do not form part of the retail market. These include facilities such as Australia Post, real estate agents, travel

agents, bank branches, financial outlets, and a number of these uses are expected to be supportable at Chisholm Plaza.

Table 5.2: Chisholm Plaza – Centre Composition and Indicative Tenancy Mix

Category/use	GLA (sq.m)	% of retail	% of total
Major tenants			
Supermarket	3,809	46%	27%
Mini-major	1,500	18%	11%
Retail specialty shops			
Fresh food (e.g. bakery/butcher/fresh produce) & liquor	700	8%	5%
Food catering (e.g. cafes/restaurants)	1,000	12%	7%
Leisure (e.g. newsagency/stationery)	201	2%	1%
General (e.g. pharmacy/discount variety/giftware/florist)	650	8%	5%
Retail services (e.g. hair/beauty/optometrist)	500	6%	4%
Total retail specialty shops	3,051	36%	21%
Total centre - retail	**8,360**	**100%**	**59%**
Non-retail uses			
Non-retail shops (e.g. real estate agent, banks, Australia Post)	1,000		7%
Gymnasium	1,057		7%
Tavern	878		6%
Learn to Swim	816		6%
Childcare Centre	890		6%
Medical	763		5%
Car Wash	473		3%
Total non-retail	**5,877**		**41%**
Total centre	**14,237**		**100%**

Source: Revelop; Ethos Urban

Table 5.3 presents the estimates of sales potential for the indicative mix of retail uses at Chisholm Plaza. The estimates of sales potential reflect the scale of the development; the sales estimated to be achieved by supermarket anchor; the available retail market; the competitive framework of the area; and the typical sales achieved by the various types of retail uses at similar scale developments.

The sales potential for the retail component of the proposed neighbourhood centre is estimated at $60.8 million at 2024, reflecting a sales productivity level of approximately $7,270 per sq.m. All sales forecasts in this report are presented as constant 2020/21 dollars and include GST.

Table 5.3: Chisholm Plaza – Estimated Sales Potential by Retail Category, 2024*

Category/use	GLA (sq.m)	Estimated sales ($ per sq.m)	Estimated sales ($m)
Major tenants			
Supermarket	3,809	8,750	33.3
Mini-major	1,500	5,000	7.5
Retail specialty shops			
Fresh food & liquor	700	8,000	5.6
Food catering	1,000	6,500	6.5
Leisure	201	5,500	1.1
General	650	6,500	4.2
Retail services	500	5,000	2.5
Total retail specialty shops	3,051	6,532	19.9
Total centre - retail	**8,360**	**7,268**	**60.8**

**Constant $2020/21 and including GST*

Source: Ethos Urban

5.3 Centre Retail Market Shares

Table 5.4 presents the estimated market shares of available retail expenditure expected to be achieved by Chisholm Plaza at FY2024. The estimated market shares of available food and non-food retail spending are calculated based on the following key points:

- The total available retail expenditure within each trade area sector is detailed, based on the data detailed in Chapter 2 of this report.
- The total estimated sales potential of each component of the proposed centre, as detailed previously, is split into food and non-food sales, taking account of the typical sales distribution for each retailer type.
- The sales expected to be captured by the centre from each trade area sector are then estimated, taking into account the likely shopping patterns of trade area residents.
- The estimated market shares expected to be achieved by the centre, of both food and non-food expenditure in each trade area sector, are then calculated by dividing the estimated centre sales from each sector by the projected retail expenditure available in each sector.

The planned Chisholm Plaza is estimated to achieve an 11% market share of total retail spending of the main trade area population, including a 17% share of food spending and a 4% share of non-food spending. The proposed centre is estimated to capture approximately $9 million of retail spending from people residing beyond the main trade area such as workers and visitors to the area.

Table 5.4: Chisholm Plaza – Estimated Centre Market Shares, 2024*

	Retail Spend ($m)			Est. Centre Sales ($m)			Market Share (%)		
Trade Area Sector	Food	Non-Food	Total	Food	Non-Food	Total	Food	Non-Food	Total
Primary	52.3	43.7	96.1	19.8	3.8	23.6	38%	9%	25%
Secondary North	11.8	10.0	21.8	3.3	0.6	3.9	28%	6%	18%
Secondary South	99.3	79.7	178.9	4.7	0.9	5.6	5%	1%	3%
Secondary West	95.2	75.8	171.0	15.6	3.0	18.6	16%	4%	11%
Total Secondary	206.3	165.5	371.8	23.5	4.5	28.0	11%	3%	8%
Main Trade Area	**258.6**	**209.2**	**467.8**	**43.3**	**8.4**	**51.6**	**17%**	**4%**	**11%**
Sales from beyond TA				7.6	1.5	9.1			
Centre Retail Sales				**50.9**	**9.8**	**60.8**			

**Constant $2020/21 and including GST*

Source: MarketInfo; Ethos Urban

6 Economic Impact and Benefit Analysis

This Chapter outlines the possible economic benefits and trading impacts that can be anticipated following the development of Chisholm Plaza, and assesses whether a net community benefit or disbenefit is likely to result.

6.1 Economic Benefits

The development of Chisholm Plaza will result in a range of economic implications. From a trading point of view, impacts may be experienced by some competitive facilities located in the surrounding area, and the likely extent of these trading impacts is considered further later in the report. On the other side of the equation, the proposed development will result in a range of economic benefits, particularly for residents of the main trade area. The key positive impacts will include the following.

Serving the growing food and grocery needs of trade area residents

The resident population of the primary sector is estimated to reach 7,300 at 2026 and increase to a substantial 10,000 at 2031. There are currently no supermarkets or notable retail facilities in the primary sector, and there is the clear demand and need for a major supermarket in the local area. In the balance of the main trade area, there is only one existing major supermarket in the secondary south sector – the Coles supermarket at Thornton Shopping Centre – as well as two smaller supermarkets in the secondary west sector. The proposed Chisholm Plaza will be anchored by a full-scale supermarket which would be able to offer local residents a full range of supermarket products and serve the daily/weekly food and grocery needs of the local population.

Improving shopping choice and convenience for local residents

The proposed development will greatly increase the choice of neighbourhood shopping facilities for local residents. Currently residents of Chisholm need to travel beyond the local area to access basis retail supplies. Chisholm Plaza is to provide a range of shopping facilities and services typically provided in a neighbourhood shopping centre and will be able to serve the convenience-oriented shopping needs of residents in the surrounding local area. The proposed centre would, therefore, provide main trade area residents with greatly improved shopping choice and convenience allowing the local population to be able to undertake their shopping in a conveniently accessible local shopping precinct.

Creating a focal point for the community

The development of a neighbourhood centre with a wide range of shops, service and community facilities at the Subject Site will create a focal point for community activity and interaction in the area.

Creating local employment opportunities

The subject development would create a number of jobs, for the construction and related industries during the construction phase, as well as ongoing jobs when the centre is operational. The methodology used in estimating the number of potential new jobs at the centre is regularly used in retail Economic Impact Assessments. The purpose is to provide a general indication of the number of jobs potentially created from the development, though does not seek to determine the precise number of jobs created.

Table 6.1 details the ongoing direct employment likely to be created by the proposed Chisholm Plaza shopping centre. The estimates of job creation are based on industry standard benchmarks of the typically number of jobs created for each proposed use. Based on the type and amount of floorspace to be provided in the proposed centre, it is estimated that approximately 480 ongoing direct jobs would be created, including for both full time and part time employees.

As the population of the area increases, new retail developments will provide new job opportunities that will not necessarily impact on the number of jobs at existing centres. Nevertheless, it may be argued that some job losses will occur at other centres as a result of the proposed development. In estimating the net long-term employment opportunities, an allowance of 5% of the employment that is likely to be created at the future centre to be absorbed in job losses at other centres, resulting in a projected net employment increase of 460 jobs.

The subject development will also create a number of new jobs in the construction and related industries during the construction phase, and for the economy generally once they are completed. Table 6.2 provides an estimation of both direct and indirect employment that may arise from the proposed neighbourhood centre development. Based on expected construction costs in the order of $30 million, it is estimated that during the construction period of the project approximately 128 direct jobs would be created, assuming a construction period of one year.

Further jobs in the broader community may also be created from supplier induced multiplier effects during this period. The indicative indirect jobs that may be created by the proposed development are detailed in Table 6.2, and are based on the appropriate ABS input/output multipliers. However, the ABS employment multiplier data is dated, and therefore the figures in Table 6.2 should be viewed as only indicative. It is, however, very likely that some indirect jobs in local economy will be created from the development, in addition to the direct employment.

Table 6.1: Chisholm Plaza – Estimated Employment Levels

Type of use	Est. employment per 1,000 sq.m	GLA (sq.m)	Employment (persons)*
Supermarket	40	3,809	152
Mini-majors	20	1,500	30
Specialty shops	50	3,818	191
Kiosks	80	233	19
Gymnasium	15	1,057	16
Tavern	20	878	18
Learn to Swim	15	816	12
Childcare centre	23	890	20
Medical centre / allied health	30	763	23
Car Wash	7	473	3
Total	**34**	**14,237**	**484**
Net increase**			460

**Employment includes both full-time and part-time workers.*

***Net increase allows for reduce employment at impacted centres - estimated at 5% of the total increase.*

Table 6.2: Chisholm Plaza – Estimated Employment Creation

Type of use	Direct employment (long-term)	Direct employment (const'n period)	Supplier employment multiplier effects	Total
Centre employment (net additional)	460		184	644
Construction of project based on $30m capital costs (Job years**)		128	205	333
Total	**460**	**128**	**389**	**977**

**Employment includes both full-time and part-time workers.*

***Indicates the estimated number of jobs over the life of the construction project, for the equivalent of one year.*

6.2 Trading Impacts Analysis

The purpose of an impact assessment is to provide guidance as to whether or not there is likely to be a net community benefit or disbenefit from any proposed development. In particular, if there is a real possibility of some existing facilities potentially being impacted to such a degree that they may be lost to the community and if the service or services provided by those facilities are not at the very least replaced by the proposed new facilities, then a community disbenefit could result.

In order to understand whether any particular centre may be impacted to the extent that its continued viability may be in question, the specific retail impacts from Chisholm Plaza on the surrounding competitive network of centres have been estimated.

These estimates provide indications as to whether any surrounding centres are likely to be at risk to the extent that the community would suffer a net disbenefit, attributable to the subject retail development. In considering likely trading impacts on any individual centre or individual retailer, it must first be acknowledged that such estimation can only realistically expect to provide a broad indication of likely outcomes, since there are many factors which can change in response to any new retail development, and which will have a bearing on the consequent outcomes.

The impacted centre or retailer has a number of possible actions which it may be able to take that may mitigate the extent of the impact. Expansions and improvements may be undertaken at other centres throughout the region, and these factors can change the nature of the impact of the new centre being developed.

It is much more reasonable for the purposes of impact analysis, therefore, to consider the likely broad changes in competitive circumstances, and in particular the changes in availability of retail spending for competitive centres, that can reasonably be expected to result from the development of Chisholm Plaza. These broad changes effectively set the market conditions within which the competitive centres will operate as a result of this development, and reasonable conclusions can then be drawn about the possible impacts of these broad changes in market conditions.

The development of Chisholm Plaza would result in a redirection of spending to the new centre from a range of other centres located within and beyond the defined trade area. In order to estimate the likely order of these potential impacts, the location and composition of each centre relative to the subject development site, and their respective roles in the region, have been considered.

The following factors are of relevance in terms of how the likely impacts will play out:

- The distance of each centre, by road, from the proposed development.
- The size of the centre, in terms of total relevant retail floorspace. More specifically in this instance, the location of surrounding supermarkets is a key factor to consider.
- The respective role and function of each centre. For example, small local centres typically serve very localised catchments, while higher-order centres serve catchments which generally cover a broad area.
- The relative accessibility and convenience of surrounding centres compared with the proposed neighbourhood centre development.
- The estimated sales performance of the centre and projected future performance.

Table 6.3 presents an impact analysis for relevant centres which may be impacted from Chisholm Plaza.

Table 6.3: Chisholm Plaza – Estimated Impacts on Specific Centres

Centre name	Est. Sales 2021	Projected 2024		Projected 2027	Impacts 2024			Change w dev't	
		No dev't	With dev't	With dev't	$m	%	Dist.	2021-24	2021-27
Within Trade Area									
Thornton Shopping Centre	$52m	$56.9m	$49.4m	$53.0m	-$7.5m	-13.2%	12.3%	-4.9%	2.0%
Tenambit	$9.8m	$10.2m	$9.7m	$10.2m	-$0.5m	-4.9%	0.8%	-0.1%	4.9%
Morpeth	$20m	$20.5m	$19.6m	$20.6m	-$0.9m	-4.4%	1.5%	0.4%	5.4%
Beyond Trade Area									
East Maitland									
Stockland Green Hills	$490m	$530m	$500m	$532m	-$29.7m	-5.6%	48.9%	1.9%	8.6%
Aldi Green Hills	na	$20.0m	$18.1m	$19.3m	-$1.9m	-9.5%	3.1%	na	na
East Maitland TC	$33m	$34.0m	$32.3m	$33.6m	-$1.7m	-5.0%	2.8%	-0.7%	3.2%
High St, East Maitland	$1.4m	$1.4m	$1.4m	$1.5m	$0.0m	-0.7%	0.0%	3.3%	7.4%
Maitland City Centre									
Riverside Plaza	$91m	$95.6m	$91.4m	$95.9m	-$4.2m	-4.4%	6.9%	0.4%	5.4%
Pender Place SC	$50m	$55.1m	$51.9m	$54.5m	-$3.2m	-5.8%	5.3%	3.9%	9.0%
Balance	$100m	$104m	$103m	$107m	-$1.1m	-1.1%	1.8%	2.9%	7.0%
Beresfield	$21m	$21.7m	$21.0m	$21.8m	-$0.7m	-3.2%	1.2%	0.2%	3.7%
Lorn Local Centre	$13.0m	$13.5m	$13.4m	$13.8m	-$0.1m	-0.7%	0.1%	2.8%	6.4%
Sub-total	**$881m**	**$963m**	**$911m**	**$964m**	**-$51.5m**	**-5.4%**	**85%**	**3.5%**	**9.4%**
All others					-$9.3m	na	15%		
Total					**-$60.8m**		**100%**		

**Constant $2020/21 and including GST*

Source: Shopping Centre News; Property Council of Australia; Stockland; Ethos Urban

The analysis presented in Table 6.3 is described as follows:

- The 2021 sales for each of the existing centres are firstly estimated. These estimates are based on public information where available, such as from Shopping Centre News and the Property Council of Australia. In this case Stockland publishes the annual sales of each of its major shopping centres including Stockland Green Hills, and the retail sales of the centre have been estimated based on the total sales achieved by the centre. Where no sales data is available, centres sales are derived based on appropriate sales productivity levels for comparable centres. These estimations have regard for the location and mix of tenancies with each centre.

- The sales potential for each centre at 2024 are estimated based on the underlying growth in the retail market, firstly assuming no development at the Subject Site.

- The sales potential for each centre at 2024 are then estimated, assuming that Chisholm Plaza is developed. The estimates of sales potential for each centre post impact are calculated by allocating an appropriate proportion of the anticipated sales potential of Chisholm Plaza across all surrounding centres.

- The estimated sales potential for each centre at 2027 are also provided, three years post development, again adopting a growth outlook for each centre that reflects the underlying growth in retail expenditure capacity of the surrounding area.

- The estimated impacts on each centre at 2024, expressed in dollar terms and in percentage terms respectively, as a result of the subject development are then calculated.

- Finally, the resultant growth in sales potential for each centre between 2021 and the forecast years are detailed, assuming the Chisholm Plaza proceeds.

The findings from the analysis are summarised as follows:

- Within the trade area the largest impact is expected to fall on Thornton Shopping Centre. In 2024, the centre is estimated to be impacted by $7.5 million of 13.2%. However, given the rapid growth occurring in the secondary south sector the centre is expected to achieve sales in 2024 only 5% below the current level, and by 2027 the turnover for the centre is projected to be 2% above its current sales level. Furthermore, the centre is currently trading strongly given the relatively limited competition in the immediate surrounding area, and therefore the estimated impact would not threaten the ongoing viability of the centre.

- Stockland Green Hills is expected is experience a significant initial impact though still achieve more sales in 2024 compared with 2021 due to the growth in the market. This level of impact takes into account that the centre includes both Coles and Woolworths supermarkets, and is likely capturing a significant proportion of the food and grocery spending of trade area residents, who would have an alternative choice for supermarket shopping once Chisholm Plaza opens.

- Minor to moderate impacts are projected on other centres in the area which include a sizable food offer. However, the analysis demonstrates that all centres will achieve more sales in 2027 compared with current sales following the development of Chisholm Plaza, and most centres will achieve greater sales by 2024.

- Chisholm Plaza will not impact, or have a negligible impact, on centres in the region without a notable food offer.

Overall, the estimated impacts from Chisholm Plaza are considered to be within the reasonable bounds of normal competition and would not threaten the viability or going concern of any of these centres or supermarkets. The potential impacts are considered acceptable, particularly given the

rapid population growth occurring in the region and the significant undersupply of, and need for, supermarket floorspace in the local area.

6.3 Net Community Benefit and Conclusion

The Subject Site, which is centrally located within the rapidly growing suburb of Chisholm, is excellently positioned to serve the food, grocery and convenience shopping needs of local residents. The analysis in this report demonstrates that there is the demand for a substantial neighbourhood shopping centre in Chisholm to cater for the needs of the growing community.

A range of economic benefits are likely to arise as a result of the subject development, which includes serving the growing food and grocery needs of trade area residents; improving shopping choice and convenience for local residents; creating a focal point for the community; and creating local employment opportunities. The development may have some trading impacts on existing facilities, however, any adverse impacts will not be such as to threaten any existing facility's ability to continue operating successfully. Consequently, in weighing the benefits and impacts, the analysis in this report demonstrates that a net community benefit will result from the proposed neighbourhood centre development at the Subject Site.

BUSHFIRE ASSESSMENT REPORT

PROPOSED COMMERCIAL DEVELOPMENT AND CHILDCARE CENTRE

LOT 11 & 12 DP1280255
Previously know as LOT 1 DP 1224700
20 Heritage Drive, Chisholm

Date: **30/11/2021**

Prepared for: **Revelop**

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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed commercial development and childcare centre against the requirements of Section 100B of the Rural Fires Act 1997, AS3959 (2018) Construction of buildings in bushfire-prone areas and Planning for Bush Fire Protection (2019).

This report establishes that the development is capable of complying with the acceptable solutions of Planning for Bush Fire Protection (2019).

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Revelop		
Site Address	20 Heritage Drive, Chisholm	**Lot/Sec/DP**	LOT 11 & 12 DP1280255 ~~Previously known as Lot 1 DP 1224700~~
Local Government Area	Maitland	**FDI**	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	Commercial development and childcare centre	**Type of Area**	Urban
Special Fire Protection Purpose	Yes. Childcare Centre	**Flame Temperature**	1090K and 1200K
Application Complies with Acceptable Solution	Yes	**Referral to NSW Rural Fire Service (NSW RFS) required**	Yes. Bushfire Safety Authority Required

TABLE 2.1 – BUSHFIRE THREAT ASSESSMENT COMMERCIAL DEVELOPMENT

	North	**East**	**South**	**West**
Vegetation Structure	Maintained Lands	Forest	Maintained Lands	Maintained Lands
Asset Protection Zone (APZ)	140 metres	41 metres	140 metres	140 metres
Accurate Slope Measure	N/A	4 degrees downslope	N/A	N/A
Slope Range	N/A	1 to 5 degrees downslope	N/A	N/A
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-LOW	BAL-19	BAL-LOW	BAL-LOW

TABLE 2.2 – BUSHFIRE THREAT ASSESSMENT CHILDCARE CENTRE DEVELOPMENT

	North	East	South	West
Vegetation Structure	Maintained Lands	Maintained Lands	Maintained Lands	Maintained Lands
Asset Protection Zone (APZ)	140 metres	140 metres	140 metres	140 metres
Accurate Slope Measure	N/A	N/A	N/A	N/A
Slope Range	N/A	N/A	N/A	N/A
Planning for Bush Fire Protection (2019) Table A1.12.2 Minimum Setbacks	N/A	N/A	N/A	N/A
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-LOW	BAL-LOW	BAL-LOW	BAL-LOW

TABLE 3.1 – PLANNING FOR BUSH FIRE PROTECTION (2019) SECTION 7 COMMERCIAL DEVELOPMENT

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Asset Protection Zones have been determined in accordance with Planning for Bush Fire Protection (2019). The Asset Protection Zone will be maintained for the life of development and defendable space is provided onsite.	Acceptable Solution
Siting and Design	Buildings have been designed to minimise the risk of bushfire attack.	Acceptable Solution
Construction Standards **AS3959 – 2018**	Bushfire Attack Levels have been determined in accordance with Planning for Bush Fire Protection (2019). The highest Bushfire Attack Level to the proposed building was determined to be BAL-19. Non-residential Class 5 to 8 buildings that are not special fire protection purpose developments require no specific level of construction in accordance with AS3959 (2018) and National Construction Code 2019 structural fire protection measures deemed adequate if located outside the flame zone.	Acceptable Solution
Private and or Public Road Infrastructure	The public road system is not affected or changed as part of this application.	Acceptable Solution

Property Access	The property access will comply with Planning for Bush Fire Protection (2019) Section 7.	Acceptable Solution
Water and Utility Services	Water, electricity and gas services offer compliance with Planning for Bush Fire Protection (2019) section 7.	Acceptable Solution
Landscaping	Landscaping to comply with Planning for Bush Fire Protection (2019), appendix 4.	Acceptable Solution

TABLE 3.2 – PLANNING FOR BUSH FIRE PROTECTION (2019) SECTION 6 CHILDCARE CENTRE COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Minimum setbacks for the childcare centre have been determined in accordance with Planning for Bush Fire Protection (2019) Table A1.12.1. Asset protection zones are able to be achieved within the subject site and adjacent managed land.	Acceptable Solution
Landscaping	Landscaping shall be in accordance with Planning for Bush Fire Protection (2019) Appendix 4.	Acceptable Solution
Construction	The building will be BAL-LOW as the immediate 140 metres surrounding the development is managed land.	Acceptable Solution
Access – Internal Roads	The internal access roads shall comply with Planning for Bush Fire Protection (2019) Section 6 property access provisions.	Acceptable Solution
Water Supply	The water supply complies with Planning for Bush Fire Protection (2019).	Acceptable Solution
Electrical Supply	The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite should be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).	Acceptable Solution
Gas Supply	Any proposed gas supply will be located underground.	Acceptable Solution
Emergency and Evacuation Planning	An emergency management plan shall be prepared with specific consideration for bushfire.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed commercial development and childcare centre to be built at Lot 11 DP1280255 previously know as Lot 1 DP 1224700, 20 Heritage Drive, Chisholm. The assessment acknowledges the requirements of Section 100B of the Rural Fires Act 1997 and Planning for Bush Fire Protection (2019) to protect persons, property and the environment from dangers that may arise from a bushfire.

Under the provisions of Section 100B of the Rural Fires Act 1997 as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation 2008 Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aims and objectives of Planning for Bush Fire Protection (2019) to reduce the risk of ignition of the development in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The land is zoned R1 General Residential and B1 Neighbourhood Centre and is comprised of a single allotment being 4.394 hectares in size. The proposed development includes the construction of a multi-building commercial development including shopping centre and tavern. The development also includes a childcare centre.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

There are no known significant environmental features located on the site.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site.

2.5 ABORIGINAL HERITAGE

Searches of NSW National Parks and Wildlife Service's database identify no known aboriginal relics or aboriginal places as defined by National Parks and Wildlife Act 1974 to exist on the site.

PHOTOGRAPH 1 – SITE PHOTO LOOKING NORTH

View of the subject site looking north. The site is predominantly unmanaged grass exceeding 50 centimetres in length. The neighbouring school can be seen in the distance.

PHOTOGRAPH 2 – EASTERN FOREST

View of dry schlerophyll forest located east of the site. The forest is dominated by eucalypts with a low density, grassy understorey.

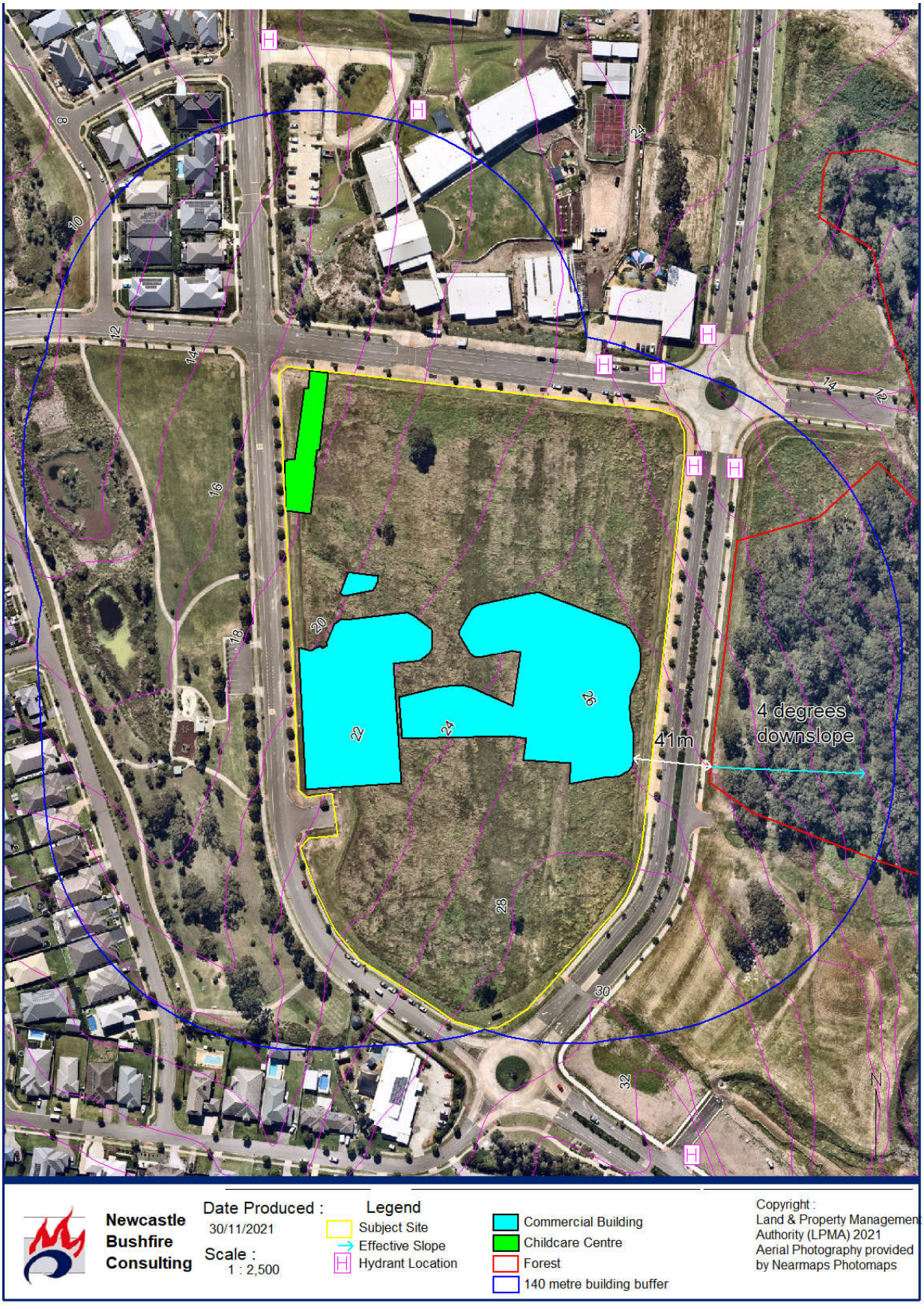


FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Maitland Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is somewhat inaccurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bush Fire Protection (2019).

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.

3.2 EFFECTIVE SLOPE

Effective slope was measured using 2-metre contour data obtained from The Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation, calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks have also been provided for the childcare centre (Special fire protection purpose development) in accordance with Planning for Bush Fire Protection (2019) Table A1.12.1. Refer to Section 1.0 Executive Summary and Compliance Tables.

BALs and relevant construction levels in accordance with Planning for Bush Fire Protection (2019) have been demonstrated in Section 1.0 Executive Summary and Compliance Tables, Table 2.1 and 2.2 Bushfire Threat Assessment.

3.4 COMPLIANCE WITH AIMS AND OBJECTIVES OF PLANNING FOR BUSH FIRE PROTECTION

The aims and objectives of Planning for Bush Fire Protection are addressed below for the proposed development.

Afford occupants of any building adequate protection from exposure to a bushfire
Building exits are available, located away from the nearest bushland threat offering significant shielding for site users. Evacuation planning in the event of bushfire should clearly indicate to building users to evacuate in a direction away from the fire.

Provide for a defendable space to be located around buildings
Defendable space is available around all buildings. In the event of bush fire, firefighters will have direct access to the bushland which will support firefighting efforts. The entire site shall be maintained as an inner protection area.

Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition
The commercial development is outside the flame zone and shall be built to the National Construction Code (2019) structural fire safety regulations.

Ensure that safe operational access and egress for emergency service personnel and residents is available
The property access to the facility offers compliance with Planning for Bush Fire Protection access requirements.

Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ)
The site manager shall maintain landscaping and fuel management in accordance with Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service's document Standards for Asset Protection Zones.

Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting)
Hydrant spans shall be installed in accordance with AS2419.1. Electrical supplies to the local area are to be located underground.

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

A reticulated water supply and street hydrant access is available. The hydrant network shall be expanded to comply with AS 2419.1.

4.2 ELECTRICITY SERVICES

The existing electrical transmission lines are located underground and require no additional protection measures.

4.3 GAS SERVICES

- Reticulated or bottled gas installed and maintained in accordance with AS/NZ1596 (2002) and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10 metres and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2 metres from flammable material with connections to and from the gas cylinder being of metal.
- Polymer-sheathed, flexible gas supply lines to gas meters adjacent to the buildings are not to be used.

PHOTOGRAPH 3 – DELINEATION OF MANAGED LAND AND FOREST

View of the interface of Settlers Drive road reserve and the forest. Despite vegetation management occuring east of the road reserve, the asset protection zone has been measured to the road reserve boundary, due to the lack of a known perpetual management agreement.

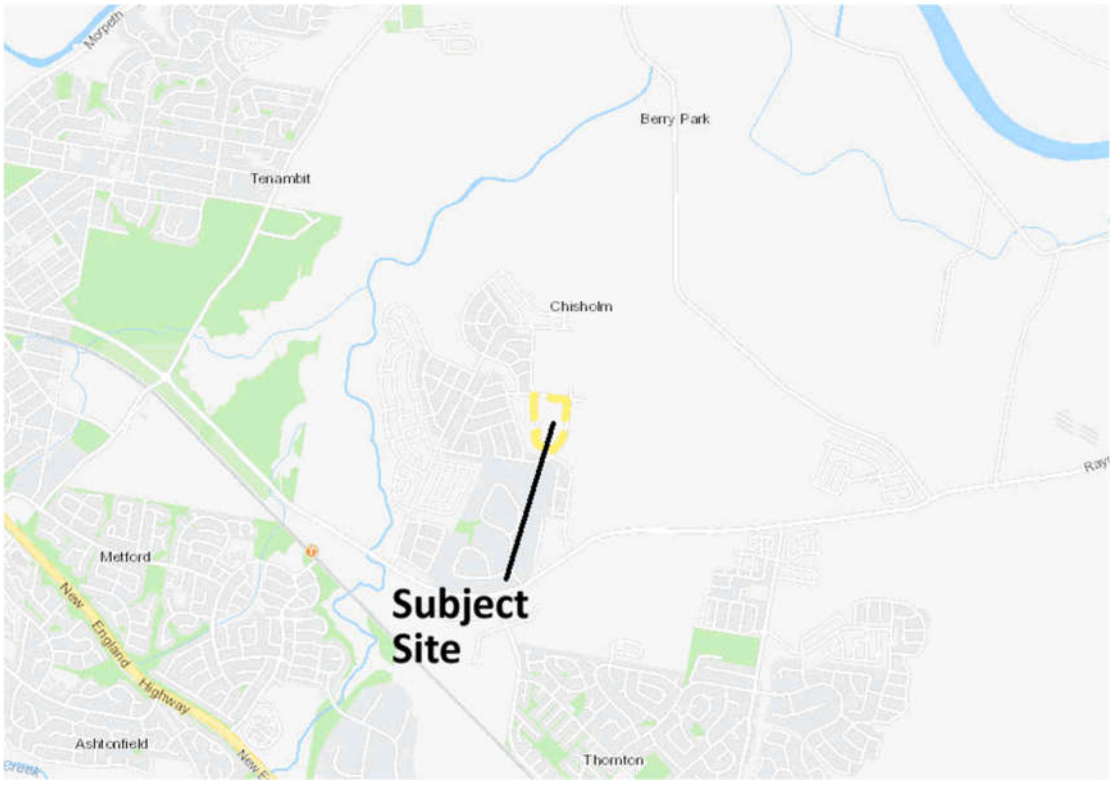


FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

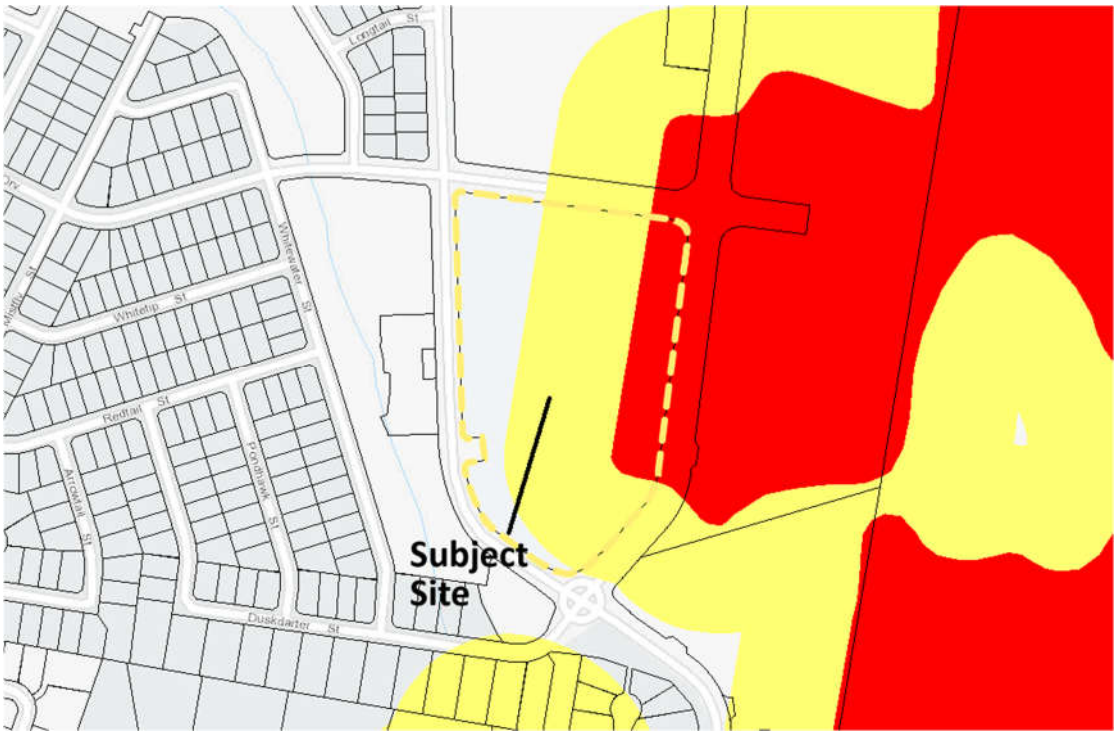


FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

FIGURE 4 – SITE PLAN

5.0 PROPERTY ACCESS

Public Road Access
The subject site is bounded by Heritage Drive, Settlers Boulevard and Tigerhawk Drive. All roads are dual carriageway roads interconnecting into the local road network. Emergency Services are expected to have good access to the area at most times.

The existing public road network is deemed adequate to handle increased volumes of traffic in the event of a bushfire emergency. No new public road access is proposed for the site, with future development stages to consider property access. A full perimeter road is presently available around the site.

Fire Trails
Fire trails do not intersect the vegetation in the local area. No new fire trails are proposed for this development.

Property Access
Property access is provided by way of Heritage Drive, Settlers Boulevard and Tigerhawk Drive providing access from the public road system directly to the private land, giving firefighters access to the site.

Property access roads shall comply with Planning for Bush Fire Protection (2019) Section 6.

No new property access is proposed for the site with future development stages to consider property access.

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris. Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6 millimetres in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and, where possible, green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

There is no known Bushfire Maintenance Plan for the site. A condition of development is to maintain the entire site as an Inner Protection Area which should be monitored by the property owner.

7.2 FIRE EMERGENCY PROCEDURES

An Emergency/Evacuation Plan is to be prepared consistent with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plan.

8.0 RECOMMENDATIONS

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions:

1. The proposed building works shall comply with National Construction Code 2019 Structural Fire Safety requirements.
2. At the commencement of building works and in perpetuity, the site shall be managed as an inner protection area (IPA) as outlined within Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service's document Standards for Asset Protection Zones.
3. Water, electricity and gas are to comply with Planning for Bush Fire Protection (2019) Section 7. The hydrant network shall be expanded to comply with AS 2419.1.
4. Landscaping is to be undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and managed and maintained in perpetuity.
5. An Emergency/Evacuation Plan is to be prepared consistent with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plan, with the new buildings incorporated in the plan.

9.0 CONCLUSION

The final recommendation is that the proposed development offers compliance with Planning for Bush Fire Protection (2019). There is potential for bushfire attack at this site and a list of recommendations has been included in the above assessment to reduce that risk.

10.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in Planning for Bush Fire Protection (2019) Appendix 4 and the NSW RFS' Standards for Asset Protection Zones. The property owner(s) should obtain these two documents and familiarise themselves with their content.

Generally
Asset Protection Zones refer to the area between the bushfire threat and the asset (i.e. building). The Asset Protection Zone may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an IPA. Refer to the plans for locations of Asset Protection Zone and distances from assets.

IPA
The IPA is located adjacent to the asset and is identified as a fuel-free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Shrubs must be located away from a building's glazing and vent openings.
2. Avoid planting around entryways if the vegetation is flammable.
3. A maximum 20% of the IPA may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100 millimetres high.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Trees are allowed in the IPA however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3 metres of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

OPA
The OPA is located adjoining the vegetation. The OPA should be maintained as a fuel-reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Reduce or trim large stands of shrubs.

B. Trees:

1. Existing trees can be retained.
2. Ensure a separation is available between shrubs and tree canopy.
3. Reduce tree canopy so there is no interlocking canopy.

11.0 REFERENCES AND DISCLAIMER

References

Standards Australia AS3959 (2018) Construction of buildings in bushfire-prone areas.

Keith D. "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney, 2004.

Environmental Planning and Assessment Act 1979.

New South Wales Rural Fire Service, Planning for Bush Fire Protection (2019).

Rural Fires Act 1997.

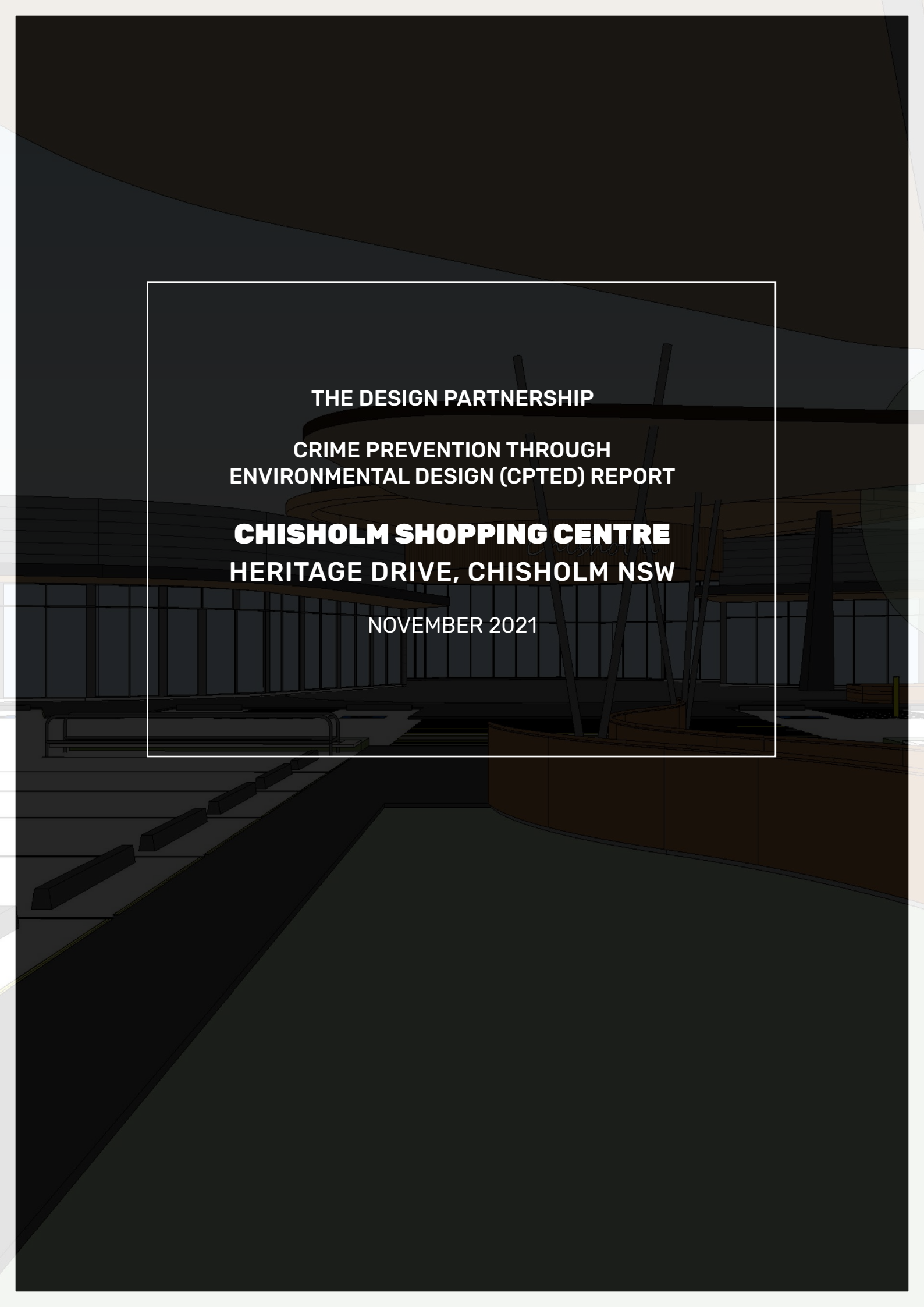
Rural Fires Regulation 2008.

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed to ensure a level of protection is provided to the building, occupants and firefighters.

Planning for Bush Fire Protection (2019) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains.

AS3959 (2018) Building in bushfire-prone areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.



THE DESIGN PARTNERSHIP

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) REPORT

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE, CHISHOLM NSW

NOVEMBER 2021

Chisholm SC Pty Ltd ATF Chisholm SC Investment Trust

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) REPORT
CHISHOLM SHOPPING CENTRE
Heritage Drive, Chisholm NSW 2322

PROJECT NUMBER: 21.019

PREPARED BY

Kristy Ryan | Managing Director, Architect & CPTED consultant.

Quality Control Plan

ISSUE	DATE	DESCRIPTION	AUTHOR	CHECKED BY
A	5.11.21	DRAFT CPTED Report - not for lodgement with Council	KR	KR

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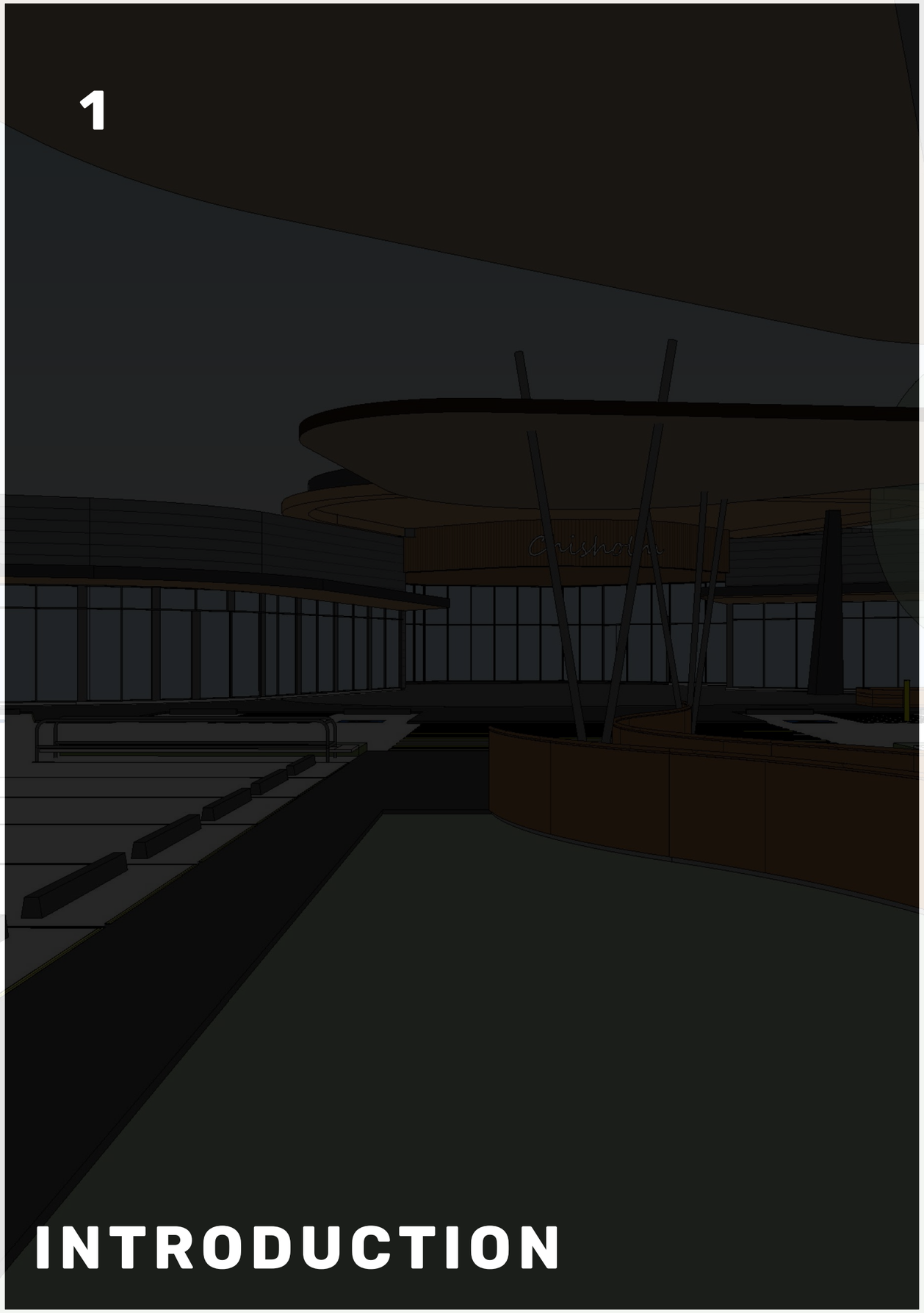

1

INTRODUCTION

1 INTRODUCTION

The Design Partnership has been engaged by Chisholm SC Pty Ltd ATF Chisholm SC Investment Trust to prepare a Crime Prevention Through Environmental Design (CPTED) Report for a shopping centre at Heritage Drive, Chisholm. This report provides an assessment and recommendations for the design produced for the development.

1.1 WHAT IS CPTED?

Crime Prevention Through Environmental Design (CPTED) is a strategy that aims to reduce crime by designing the built environment according to a set of guidelines.

CPTED is based on the principle that many offenders are guided by rational thought and make a cost/benefit analysis of their actions prior to committing a crime. Applying CPTED methods aims to discourage offenders by maximising the risk and effort of committing a crime, while minimising the benefits and opportunities of committing that crime.

CPTED also identifies ways to create a feeling of safety, leading to increased use of an area, which in turn improves natural surveillance and deters offenders.

In NSW, CPTED is largely administered by Safer By Design, a co-operative made up of NSW Police, local councils, government departments and private sector organisations. The Design Partnership structures its CPTED reports according to Safer By Design guidelines.

Safer By Design identifies seven key areas where CPTED principles can be applied: surveillance; lighting/technical supervision; territorial reinforcement; environmental maintenance; activity and space management; access control; design/definition/designation.

1.2 SCOPE & METHODOLOGY

The scope of this project is an assessment of the proposed shopping centre development at Heritage Drive, Chisholm (The Development). The architectural plans have been prepared by BN Group and the landscape plans by Moir Landscape Architecture. This CPTED Report will form part of a Development Application. To prepare the report, The Design Partnership undertook the following Methodology:

1. Desktop review of the design. Note: A site visit was not possible due to the project timeframe and the regional travel restriction prior to 1 November 2021. It is also noted, that Chisholm is an emerging community and this review considers the continued evolution of the suburb.
2. Review of crime data available through the Bureau of Crime Statistics and Research (BOSCAR).
3. Review of media and similar publications.
4. Email discussions with project manager.
5. Preparation of draft CPTED Report.
6. Preparation of final CPTED Report for lodgement with Council with the Development Application.

1.3 STRUCTURE OF THE REPORT

The basis of this report is a Crime Risk Assessment (CRA), which is used to identify overall crime risk for the project and the appropriate level of CPTED treatments. A summary of the Crime Risk Assessment has been provided in Section 4.

Using the Crime Risk Assessment as a template, this report then assesses each of the seven areas outlined below and provides recommendations for each. The remainder of the report is structured as follows:
Section 5 – Surveillance;
Section 6 – Lighting/Technical Supervision;
Section 7 – Territorial Reinforcement;
Section 8 – Environmental Maintenance;
Section 9 – Activity and Space Management;
Section 10 – Access Control;
Section 11 – Design/Definition/Designation;
Section 12 – Conclusion;
Section 13 – References.

2

WIDER CONTEXT

2 THE WIDER CONTEXT

2.1 THE CONTEXT OF CHISHOLM

Chisholm is located within the Maitland Local Government Area (LGA), 23 km north-north west of Newcastle CBD and 7km south-east from Maitland. The traditional Owners and Custodians of the Maitland area are the Wonnarua people.

Chisholm is an emerging community which is predominately residential with supporting infrastructure including schools and childcare facilities. The new community is branded as 'ideal for families searching for purpose built homes and neighbourhood with all required facilities within reach' (Maitland City Council website). Chisholm includes 74 hectares of open spaces, wetlands and parklands. The proposed development proposes retail and commercial infrastructure to service the local community.

Data from Australian Bureau of Statistics (ABS) shows Chisholm as having a population of 1,461 (2016 Census). This small population is increasing with the release of 5,000 new residential lots which could accommodate 15,000 new residents. The population statistics identify professionals as the highest percentage of occupation (20.1%) followed closely by Technicians and Trade Workers (18.5%) and Clerical and Administrative Works (18.3%). 56.1% of the households comprise couples with children, followed by couples without children (38.2%). The households with children is well over the NSW average which is 36.6%.

The subject site is located east of Maitland which is the main centre of the LGA. Stockland Green Hills is a large shopping centre to the south-west. The suburb is accessed from Raymond Terrace Road to the south, which connects Raymond Terrace with Maitland and East Maitland. The Hunter River is to the north of Chisholm and wetlands are to the west.

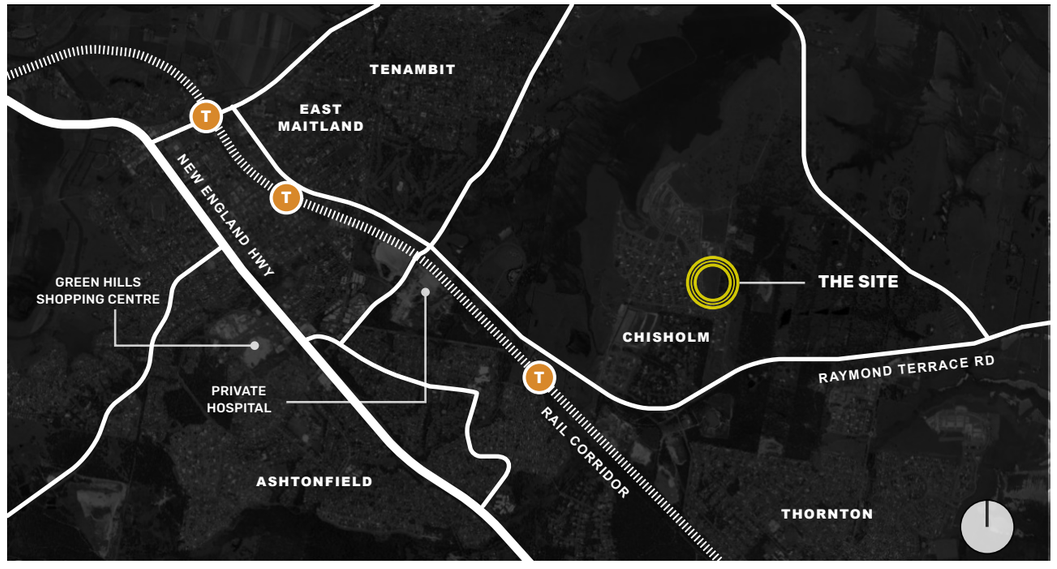

Figure 1: Context plan showing the location of the subject site within the area and the Chisholm suburb (TDP / Google Earth 2021)

2.2 PROPOSED DEVELOPMENT

The proposed shopping centre development comprises a range of services including:

- Major supermarket (and associated liquor store)
- Mini major supermarket
- Mixed retail
- Childcare centre
- Tavern
- Medical Centre
- Gym and
- associated carparking for 664 parking spaces comprising 535 on grade spaces and 129 basement spaces. A carwash also forms part of the development.

The shopping centre is predominately a single storey structure with its basement carpark, accessed from Heritage Drive. The major supermarket is located in the eastern wing and the mini major is located in its western wing. Both are accessed internally. Small retail is located internally between the majors and accessed from the internal space. The entry to the centre is located centrally. Retail is also located externally and is accessed from the forecourt. The loading docks are located off the new road proposed between Lot 1 and the centre, to the south. Lot 1 is identified for residential and its design will need to respond to the impacts of the loading dock.

A tavern is proposed on the western edge of the centre fronting Heritage Drive. It is accessed externally and not from within the centre. Across Heritage Drive is Whitewater Park which has walking paths and connects to residential areas.

A medical centre is proposed on the eastern edge of the centre fronting Settlers Boulevard. It is accessed externally and not from within the centre.

The proposed childcare centre is a separate building located on the corner of Heritage Drive and Tigerhawk Drive. The entry to the childcare centre is from the carpark however, there is access to the carpark entry through the building from a pedestrian entry on Heritage Drive.

The on grade carpark occupies the remainder of the northern part of the site. There are two entries to the carpark, one from Heritage Drive and the second from Settlers Boulevard. The carpark is split into two parts and is separated by a pedestrian link that connects Tigerhawk Drive with the pedestrian entry to the shopping centre. Two schools and an early education centre are located across Tigerhawk Drive and an existing pedestrian crossing will connect to the future shopping centre. The carpark proposes shade structures over central four rows, either side of the landscaped pedestrian link. The remainder of the carpark will be shaded by trees.

A pad site for future development is nominated in the eastern portion on the corner of Settlers Boulevard and Tigerhawk Drive.

Refer to Appendix A for reference design plans prepared by the project architects and landscape architects.

Figure 2: The Site within its immediate street context of Chisholm (TDP / Google Earth 2021)
1. Existing low density residential 2. Low density residential under construction 3. Existing Senior School, Junior School and Early Learning Centre 4. Whitewater Park 5. Lot 1 - use TBD 6. Entry to suburb from Raymond Terrace Road.

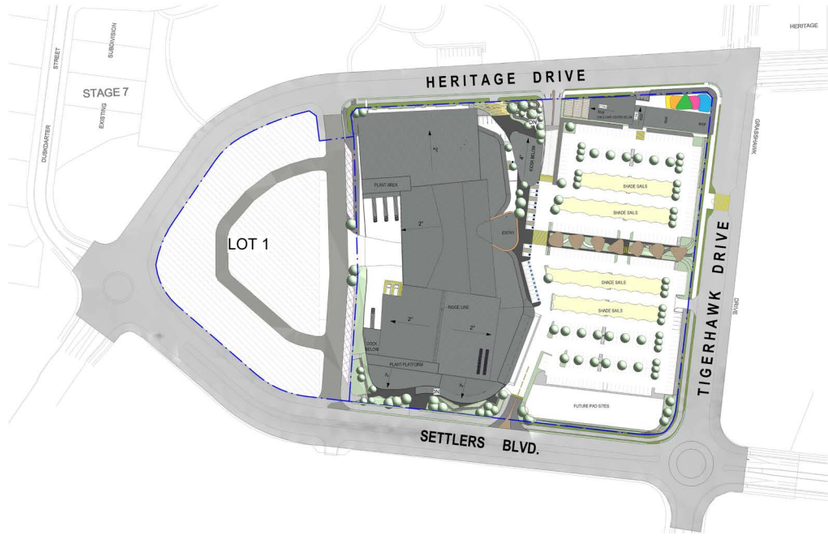

Figure 3: Site Plan showing the shopping centre, its carpark and road network. (BN Group 2021)

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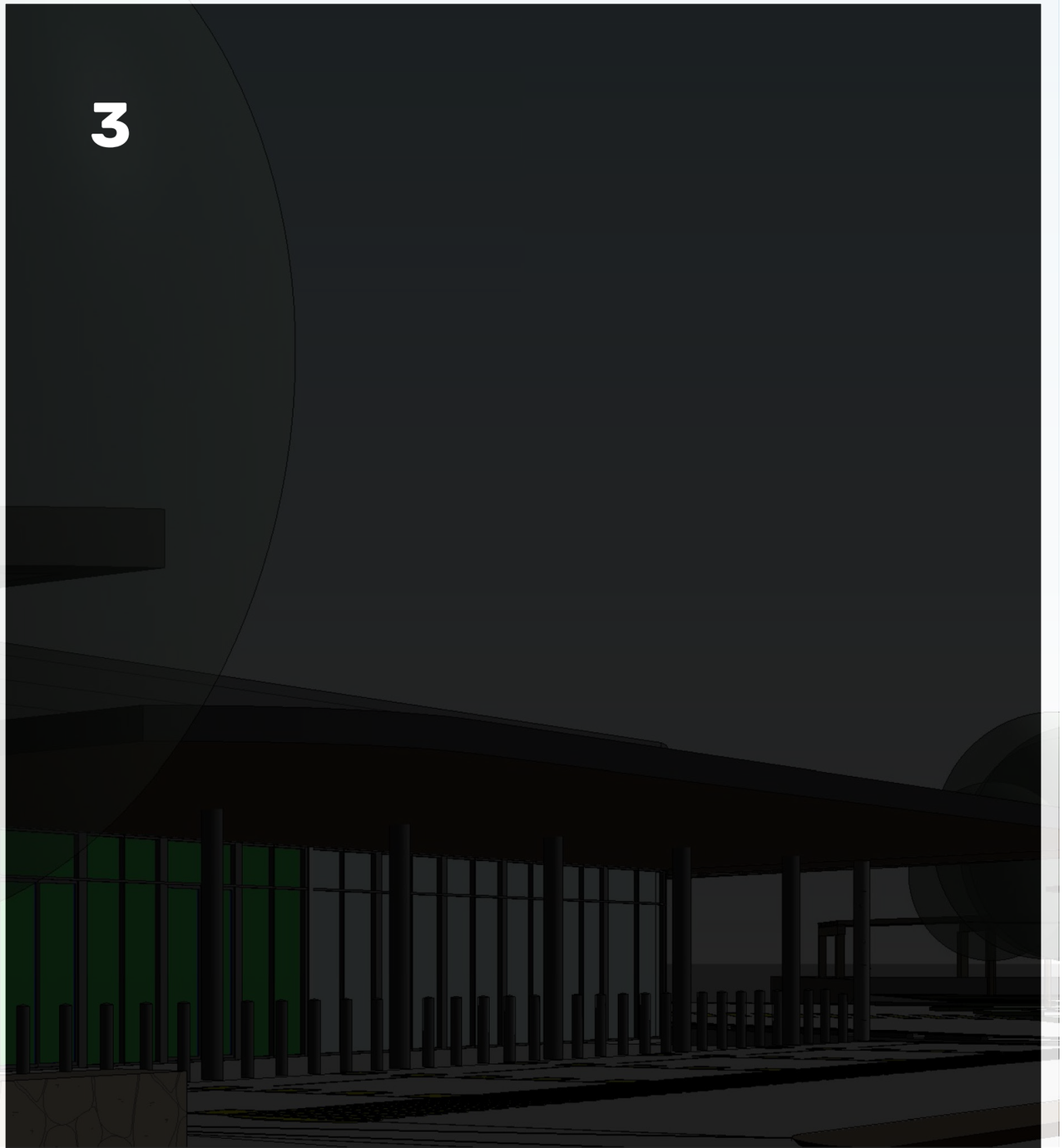

DETAILED ASSESSMENT

3 DETAILED ASSESSMENT

3.1 STRUCTURE OF THE DETAILED ASSESSMENT

The basis of Sections 4 - 12 is a Crime Risk Assessment, which is used to identify overall crime risk for the project and the appropriate level of CPTED treatments.

A summary of the Crime Risk Assessment (CRA) has been provided as a diagram in Section 4.

Using the Crime Risk Assessment as a template, this report then assesses each of the seven areas outlined below and provides recommendations for each.

The remainder of the report is structured as follows:

- Section 4 - Crime Risk Assessment Summary
- Section 5 – Surveillance
- Section 6 – Lighting/Technical Supervision
- Section 7 – Territorial Reinforcement
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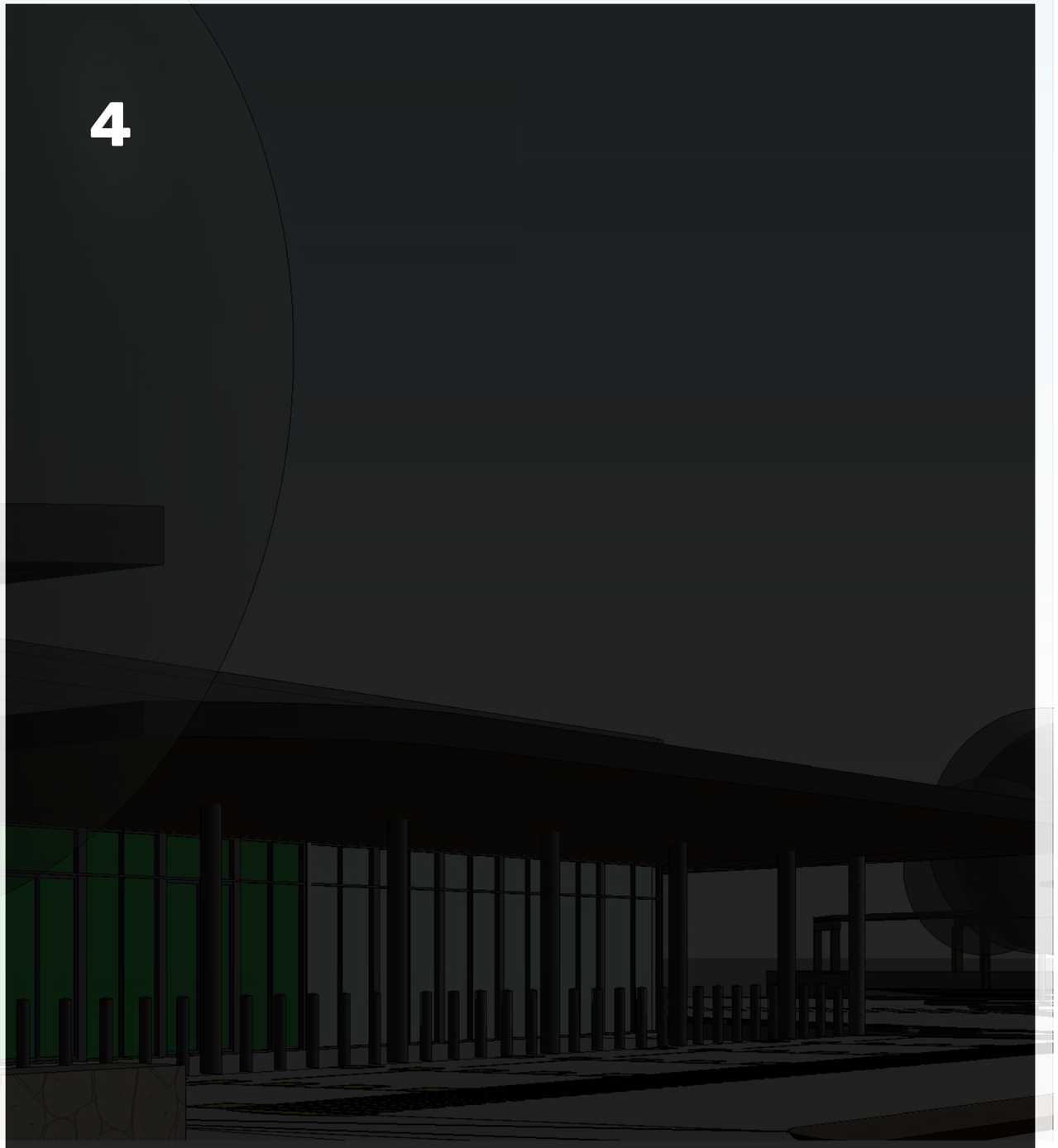


CRIME RISK ASSESSMENT

4 CRIME RISK ASSESSMENT SUMMARY

4.1 SITE ANALYSIS & PROPOSED DEVELOPMENT

Site analysis helps in the understanding of a place – how the built form, landform and local user groups can increase or decrease criminal activity.

This analysis then considers how the proposed development will function within its context and identify risks associated with the proposed design, uses and operations. Recommendations are then provided in Sections 5 – 12.

Figure 4: Crime Prevention Assessment Context Site Analysis (TDP/Google Earth 2021)

- The subject site.
- Existing road network
- Existing pedestrian crossing
- Proposed driveway entries to the centre
- Distant views from residential across park. Negligible surveillance.
- No surveillance from rural land across Settlers Blvd.
- Existing footpath could provide pedestrian surveillance.
- Bus Stops. Footpaths connects to bus stops.

1. Adjoining education precinct.
2. Whitewater Park - open space within the centre of the suburb.
3. Existing early learning centre.
4. Existing residential development.
5. Existing footpath aligns with entry to the centre.

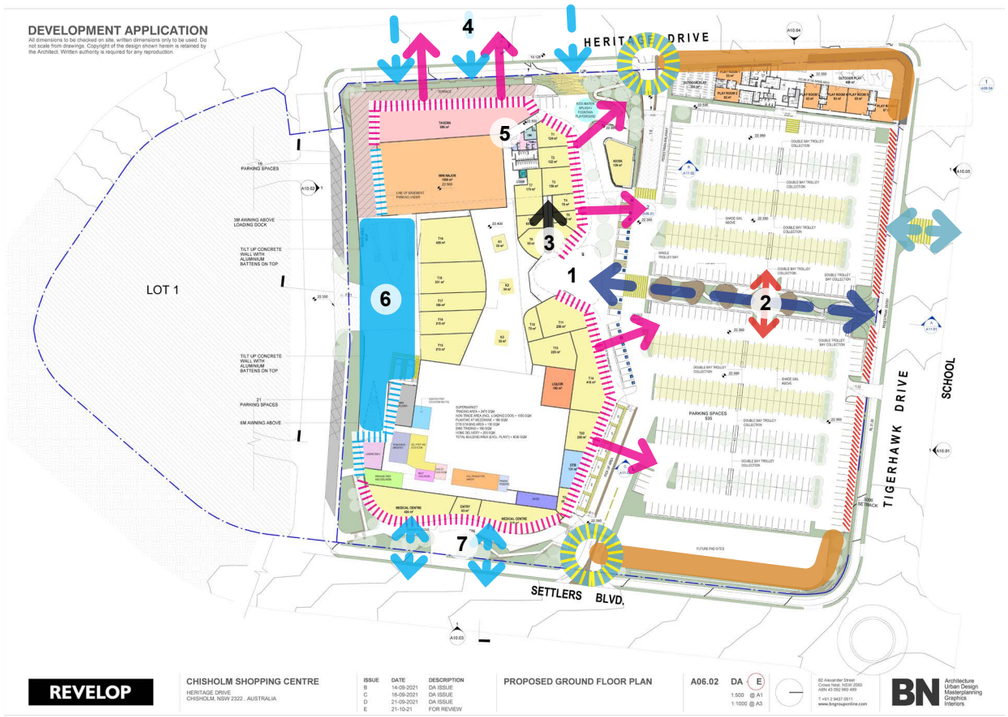
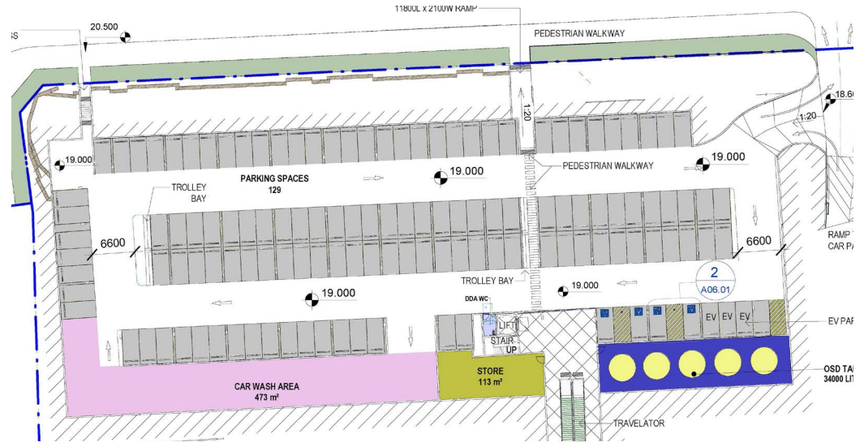
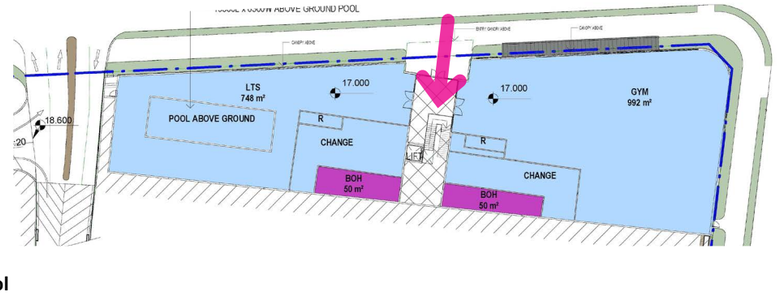


Figure 5: Summary Crime Prevention Assessment - Ground Floor Plan (BN Group/ TDP 2021).

Activate frontages which <u>can</u> provide surveillance.	**1** The entry to the centre aligns with the pedestrian link improving access with the school.
Inactive frontages which <u>cannot</u> provide surveillance.	**2** The barriers channel movement however, could obscure small children, in particular at the shared aisle crossing. The development of the barrier should be undertaken concurrently with the planting and lighting recommendations.
Direction of views for surveillance.	**3** The travelator is open to the basement carpark, and is unsecured. The travelator and the basement carpark should be secured when the centre closes.
Inhibited views due to level change or structures	**4** The development is elevated which inhibits views to the footpath. The tavern has good sightlines however, decals and signage block should not windows.
Existing pedestrian crossing	**5** The external entry to the amenities will need to be secured when the centre closes and not be available to the tavern.
Pedestrian link that connects the education precinct and the centre.	**6** The loading area is well defined. The future residential on Lot 1 will provide good surveillance of this space.
Carpark aisle connection. Nominated as a shared space with different paving treatment.	**7** Walls within the landscape could reduce surveillance from within the medical centre and to the public domain.
Retaining wall and transparent fence prevents movement of students through carpark from footpath.	
Structures block surveillance of internal carpark resulting in a reliance on internal surveillance.	
Loading area will have the opportunity for surveillance from future residential however, until that time this edge will be vulnerable.	
Pedestrian and driveway potential conflict.	



Basement Carpark



Gym and Pool

Childcare Centre

Figure 6: Summary Crime Prevention Assessment - Basement Carpark, Childcare Centre, Gym and Pool (BN Group/ TDP 2021).

The basement carpark needs to be a secure space after hours. This means the travelator requires doors as it opens into the centre <u>outdoor</u> forecourt. A garage door is also needed at the vehicular entry.

The gym and the pool have access from the carpark and from Heritage Drive, which the chilcare centre shares. The childcare's entry is located adjacent the common gym/pool entry. It is important that the two entries are treated differently so the public are not confused and try to access the childcare premises. The entry space (outside the childcare centre entry) is tight (8) and could benefit from more space - in particular due to the changes to drop off rules during COVID-19 lockdowns which could reoccur over time.

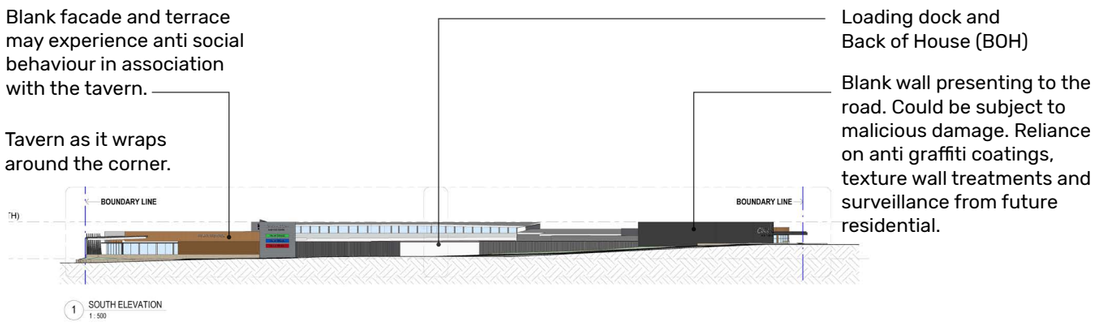


Figure 7: Summary Crime Prevention Assessment - Southern elevation / Back of House (BN Group / TDP 2021).
The back of house and loading docks will be accessed from a proposed road to the south of the centre. The facade is predominately blank with the exception of the tavern which wraps around the corner. This space will rely on future residential for surveillance. A terrace space associated with the Tavern returns around the corner towards the loading dock. The removal of this space should be considered as it will not have surveillance from the tavern and could impact on future adjoining residential (lot 1).

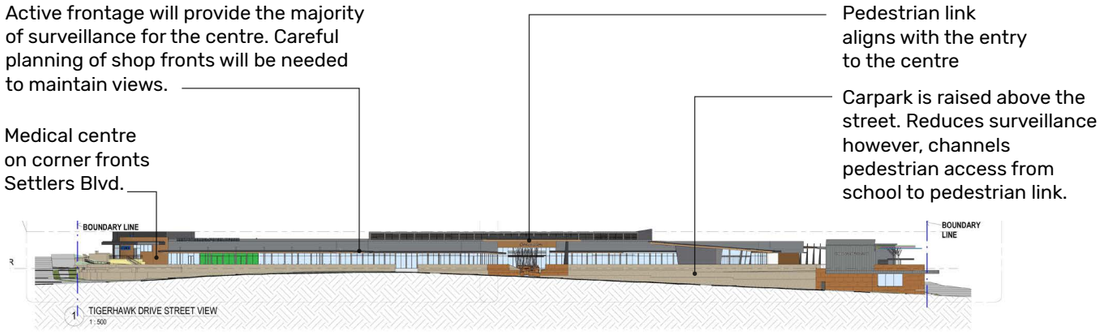


Figure 8: Summary Crime Prevention Assessment - Tigerhawk Drive elevation (BN Group / TDP 2021).
This view shows how the level changes wrap around the corners of both streets - Heritage Drive and Settlers Boulevard. This means that surveillance from the education precinct and its bus stop will be marginally better than the surrounding streets. Surveillance, Space and Activity Managed, Access Control and Territorial Reinforcement within the space will be the priority.

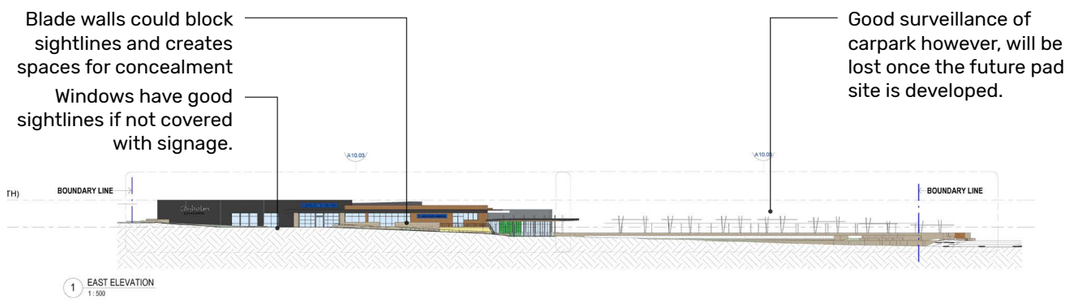


Figure 9: Summary Crime Prevention Assessment - Settlers Blvd Elevation (BN Group / TDP 2021).
The Settlers Boulevard streetscape will have good sightlines into the carpark in the short term until the future pad sites are developed. The large windows of the medical centre are good however, it will be important not to cover windows with signage and decals. The lowering or removal of blade walls could also be considered to improve sightlines.

Figure 10: Summary Crime Prevention Assessment - Heritage Drive Elevation (BN Group / TDP 2021).
The ‘ground floor’ of the shopping centre is raised above Heritage Drive and the development presents a blank wall to the road. The tavern located above the basement carpark has large windows which will offer surveillance over Whitewater Park and the road, however the footpath will not have surveillance.

4.2 CRIME PREVENTION ASSESSMENT: CRIME DATA

Analysis of Crime Data has limitations that are important to consider when undertaking a assessment of a place.

The crime data that is available for the suburb is not location specific and it is not possible to know if it relates to the study area. Hotspots can provide an indication if there is activity happening to a specific area.

It is also important to note additional limitations with regard to the reporting of crime, that 'the reporting of crime is influenced by a number of factors, including public understanding of what constitutes a crime and the public's willingness to report crime.'(Weatherburn 2011).

Data used for crime assessments are from NSW Bureau of Crime Statistics (BOSCAR).

Summary of Findings.

Analysis of BOSCAR data for the suburb of Chisholm identifies low crime levels in the suburb. The suburb is emerging and has a low population. At the 2016 census, the population was recorded as having 1,461 people however, it likely to have increased since that time, as new areas are released and new dwellings are constructed. This is important to note, as the existing crime data cannot predict the future and the current crime activity is likely to change as the population becomes denser. Crime activity can change from year to year. This may not be because the activity has increased, but because activity is reported inconsistently or because Police are targeting that particular crime activity.

Due to the evolving nature of the suburb, the recommendations of this report will consider possible future impacts as the area changes. As this shopping centre is intended to form part of this community for a long period time, this requires resilient design approaches.

The proposed development (shopping centre) will the first of its kind in the suburb and therefore, there is no precedent crime data to analyse.

Hotspots
A hotspot for ***Steal from Vehicle*** has been identified close to the proposed shopping centre. The hotspot is within the new residential area south west of the proposed development. Although rates are low, it will be important to consider the risk of similar crime activities for the shopping centre. This makes Surveillance of the carpark and Access Control of the development an important consideration for the shopping centre.

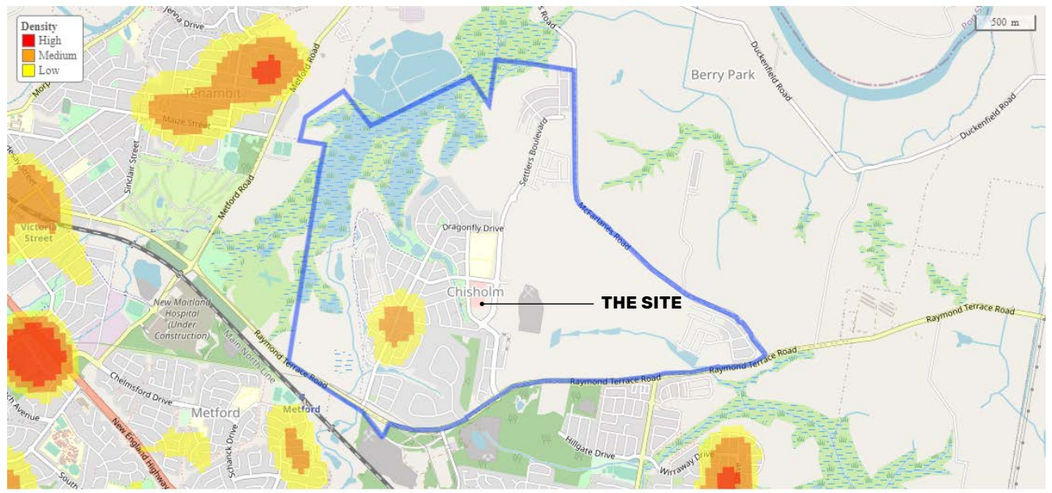
Crime Data Summary

The assessment of crime data was focused on activities that relate to the future operations.

Crime activities assessed include:
- Non-Domestic Assault
- Steal from Person
- Theft of Vehicle
- Theft from Vehicle
- Malicious Damage

	Year to June 2020		Year to June 2021	
Offence	**Chisholm Rate per 100,000**	**NSW Rate per 100,000**	**Chisholm Rate per 100,000**	**NSW Rate per 100,000**
Non-Domestic Assault	94.7	373.4	284.1	381.0
Steal from Person	0	36	0	25.8
Motor Vehicle Theft	94.7	155.9	236.7	142.4
Steal from Motor Vehicle	568.2	414.3	520.8	354.7
Malicious Damage	189.4	675.5	331.4	659.0

Incidents of Theft (Steal from motor vehicle) from July 2020 to June 2021



Source: NSW Bureau of Crime Statistics and Research

Figure 11: Hotspot - Steal from Motor Vehicle (BN Group / TDP 2021).
A hotspot has emerged for Steal from Motor Vehicle. In this location are new residential dwellings.

5 SURVEILLANCE

Surveillance is a core element of CPTED. There are three types of surveillance - Natural, Technical and Formal. The concept of surveillance seeks to discourage anti-social behaviour by creating an environment where people can see and interact with others. When people feel they are being watched, they are less likely to commit a crime.

Surveillance is achieved through well considered urban design, careful selection of landscaping solutions and lighting. This can create a safer environment. Successful surveillance outcomes are the product of good design.

5.1 ASSESSMENT

5.1.1 Existing Conditions Assessment

At this stage, detailed designs have not been prepared. This assessment and the following recommendations provide guidance for the future development of the site.

The site is a vacant greenfield lot that has been zoned for retail activities. To the north is an education precinct which includes a senior and junior school and early learning centre.

To the west is Whitewater Park, an open space that runs north-south through the suburb. The park features walking paths, seating areas and passive open spaces. The active use of this space facilitates good surveillance of the area. A pathway that crosses east-west through the park aligns with the proposed vehicular and pedestrian entry to the shopping centre.

Beyond the park, further to the west is an existing residential subdivision which provides surveillance for the park. Its views of the shopping centre site are distant. To the east are rural lands that are not developed and do not provide surveillance for the shopping centre site.

The shopping centre site is located on what could be considered one of the main roads of the suburb - Settlers Boulevard.

5.1.2 Proposed Design Assessment

The proposed development comprises a single story shopping centre with a range of uses that can be active both day and in the evening. The activity of the shopping centre will provide its own surveillance as the topography and configuration of the proposed centre limits natural surveillance.

The education precinct to the north can provide surveillance over the central part of the shopping centre carpark - in proximity to the pedestrian link. This can be through the movement of teachers and students walking to the centre on foot. A pedestrian crossing and bus stop is located on Tigerhawk Drive. The entry to the junior school is also located on Tigerhawk Drive.

The arrangement of the shopping centre provides small retail premises which address the on-grade carpark. These premises activate and provide surveillance for the carpark.

The centre's loading dock is located off a new road proposed to the south of the centre. A new residential development site, identified as Lot 1 is proposed opposite, which can provide surveillance of this space. Parking is proposed on this road which is likely to be for staff parking. The flow of staff into the centre can provide natural surveillance however, it is not clear where their entry point will be.

5.2 RECOMMENDATIONS

5.2.1 Sight lines

Sight line considerations are multi-directional. They are important for the public looking into the development and for the those within the development looking out into the public domain.

Sight lines into the site will be limited by the site's topography and the centres proposed perimeter structures including the shopping centre, childcare, gym and future 'pad site' buildings. The development will be reliant on good internal surveillance by users of the shopping centre. The facades fronting Heritage Drive, Settlers Boulevard and the carpark have active uses that can have good sightlines. Retails premises that front public spaces should limit the extent of signage and decals on windows that can inhibit sightlines.

Blade walls are proposed in the landscape between the medical centre and Settlers Boulevard. These walls could inhibit sightlines from the road and should be reduced in height or increased in transparency.

The pedestrian link that separates the two on-grade carparks proposes 'corten' balustrades. The balustrades can be used to channel students however, it could obscure views of children as they approach the shared crossing through the centre of the link. The balustrade could also block sightlines through the carpark. The balustrade should increase transparency and be designed in conjunction with the vegetation and lighting recommendations.

5.2.2 Vegetation

The development is proposed to be enhanced with a high quality landscape treatment. This provides the opportunity to implement positive CPTED outcomes from the outset.

a. Places of concealment and entrapment

Places of concealment and entrapment can be easily created in the public and private domain. These are spaces which may enable someone to hide or trap a person.

Landscaping around the edges of the carpark, between Settlers Boulevard and the medical centre, within the pedestrian spine and along the southern facade is recommended to be limited to ground covers, shrubs and taller trees with no significant branches below 2 metres. Shrubs are recommended to be a maximum of 700mm in height.

Trees proposed within the carpark should be taller trees with no significant branches below 2 metres.

b. Vegetation blocking lighting

Shadowy spaces are created where the trees obscure light fall from light poles and internal lighting. Consider the location of lighting and trees so as not to block the fall of light. This is particularly important in the parking areas where good lighting at night is important.

Future advice on lighting design, in conjunction with the landscape design (during the construction documentation and construction phase) is strongly recommended. Modelling of proposed lighting in conjunction with landscaping is recommended to test light spill and shadows.

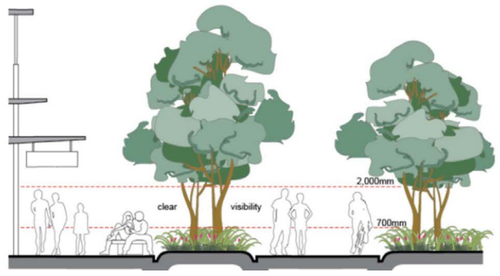


Figure 12: Example of tree and shrub clearance zones for good sight lines.
The diagrams shows a clear space between 700mm (tops of shrubs) and 2.0m (lower limbs of branches) to provide clear sightlines. (source Cairns Plan 2016) .

6 LIGHTING & TECHNICAL SUPERVISION

Lighting and Technical Supervision refers to the role that lighting and products such as CCTV have in improving safety in the public domain. Many public spaces have lighting however, the specified products are often inappropriate, or are not wisely located. Often lighting creates new issues, as poorly located lighting can create shadows that previously didn't exist. Likewise, CCTV can often be a waste of money if there is low risk of crime, is poorly located or if no one is monitoring the footage. The following assessment and recommendations identifies methods to use lighting and technical supervision to achieve the best outcome.

6.1 ASSESSMENT

6.1.1 Existing Conditions Assessment

At this stage detailed designs have not been prepared. This assessment and the following recommendations provide guidance for the future development of the site.

Due to the timeframe to produce this report and the COVID19 travel restrictions in place until 1 November 21, a site visit was not undertaken. Existing lighting surrounding the development was identified from Google Street View.

Lighting identified as follows:

- Street lighting on Heritage Drive, Tigerhawk Drive and Settlers Boulevard.

6.1.2 Proposed Conditions Assessment

Lighting design has not been undertaken at this stage and will be further developed during the construction documentation phase.

The following recommendations can be used by the project architects and landscape architects to incorporate lighting and lighting enhancing features into their designs.

6.2 RECOMMENDATIONS

General Lighting comments:
Lighting strategy and design should be undertaken by a qualified lighting engineer for the development to test light spill and identify any spaces of shadow and concealment – particularly at the shopping centre entry, along perimeter footpaths, within the carpark, in the loading dock area and the path of travel from the loading area and associated staff parking to the main entry.

Lighting design:
Design the lighting approach to fulfil the following recommendations:

General Lighting and CCTV
- All pathways should have effective lighting which improves visibility and as a result reduces fear. Bollard lighting is discouraged as it is prone to vandalism and is not particularly effective at illuminating faces. Ground surface lighting is recommended along paths of travel to key areas. Ground surface lighting can assist with wayfinding as long as it does not result in night blinding when a person looks down.
- All lighting should comply with relevant Australian Standards, particularly AS 1158.
- Avoid using low-pressure sodium lamps.
- Vandal-resistant lamps are recommended.
- Avoid the use of coloured lighting
- Lighting can lose up to 20% capacity within 12 months, resulting in inadequate light levels. This should be considered when selected lighting type and brightness.

General
- Ensure no shadowy spaces are created by the buildings, the gaps between the lights themselves and the landscape.
- Any signage should be as legible at night as it is during the day.
- Landscaping within the carpark, at the entry to the centre and along its edges is recommended to be limited to low ground covers and shrubs a maximum of 700mm high. Trees should have no significant branches below 2.0m to facilitate good view lines at night and reduce shadows.
- Highlight the entries to the centre, tavern, pool/ gym, childcare centre and medical centre.

On grade parking Areas
- Lighting should be bright and even to allow an observer to see into a parked car.
- Ensure any landscaping around the parking spaces does not obscure views into the car.
- Areas where pedestrians and vehicles are in close proximity, such as pedestrian crossings, should be well lit to enable a person to be clearly visible.

Residential basement carparking
- Use high quality lighting and white finishes in the basement carpark. The white walls and columns to reflect the lighting back and enhances lighting outputs. This is also important for any transitional spaces such as fire exits and entry to the travellator.
- Design lighting to allow for eyes to adjust after leaving a transitional space - as it can take up to half an hour for eyes to adjust.

Pedestrian pathways and lobbies
- Intelligent lighting that is based on sensors may be appropriate along the pathways within the shopping centre forecourt areas. But care should be taken to ensure that the transition between light and dark does not give rise to concealment opportunities.

Pedestrian link
- Lighting is recommended to be installed along the pedestrian link to create a welcoming environment that encourages its use. Opportunities to integrate public art into this space is encouraged.
- Intelligent lighting that is based on sensors may be appropriate within the pedestrian link after hours. But care should be taken to ensure that the transition between light and dark does not give rise to concealment opportunities.
- Areas where pedestrians and vehicles are in close proximity such as
  - Tigerhawk Drive pedestrian crossing
  - Settlers Boulevard driveway entry where the footpath crosses
  - Heritage Drive driveway entry where the footpath crosses
  - pedestrian link crossings including the aisle split and the crossing adjcant the entry.

7 TERRITORIAL REINFORCEMENT

Territorial Reinforcement recognises the importance of ownership of public spaces. Spaces that are well used and cared for are less likely to attract crime and anti-social behaviour. The role the community plays is often important to the success of the public space.

This principle seeks to remove the confusion from the public domain – to make the purpose of each space clear. This includes the definition of boundaries, function and operation of a space.

7.1 ASSESSMENT

At this stage detailed designs have not been prepared. This assessment and the following recommendations provide guidance for the future development of the site.

7.1.1 Existing Conditions Assessment

At present, the site is a vacant lot. All maintenance and control of the space is currently managed by the owner of the site.

7.1.2 Proposed Design Assessment

The new development will significantly change the current Territorial Reinforcement framework of the site. The development will change from a vacant lot to a site which will service a large number of people. This will establish specific Territorial Reinforcement and maintenance requirements for the site.

Management
There are five primary facilities within the centre - the shopping centre, child care facility, tavern, pool/gym and medical centre. The shopping centre is composed of a number of individual premises. The site will also accommodate future unknown development on the 'pad site'. Each will be responsible for their own Territorial Reinforcement.

Individually, each of the premises will manage and control their facilities/space however, there will be an over arching shopping centre management that will coordinate the precinct. This results in a multi-layered management of the precinct.

Carparks
Two carparks - one on-grade and one basement carpark - are proposed. The childcare centre users are more likely to use the parking spaces outside their premises opposed to the basement carpark. The basement carpark provides direct access to the shopping centre forecourt which is external and unsecure at night. Access to the basement carpark, via the travelator is open and not secure which could give rise to malicious damage and other crime activities.

Back of House
The development's back of house (BOH) and loading areas are proposed on the southern edge of the shopping centre and accessed from the new southern road. This space is clearly identifiable as back of house and its function is clearly defined.

Pedestrian Links
There are six pedestrian entry points into the shopping centre. The public domain is highly permeable and allows for the flow of people. This allows for people to enter on foot, bike or by car.

Tavern
A tavern is proposed on the western edge of the shopping centre, fronting Heritage Drive. It is independent to the shopping centre and is accessed externally. A terrace wraps around the western and southern facades. This space can activate the street however, where it wraps around the southern corner it could impact upon future residential. There is also a portion of the terrace that is behind the mini major which has no surveillance.

Water Play
A water play area is proposed at the entry from Heritage Drive. Amenities can be accessed externally.

7.2 RECOMMENDATIONS

Entry points
Establish distinct entry points that define the edges of the shopping centre and the entry points to the buildings. Use lighting, landscaping, variation in colour/material and signage.

Signage
Signage should be used to clarify ownership and responsibilty. In the case of damage, signage should assist the public in reporting damage. Clear signage should be installed throughout the development. Overuse of signage is not supported as it becomes less effective. Consistency of design will add to the overall sense of a cohesive community and sense of place.

Lighting
Lights in the ground can be used to reinforce paths of travel within the development. Refer to Section 5 for detailed recommendations regarding lighting.

Maintenance
Maintenance of the development is a powerful tool in Territorial Reinforcement. A Maintenance Plan for the development should be identified at the Construction Certificate stage. The Maintenance Plan should include the selection of durable materials and plant species that do not require extensive maintenance.

Public Domain Treatment
Landscaping is useful in reinforcing the difference between the shopping centre and the residential and educational areas of Chisholm. The shopping centre is a public space with a varying degree of private spaces. The public domain treatment should demonstrate that this is a high quality development with strong local ownership. This can be achieved by incorporating bespoke treatments such as bespoke street furniture, lighting and paving inlays. Opportunities for local community involvement, including local shop owners and residents, can help identify themes and images to influence the treatments.

Separation of cars and pedestrians
The separation of cars and pedestrians are important in developments that are open to the public. The likely movement of school aged children from Tigerhawk Drive and to the centre has been well considered by the creation of the pedestrian link. It is noted, that the path is lined with 'corten' balustrades. These balustrades have the benefit of channelling the children however, smaller children may not be as visible and could collide with a vehicle - in particular where the aisle break is provided. A less solid barrier should be considered that channels children while allowing for drivers to see children as they approach the openings and driveway crossings. The height of the balustrade should also consider the requirements for clear surveillance within the carpark as identified in Section 5 Surveillance and Section 6 Lighting. The design of the balustrade should be factored into the landscaping and lighting design as per the recommendations.

Tavern
The design of the tavern terrace should consider the visual and acoustic impact on future residential development in Lot 1. The terrace also wraps behind the mini major which is a blank facade. It has no surveillance and could become a space for anti social or crime activity. The redesign or re-purposing of this space is recommended.

Water Play Area
The waterplay area at the Heritage Drive entry provides a space for families which strengthens Territorial Reinforcement. Families are positive user groups and can discourage anti social behaviour. The areas role in the evening will require further consideration, in particular in association with the tavern. The water may need to be turned off to reduce opportunities for anti social behaviour. The entry to the amenities, from the water play area should be locked at dusk or when the water is turned off.

8 ENVIRONMENTAL MAINTENANCE

Environmental Maintenance is the maintenance and management of physical assets. This takes place during the operational stage of the Precinct. The assessment and recommendations provided below are guidance for the current design process and for future management. Public spaces that are poorly maintained, damaged, vandalised, appear abandoned and full of rubbish are unlikely to attract positive user groups. These types of spaces show a lack of pride by the community. Well maintained spaces send a positive message and tells potential offenders that people are watching and using this space. It is a good deterrent. Good design can help with maintenance in the future.

8.1 ASSESSMENT

Environmental Maintenance will generally occur in the detailed design and operational stage however, there are opportunities to integrate solutions during the design phase which will assist in the management of the new development. The aim is to create a development that is easy to maintain. The recommendations in the following section may be issued as conditions of consent at Council's discretion.

8.1.1 Existing Conditions Assessment

The site is currently vacant. Existing Environmental Maintenance is not relevant.

8.1.2 Proposed Design Assessment

The Development Application documentation does not provide detail for an Environmental Maintenance assessment. However, the following recommendations are provided to assist with the next stage of design development.

8.2 RECOMMENDATIONS

Regular maintenance and well designed landscaping will demonstrate to visitors that this development has a site guardian and is safe.

Environmental Management Design:

- Walls and fences at the street and loading areas are at risk of malicious damage. The use of anti-graffiti coatings is recommended, in particular in the loading dock area and on the southern facade where there is little surveillance in the short term.
- Select materials that are robust and durable. Materials/elements should not be easily removed. However, the final outcome should not appear overly harsh, thereby reducing the amenity of the space and create fear.
- Provide rubbish bins and plan for regular removal to avoid build up of waste. Provide flame retardant bins through the development.
- Use low maintenance and drought-resistant plant species throughout the site.
- Fixtures such as the bike racks and bins should be secure and not easily removed.

Environmental Management Operational:

- Establish an Environmental Maintenance Plan.
- Graffiti should be removed quickly. The longer tags are left on display, the greater the reward for offenders.
- Avoid the use of porus materials in areas with the greatest risk of graffiti tagging.
- Establish a reporting system that allows users and visitors to quickly report damage or anti social behaviour.
- Repair or replace broken or damaged furniture/ bins/signs quickly.
- Review the current trends in crime in the area with the local Police, Neighbourhood Watch and regularly update Environmental Maintenance Plan.

9 ACTIVITY & SPACE MANAGEMENT

Activity and Space Management identifies strategies to establish natural community control.
These strategies include:

- Formal supervision
- Control of the space
- Maintenance of the space.

Activity and Space Management has strong correlations to earlier sections of this report. For instance, poor Environmental Maintenance results in urban decay which sends a negative image. This section explores how to improve community safety by increasing visitation and use of a space

9.1 ASSESSMENT

Activity and Space Management will generally occur in the operational stage however, there are opportunities to integrate solutions during the design phase which will assist in the management of the new development. The aim is to create opportunities for natural community control. The recommendations in this section may be issued as conditions of consent at Council's discretion.

9.1.1 Existing Conditions Assessment

The management of the subject site will change significantly following the construction of the new development. The mix of users of the shopping centre and the other facilities will require a higher level of Activity and Space Management.

9.1.2 Proposed Design Assessment

The proposed design will change the development from a vacant site to a shopping centre with a range of users at various times of the day. It will comprise a combination of semi public and semi private and private spaces. There will be formal guardianship from the shopping centre management and business owners. There will be informal guardianship from users of the childcare centre, gym, swim school and staff.

9.2 RECOMMENDATIONS

Semi Public and Private Space

The design should enforce clarity of land use - making it clear what is semi public (spaces where visitors can go - noting it is a private development) and what is private (private to childcare and back of house). Methods that can be adopted include:

- Use paving treatments that are distinctly different to footpaths outside the development.
- Provide entry features/statements/structures that reinforce the pedestrian thresholds.
- Clearly identify areas within the development which are not accessible by visitors such as back of house, storage areas and the childcare centre. However, be cautious of the over use of signage as it may become less effective.

Maintenance Planning

Establish a Maintenance Plan that ensures the site retains the appearance of a clean and well maintained sports precinct. The Maintenance Plan should include routines for rubbish removal and steps to take when rubbish accumulation exceeds the norm. Rubbish should be removed as soon as practical. The plan should also include:

- reporting of waste
- methods for reporting damage
- time frames for quick repair of damage.

Amenities

The amenities located in the western wing can be accessed internally and externally. Amenities can be spaces where anti social behaviour and criminal activity can occur. Management through formal supervision and physical control of the space will be needed. This means an external door and CCTV should be considered. These amenities should not be available to the tavern.

10 ACCESS CONTROL

Access Control identifies methods to manage access to and within a site. Methods may range from site restrictions through to helping people leave a site safely.
Three methods are generally used: Natural Control, Technical or Mechanical Control and/or Formal Access Control. Natural Control Solutions seek to restrict and channel people into specific areas. Restrictions/ channelling can be a good deterrent for criminals as it increases the risk of being caught.
Methods are typically Natural Control solutions which may include:

- Landscape site planning such as fencing, water features, paths and vegetation
- Building site planning
- Wayfinding signage
- Control of lines of sight

Technical or Mechanical Control Solutions may include the use of Closed Circuit Television (CCTV) equipment.
Lastly, Formal Access Control solutions would be the use of security officers.

10.1 ASSESSMENT

Access Control is determined during the design and operational stage which will assist in the management of the development.

10.1.1 Existing Conditions Assessment

The existing controls are not relevant as the site will change from a vacant lot to a shopping centre with associated premises. The introduction of new users, the mix of users and the hours of operation makes Access Control more complex.

10.1.2 Proposed Design Assessment

The design proposes a single shopping centre building (with a number of uses) that fronts an ongrade carpark. The ongrade carpark is accessed by two driveways. The ongrade carpark is located above Heritage Drive and is accessed by a ramp. A basement carpark is located under the shopping centre and is accessed from the driveway entry from Heritage Road. It is connected to the centre by a travelator that discharges into the forecourt. This means the basement carpark is not secure.

A tavern is located on the western facade and is accessed externally and a medical centre is located on the eastern facade and is also accessed externally. Their location allows them to operate outside the centre's operational hours.

A childcare centre is located on the corner of Heritage Drive and Tigerhawk Drive. It is an independent building with two entry points - one from Heritage Drive and the other from the on-grade carpark.

The tavern could be accessed from the forecourt and the rear southern road. The entry point is not yet nominated.

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10.2 RECOMMENDATIONS

- Provide wayfinding signage to identify what is public and what is private. Signage should clearly direct people to key buildings/ destinations in the centre.
- Consider improving access to the childcare centre by making it clearly different to the entry to the gym/pool entry (from the carpark). Provide more space to the entry to the childcare centre and allow for waiting areas outside the entry - noting the changes to childcare pickup and drop off during COVID which could continue.
- Establish entry points to centre, retail premises, tavern and medical centre that look different to the rest of the building. Use colour, materials, lighting and signage to distinguish.
- Use signage to identify the location of public amenities. Provide an external door to the corridor and lock this door when outdoor cafes and retail premises have closed. Management of the centre many need to adjust the toilets hours of operation if there is anti social/criminal behaviour. It should not be available for use by the tavern.
- The proximity of the tavern and the loading dock could result in criminal activity. Security for back of house should be regularly reviewed.
- The basement carpark needs to be secured after hours. This should include a garage door and a door to enclose and secure the travelator. The door should be located at the upper forecourt level as the basement lobby area and internal areas of the carpark could become a target for malicious damage and concealment.

11 3 D's : DESIGN/DEFINITION/DESIGNATION

It is important for the design, definition and definition of a public space to be in harmony. If a space comprises uses that conflict with another use, dangerous situations could arise. Offenders often exploit situations that are confusing.

This can be described as the three D's.

Designation
- What is the designated purpose of this space?
- What this its original purpose?
- How well does the space support its current or its intended use?
- Is there a conflict between its current and intended use?

Definition
- How is space defined?
- Who owns the space and is it clear?
- Where are its borders?
- Is the space defined by social or cultural factors – does this affect how space is used?
- Are the legal or administrative rules clearly set out and reinforced in policy?
- Are there signs?
- Is there conflict or confusion between designation and definition?

Design
- Does the physical design support the intended function?
- Does the physical design support the desired or accepted behaviour?
- Does the physical design conflict with proper functioning of the space?
- Is there confusion or conflict in the physical design which is intended to control behaviour?

11.1 ASSESSMENT

If the recommendations in previous sections are carried out it will be clear which spaces are semi public and which are semi-private.

Ongoing maintenance by management and a clear plan for maintenance work will be beneficial.

Spatial boundaries throughout the site will reinforce intended function if the recommendations in this report are carried out.

11.2 RECOMMENDATIONS

- Undertake a 3 D's assessment regularly.
- Implement recommendations from Sections 5 – 11.

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12

CONCLUSION

12 CONCLUSION

The proposed development will change the current use of the site - from a vacant lot to a shopping centre development with a range of uses and premises. Analysis of BOSCAR data for the suburb of Chisholm identifies low crime levels in the suburb. The suburb is emerging and has a low population. At the 2016 census, the population was recorded as having 1,461 people however, it likely to have increased since that time, as new areas are released and new dwellings are constructed. This is important to note that existing crime data cannot predict the future and that current crime activity is likely to change as the population becomes denser. Crime activity can change from year to year. This may not be because the activity has increased, but because activity is reported inconsistently or because Police are targeting that particular crime activity. The proposed development (shopping centre) will the first of its kind in the suburb and therefore, there is no precedent crime data to analyse.

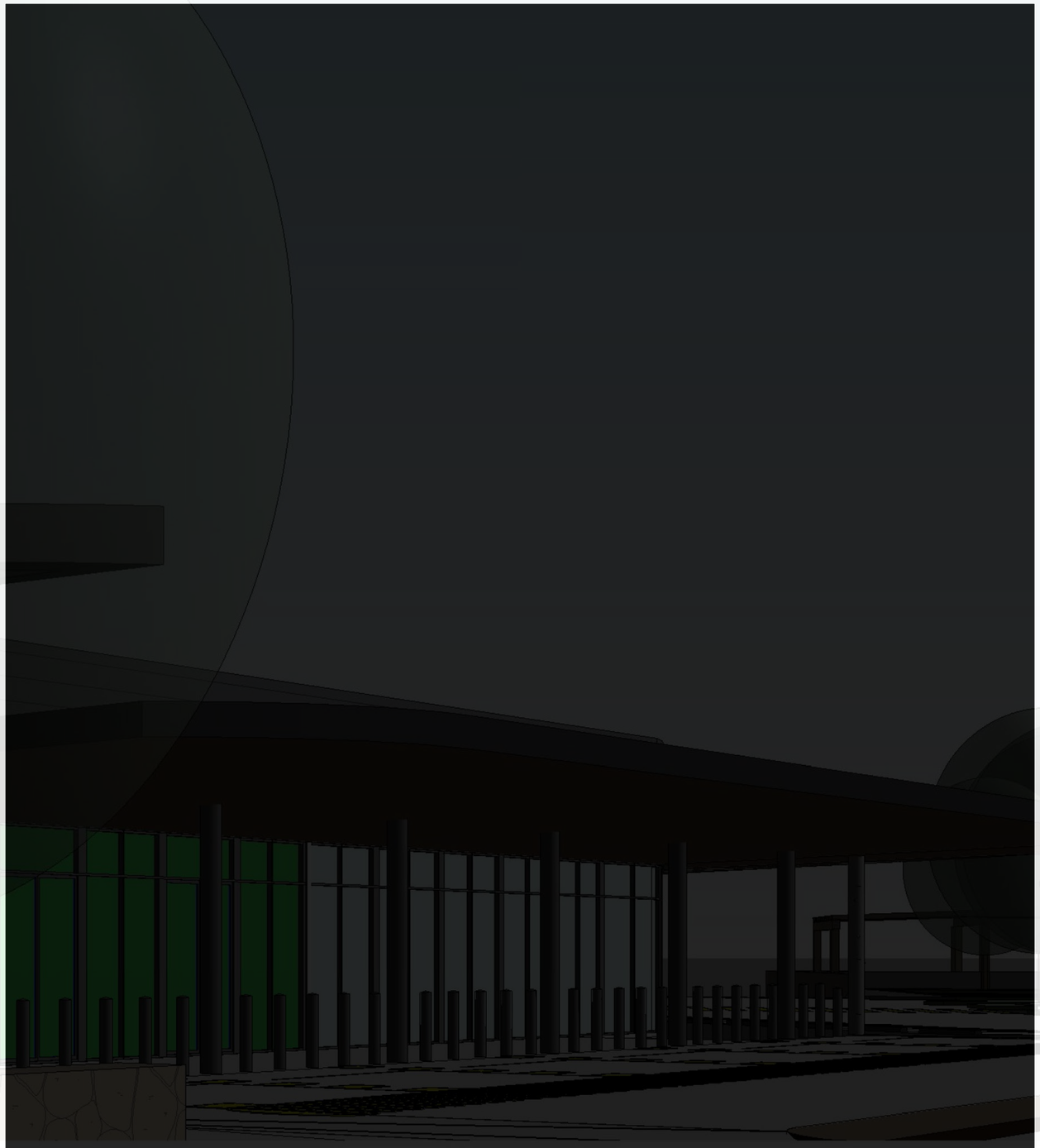
The documentation is at a Development Application level. Therefore, many specific details are yet to be fully established and will be documented during future stages. However, this report endeavours to provide recommendations to guide the plans for future development, to ensure the development is set in the right direction.

The key recommendations address all principles including Surveillance (including Lighting), Territorial Reinforcement, Environmental Maintenance, Activity and Space Management and Access Control. The proposed design is attractive and its development will be an important contribution to the Chishom community. However, the proposed sites activities such as the tavern, the elevation of the carpark from Heritage Drive and the vulnerability of local school children will require high levels of management to ensure the premises remain safe and secure for its visitors.

A high level of consistent maintenance and the delivery of high quality landscaping and finishes will demonstrate to users and staff that this is a well loved centre - demonstrating there is guardianship over the site. Therefore, it is important that there is a strong visible presence of people and limiting of opportunities for criminal behaviour so there is no perception of vulnerability which could turn this site into a target. Consultation with local area police and participation in the newly established Neighbourhood Watch is highly recommended to monitor the area and the proposed development.

The key recommendations include:

- providing clarity between semi public and private spaces using landscaping, fencing, signage and materials.
- providing clear delineation between people and vehicles between the carpark and the movement areas, this includes good lighting to illuminate pedestrians.
- Clearly naming each building so it can be easily identified by emergency services or users of the facility.
- securing the basement carpark with a security door and secure the travelator to prevent unauthorised access after hours.
- low maintenance landscaping which does not inhibit sight lines e.g. landscaping is recommended to be limited to groundcovers, shrubs (no taller than 700mm) and taller trees with no significant branches below 2 metres.
- using appropriate and high quality lighting designed by a lighting engineer.
- reconsider the design of the pedestrian through site link and the corten blades that could inhibit views of small children.
- establishing a Maintenance Plan and implementing it on a regular basis. This includes inspecting the grounds to identify if new CPTED issues have arisen and liaising with local police on a regular basis
- using anti-graffiti coatings, fast removal of graffiti and rubbish.
- maintaining good surveillance form retail and business premises to the carpark, entry points and footpaths by not obscuring windows with signage and shelving and designing landscape to maximise clear sightlines.
- registering CCTV with NSW Police.



CRIME RISK ASSESSMENT

APPENDIX A - DESIGN DRAWINGS

D. National Quality Framework Assessment Checklist

Table 2 - Assessment checklist

REGULATION	PROPOSED	COMPLIES (TICK OR CROSS)
104. Fencing or barrier that encloses outdoor spaces. Outdoor space that will be used by children will be enclosed by a fence or barrier that is of a height and design that children preschool age or under cannot go through, over or under it. Note: This clause does not apply to a centre-based service primarily for children over preschool age or a family day care residence or venue for over preschool age children.	Indicate height, materials and style on plans. 1500mm HIGH SOLID WALL ON THE CHILDCARE PERIMETER	✓
106. Laundry and hygiene facilities The proposed development includes laundry facilities or access to laundry facilities OR explain the other arrangements for dealing with soiled clothing, nappies and linen, including hygienic facilities for storage of soiled clothing, nappies and linen prior to their disposal or laundering. Laundry / hygienic facilities are located where they do not pose a risk to children	On-site or off-site facilities ON SITE FACILITY PROVIDED	On-site ✓ Off-site
107. Unencumbered indoor space The proposed development includes at least 3.25m^2 of unencumbered indoor space for each child. Refer to Regulation 107 of the Education and Care Services National Regulation for further information on calculating indoor space.	Number of children: Required area: Provided Area:	112 364 366
108. Unencumbered outdoor space The proposed development includes at least 7.0m^2 of unencumbered outdoor space for each child. Refer to Regulation 108 of the Education and Care Services National Regulation for further information on calculating outdoor space, and for different requirements for out-of-school-hours care services.	Number of children: Required area: Provided Area	112 789 795.3
109. Toilet and hygiene facilities The proposed development includes adequate, developmentally and age-appropriate toilet, washing and drying facilities for use by children being educated and cared for by the service. The location and design of the toilet, washing and drying facilities enable safe and convenient use by the children.	Show number of toilets and hand basins on plan	11 TOILET PANS 10 HAND WASH SINK

Table 2 - Assessment checklist

REGULATION	PROPOSED	COMPLIES (TICK OR CROSS)
110. Ventilation and natural light The proposed development includes indoor spaces to be used by children that — • will be well ventilated; and • will have adequate natural light; and • can be maintained at a temperature that ensures the safety and well-being of children.	Indicate on plans and elevations how natural ventilation and lighting is achieved.	✓
111. Administrative space The proposed development includes an adequate area or areas for the purposes of conducting the administrative functions of the service; and consulting with parents of children; and conducting private conversations. Note: This space cannot be included in the calculation of unencumbered indoor space – see Regulation 107.	Indicate administrative space on plans	✓
112. Nappy change facilities (To be completed only if the proposed development is for a service that will care for children who wear nappies) The proposed development includes an adequate area for construction of appropriate hygienic facilities for nappy changing including at least one properly constructed nappy changing bench and hand cleansing facilities for adults in the immediate vicinity of the nappy change area. The proposed nappy change facilities can be designed and located in a way that prevents unsupervised access by children.	Indicate nappy change on plans	✓ REFER TO PLANS
113. Outdoor space—natural environment The proposed development includes outdoor spaces that will allow children to explore and experience the natural environment.	Indicate on landscape plans	✓ REFER TO LANDSCAPE PLANS
114. Outdoor space—shade The proposed development includes adequate shaded areas to protect children from overexposure to ultraviolet radiation from the sun.	Indicate shade on landscape plans	✓ REFER TO PLANS
115. Premises designed to facilitate supervision The proposed development (including toilets and nappy change facilities) are designed in a way that facilitates supervision of children at all times, having regard to the need to maintain the rights and dignity of the children.	Indicate on floor plans	✓ REFER TO PLANS

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PROVISION OF CONSULTING ENGINEERING SERVICES

CHISHOLM PLAZA
20 HERITAGE DRIVE
CHISHOLM NSW 2322
STORMWATER MANAGEMENT PLAN REPORT

Prepared for: **Revelop Building and Developments Pty. Ltd.**
Suite 506, Level 5, 55 Phillip Street
PARRAMATTA NSW 2150

Prepared by: **Triaxial Consulting Pty Ltd**
Unit 1
3 Teamster Close
TUGGERAH NSW 2259

10 DECEMBER 2021

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Document Control

Client	**Revelop Building and Developments Pty. Ltd.**		
Prepared By:	Triaxial Consulting Pty Ltd		
Report Author	Benjamin Koopman		
File Reference:	TX15901.00-01.SWMP [0]		
Report Date:	10 December 2021		
Current Revision:	0		
Revision History:	**Report Author**	**Reviewed By**	**Report Date**
0	B.K	B.W	08/12/2021

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Revelop Building and Developments Pty. Ltd.
Suite 506, Level 5, 55 Phillip Street
PARRAMATTA NSW 2150

Re: Provision of Consulting Engineering Services
Chisholm Plaza 20 Heritage Drive, Chisholm NSW 2322
Stormwater Management Plan Report
Triaxial Reference: TX15901.00-01.SMPR

Revelop Building and Developments Pty. Ltd. (The Client) has engaged Triaxial Consulting to complete a conceptual Stormwater Management Plan and Report for the proposed Plaza Development at lot 1 DP 1224700, 20 Heritage Drive, Chisholm (Subject Site). Triaxial has prepared DA Engineering Drawings which should be referenced during review of this report. The Subject Site is located within the Maitland City Council LGA.

The Client proposes to construct a Commercial Center Plaza and associated infrastructure on the subject site as detailed in the architectural plans attached at Appendix A for reference. For developments of this type, Council requires stormwater to be managed both quantitatively and qualitatively prior to discharging into receiving water or receiving drainage infrastructure. This is to be undertaken both during and after construction and involves a number of modelling techniques to determine the measures required to achieve Council's targets outlined in their Manual of Engineering Standards and Development Control Plan.

During construction, implementation of water quality control as defined in the NSW Department of Housing Publication "Soils and Construction" (The Blue Book) is to be adopted to maximise the capture of sediments and minimise erosion of disturbed soils during the construction phase.

After construction, the development is expected to generate an increase in the amount of pollutants being transported by stormwater leaving the development. Council specifies within their Manual of Engineering Standards that pollutant reductions targets must be satisfied prior to approval of the development. The qualitative models prepared involved the inclusion of water quality improvement devices to treat stormwater runoff. These devices are detailed within the Triaxial Drawing Set accompanying this SMP Report. Modelling and designing of the On-Site Detention (OSD) was also carried out to address council's water quantity requirements.

This report summarises the modelling techniques employed, the results of the modelling, and provides recommendations of economical methods to achieve Council's design requirements. It will also provide a guideline to allow designers to provide detailed designs in the future.

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1. EXISTING SITE

The Subject Site is located on the Eastern alignment of Heritage Drive. It is bounded on the North and East by Tigerhawk Drive and Settlers Boulevard respectively. The site is zoned B1: Neighbourhood Centre and is shown below in figure 1.

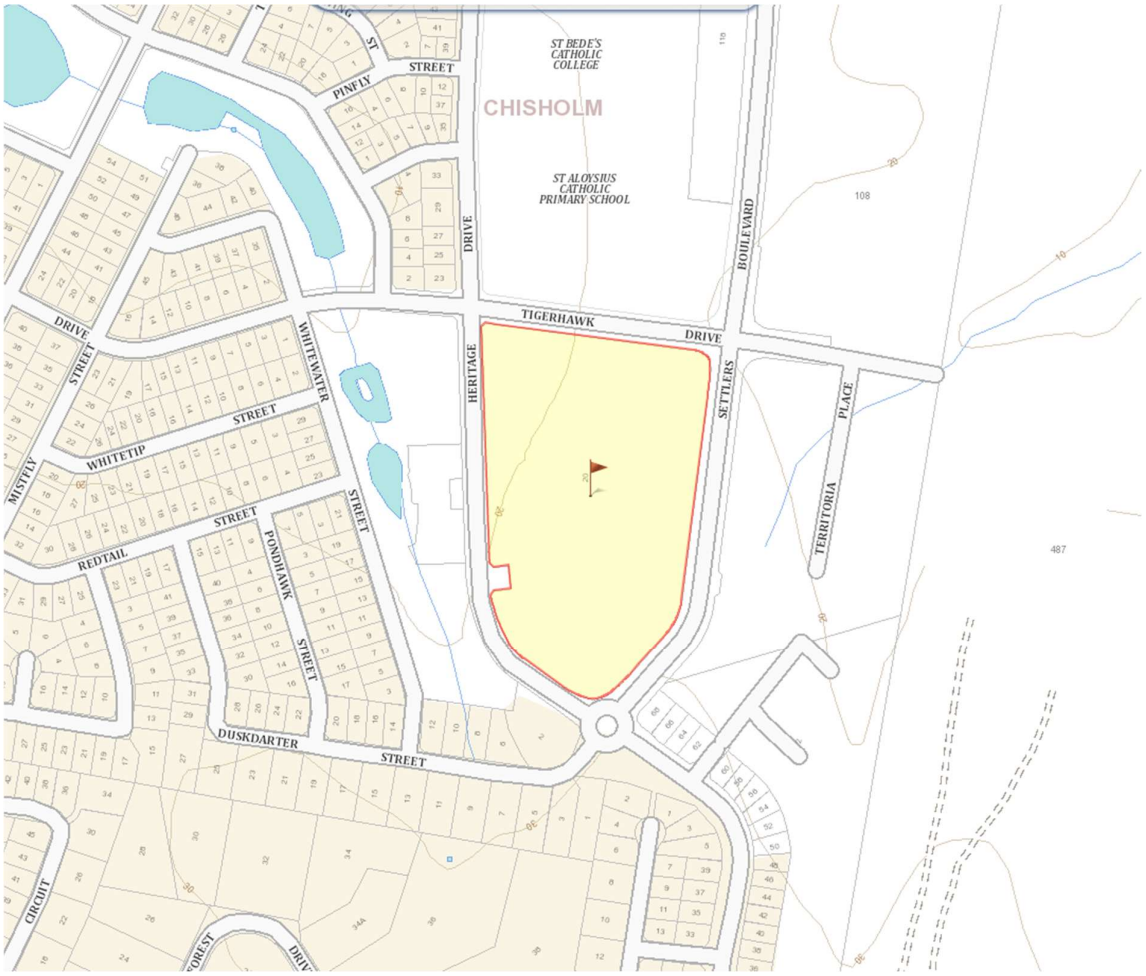

Figure 1 - Locality Map for 20 Heritage Drive, Chisholm NSW

(Source: https://maps.six.nsw.gov.au/)

The existing site is currently a vacant lot at shown on the detailed site survey attached at appendix B for reference. The Plaza development is proposed as Lot 11 of the site subdivision with future residential development to the proposed lot 12.

The existing natural ground exhibits a ridge line running North-South towards the eastern side of the lot. Gradients within the Subject Site are typically in the order of 4-6%, with slopes from the ridge line towards both the east and the west. The site contains no watercourses or major overland flows.

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2. STORMWATER MANAGEMENT

2.1. Hydraulic Design

Preliminary hydraulic design of the proposed stormwater network was carried out in order to size the various elements of the stormwater system. Generally proposed development sub-catchment areas were determined and catchment flow path lengths were adopted from the proposed site layout.

Piped systems were sized to cater for the design storm being the 5% AEP (Annual Exceedance Probability) storm as per AS3500.3 'Plumbing and Drainage', and upsized where necessary to ensure 1% AEP flows are captured and directed into the OSD system. Piped outlets from the recessed loading docks were upsized to cater for the 1% AEP flowrate. The loading dock catchment bypasses the OSD system to prevent excessive ponding in the loading dock area. The OSD system was designed in the form of below ground tanks and surface storage located within the proposed carparking areas.

2.2. On-site Detention

The objectives of council's onsite detention target are to ensure future development does not increase the impact of rainfall events and that the stormwater management design demonstrates a consideration for the existing capacity of the public drainage system. Council's OSD policy is to ensure that the pre-development peak site discharge is not exceeded by the calculated post-development peak site discharge for the 100% Annual Exceedance Probability (AEP), 10% AEP and 1% AEP rainfall events.

The OSD system was modelled using a runoff-routing method. Therefore, calculations were performed using the "DRAINS" program to model and design the OSD system. As discussed above, a ridge line in the existing site creates two distinct catchments on the site. Therefore, it was deemed necessary to provide a separate OSD system for each of the catchments.

In accordance with the manual of engineering standards, the DRAINS model prepared adopts a Soil Type of '3', grassed depression storage of 5mm and a paved depression storage of 1mm. A roughness coefficient (n*) of 0.17 was adopted for pervious (grassed) areas and 0.012 for impervious (paved) areas.

The Triaxial Drawing Set reflects the OSD system size and location as per the DRAINS modelling carried out. The DRAINS output results for the development site are included within appendix C. Table 1 below provides a summary of the DRAINS modelling for the development proposed.

Table 1 - Summary of DRAINS modelling results

Summary of Drains Modelling Results				
	Eastern Catchment		**Western Catchment**	
AR&R 2019 STORM EVENT	**Pre-Development Discharge (m^3/s)**	**Post-Development Discharge (m^3/s)**	**Pre-Development Discharge (m^3/s)**	**Post-Development Discharge (m^3/s)**
1% EY	0.034	0.034	0.057	0.057
10% AEP	0.240	0.239	0.513	0.511
1% AEP	0.535	0.492	1.280	1.040

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The low-level outlet for each tank was modelled as an orifice plate in order to tune the peak site discharge in the 1EY event to pre-development levels. High level piped outlets were also utilised to minimise overall tank volume whilst limiting peak site discharge to pre-development levels. High level weir overflows were utilised in order to control the 1% AEP storm event and limit surface ponding in the carpark to below 200mm as required in the Manual of Engineering Standards.

None of the predevelopment peak flows calculated are exceeded by the post development peak flows calculated for the proposal. Therefore, the requirements of Council have been achieved economically with regard to the quantitative measure's requirements.

2.3. Stormwater Quality

Stormwater quality was also managed in accordance with Council's Manual of Engineering Standards for developments. Rainwater reuse tanks were included into the model for the purposes of outdoor irrigation and non-potable usage, reuse rates were calculated to be approximately 5kL per day. Due to the client's water efficiency objectives, additional rainwater storage is to be provided in the form of 5x34,000L rainwater tanks.

Rainwater re-use tanks are to be installed with first-flush diverters, which capture the initial flow of stormwater from the roof areas, expected to contain the majority of pollutant runoff. The OSD tanks were also incorporated in the model for their storage properties to aid in the capture of suspended solids. Proprietary trash racks were added to the outlet structures of each tank to capture gross pollutants. It was also deemed necessary to incorporate bioretention basins to aid in the reduction of nitrogen and phosphates.

Figure 2 - MUSIC Model Schematic

Figure 2 above shows the MUSIC model schematic adopted for the simulation, the resulting pollutant reductions in regards to council's targets are summarised below in table 2.

A Detailed summary of the MUSIC modelling results can be found in Appendix D.

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Table 2 - MUSIC Model Results

Pollutant	Target	Reduction
Total Suspended Solids (TSS)	80%	81.6%
Total Phosphorus (TP)	45%	67.7%
Total Nitrogen (TN)	45%	45.0%
Gross Pollutants (GP)	70%	99.7%

2.4. Sediment and Erosion Control

During construction, the implementation of water quality control as defined in the NSW Department of Housing Publication "Soils and Construction" (The Blue Book) is to be adopted, to maximise the capture of sediments and minimise erosion of disturbed soils during the construction phase. Under the Blue Book guidelines, if an area of up to 2,500m^2 of disturbance is proposed, sediment basin calculations are not required to be undertaken. Furthermore, if an area of greater than 2,500m^2 of disturbance can be shown to expect an annual soil loss of less than 150m^3, under the RUSLE method, a sediment basin is also deemed unnecessary. As the total maximum disturbed area of the works exceeds 2,500m^2, detailed RUSLE calculations were performed.

The soil landscape mapping available on the NSW Government eSPADE website was consulted for the subject site. Group C and B soil hydrologic group was adopted for calculations as the site is located in Beresfield (be) soil landscape. The formation contains type D and F sediment types with k-factors ranging from 0.017 to 0.048.

The RUSLE calculations performed result in an expected worst case soil loss of 240 tonnes per hectare annually (t/Ha/yr) for the Eastern catchment, equating to a soil loss class of '*3 – LOW-MOD*', a maximum soil loss of 185 (m^3/Ha/yr) and sediment basin storage volume of 30m^3. For the Western catchment a worst-case soil loss of 329 t/Ha/yr was calculated using the RUSLE method, with a corresponding soil loss class of '*3 – LOW-MOD*', a soil loss of 253 m^3/Ha/yr and a minimum sediment basin volume of 146m^3.

A settling zone volume of 59m^3 was calculated for the Eastern sediment basin, therefore the sediment basin servicing the eastern catchment of the site is to have a total volume of 89m^3. A settling zone volume of 146m^3 was calculated for the Western sediment basin, therefore the sediment basin servicing the Western catchment of the site is to have a total volume of 352m^3. Detailed sediment basin calculations are detailed on the conceptual erosion and sediment control plans within the drawing set.

The Blue Book's standard details for Type D and F sediment basins (Drawing SD6-4, p. 6-19) show than the type "*Earth Basin – Wet*" is required, as shown on the RGH Drawing Set. This type of sediment basin does not require a riser outlet and any maintenance procedures should be undertaken as follows:

- Regular flocculation and pumped removal of the sediment basin stored water to discharge as clean water into the existing watercourses adjacent to the ponds.
- Flocculation and pumping to occur after each storm event.
- After pumping, siltation and gross litter build up to be mechanically removed in preparation for the next storm and disposed of appropriately and accordingly.

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Standard Blue Book details and provisions have been provided within the Triaxial Drawing Set and are specified to be installed during the construction phase of the project. It is considered that the sediment and erosion control measures detailed on the drawing set will adequately capture siltation and control sedimentation carried by stormwater to acceptable standards during the construction period.

2.5. Stormwater System Maintenance

The stormwater drainage system will need to be inspected and maintained at regular intervals. It is recommended that monitoring and recording of the performance of the stormwater system be undertaken regularly over a period of one year until such time as typical maintenance periods can be established. Initially, it is recommended that inspections be conducted at quarterly intervals and after large rainfall events until a suitable baseline can be estimated. Suitable intervals for maintenance work to be undertaken can then be programmed.

The OSD and bioretention systems and outlets should be cleared of debris whenever the site is visited by maintenance staff to ensure it functions as required. The bioretention basins should be cleared of foreign plant species. Table 2 below provides a schedule of maintenance procedures for the stormwater system.

Table 3 - Operation and Maintenance Intervals and Procedures

Item	Inspection Interval	Maintenance Interval	Task/Procedure
Pits and Pipes Network	Yearly	As required / Yearly	Remove and Dispose of Debris from Item
OSD and Outlet	Yearly	As required / Yearly	De-silt and Disposal of sediment
Rainwater Re-Use Tank	Yearly	5 Years Maximum	De-sludge and dispose of sediment
Bioretention Basins	Quarterly	5 Years Maximum	Replace sand filter media

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3. CONCLUSIONS AND RECOMMENDATIONS

Revelop Building and Developments Pty. Ltd. has engaged Triaxial Consulting to complete a conceptual Stormwater Management Plan and Report for the proposed Plaza development at the subject site. Triaxial has prepared DA Engineering Drawings which should be referenced during review of this report. The Subject Site is located within the Maitland City Council LGA.

Management of stormwater is to occur both during and after construction. During construction, implementation of water quality control as defined in the NSW Department of Housing Publication "*Soils and Construction*" (The Blue Book) is to be adopted to maximise the capture of sediments and minimise erosion of disturbed soils during the construction phase. After construction, the inclusion of water quality improvement devices is needed to treat stormwater runoff to acceptable levels before discharging to the receiving drainage infrastructure.

The water quantity control was managed by providing On-Site Detention (OSD) systems to reduce the rate of stormwater runoff in the post-development condition from the Subject Site to be equal or less than the rates for the pre-development existing condition. The OSD systems were provided as a combination of below ground tanks and surface storage within the proposed carpark.

This report has summarised the modelling techniques employed, the results of the modelling, and subsequently presented the most economical method to achieve Council's design requirements. Therefore, it is the recommendation of Triaxial that the stormwater management measures suggested and described within this report and upon the Triaxial Drawing Set be implemented in order to satisfy Council's requirements for the development. We trust this report meets your current requirements and should you wish to discuss the matter further please do not hesitate to contact the undersigned.

Yours faithfully,

TRIAXIAL CONSULTING

Benjamin Koopman
Civil Engineer
B.Eng.(Civil)(Hons) | GradIEAust.

Reviewed,

Ben Williams
Civil Team Leader
BE (Hons) | MIEAust.

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4. REFERENCES

NSW Department of Housing, ***"Soils and Construction"***, Vol.1, 4th Edition, 2004.

Pilgrim, D.H., ***"Australian Rainfall and Runoff"***, Engineers Australia, 2019.

Standards Australia, ***"AS3500.3 – Plumbing and Drainage"***, 2018.

Maitland City Council, ***"Manual of Engineering Standards"***

BMT WBM, **"NSW MUSIC Modelling Guidelines"**, August 2015.

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APPENDIX A – ARCHITECTURAL PLANS (BN ARCHITECTURE)

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DEVELOPMENT APPLICATION
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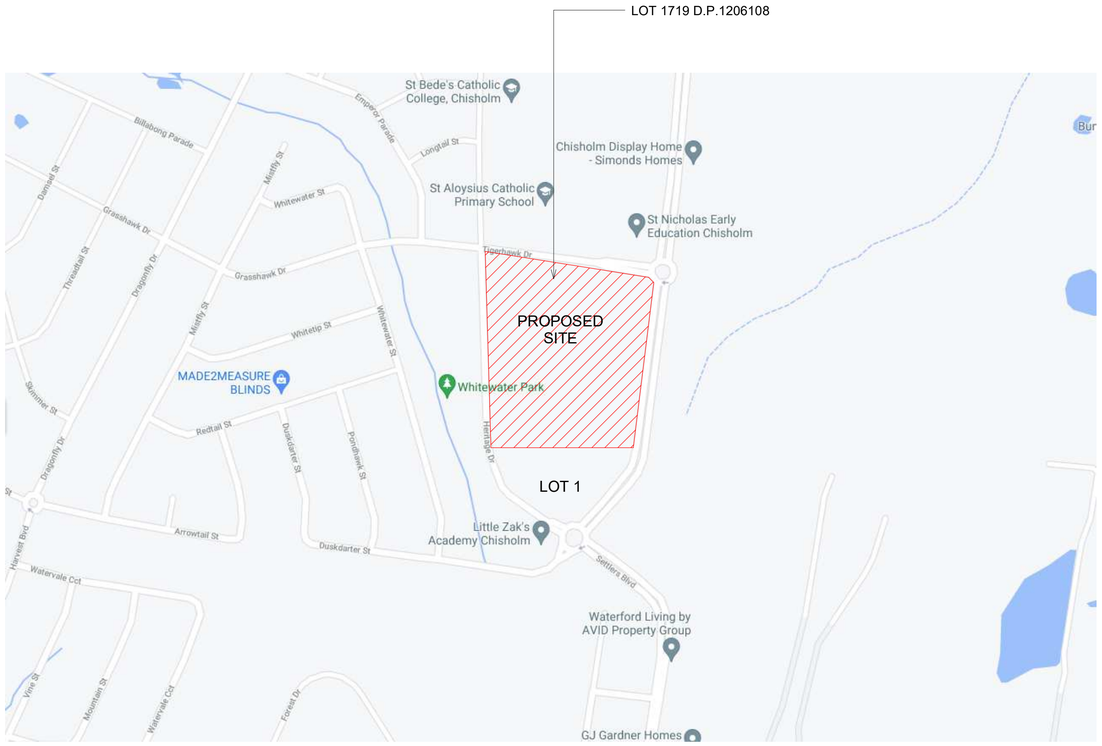
PROPOSED SHOPPING CENTRE

DEVELOPMENT APPLICATION

WATERFORD COUNTY
CHISHOLM NSW 2322



DRAWING LIST DA		
GROUP	**Sheet Number**	**Sheet Name**
	A100.01	PROPOSED MATERIAL BOARD
A00 SERIES - INFORMATION AND ANAYLYSIS		
A00 SERIES - INFORMATION AND ANAYLYSIS	A00.01	TITLE SHEET, LOCATION PLAN & DRAWING LIST
A00 SERIES - INFORMATION AND ANAYLYSIS	A00.05	SITE ANALYSIS
A00 SERIES - INFORMATION AND ANAYLYSIS	A00.20	GLAR & CARPARKING ANALYSIS
A00 SERIES - INFORMATION AND ANAYLYSIS	A00.80	SOLAR STUDY
A02 SERIES - GENERAL SITEPLANS		
A02 SERIES - GENERAL SITEPLANS	A02.01	PROPOSED SITE PLAN
A06 SERIES - FLOOR PLANS		
A06 SERIES - FLOOR PLANS	A06.01	PROPOSED BASEMENT FLOOR PLAN
A06 SERIES - FLOOR PLANS	A06.02	PROPOSED GROUND FLOOR PLAN
A06 SERIES - FLOOR PLANS	A06.03	PROPOSED ROOF PLAN
A06 SERIES - FLOOR PLANS	A06.04	PROPOSED CHILDCARE PLAN
A10 SERIES - ELEVATIONS		
A10 SERIES - ELEVATIONS	A10.01	NORTH ELEVATION
A10 SERIES - ELEVATIONS	A10.02	SOUTH ELEVATION
A10 SERIES - ELEVATIONS	A10.03	EAST ELEVATION
A10 SERIES - ELEVATIONS	A10.04	WEST ELEVATION
A10 SERIES - ELEVATIONS	A10.05	TIGERHAWK DRIVE STREET VIEW
A10 SERIES - ELEVATIONS	A10.09	ELEVATION CHILDCARE
A11 SERIES - SECTIONS		
A11 SERIES - SECTIONS	A11.01	SECTION 1
A11 SERIES - SECTIONS	A11.02	SECTION 2
A11 SERIES - SECTIONS	A11.03	SECTION 3
A11 SERIES - SECTIONS	A11.04	SECTIONS CHILDCARE
A80 SERIES - 3D VISUALISATIONS & PERSPECTIVES		
A80 SERIES - 3D VISUALISATIONS & PERSPECTIVES	A80.01	3D VISUALIZATION
A80 SERIES - 3D VISUALISATIONS & PERSPECTIVES	A80.02	PERSPECTIVES SHEET 1
A80 SERIES - 3D VISUALISATIONS & PERSPECTIVES	A80.03	PERSPECTIVES SHEET 2

REVELOP

CHISHOLM SHOPPING CENTRE
HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
E	05-10-2021	DA ISSUE
F	21-10-21	FOR REVIEW
G	08-11-21	FOR REVIEW

TITLE SHEET, LOCATION PLAN & DRAWING LIST

A00.01 DA G
1:NTS @ A1
1:NTS @ A3

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Crows Nest, NSW 2065
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DEVELOPMENT APPLICATION

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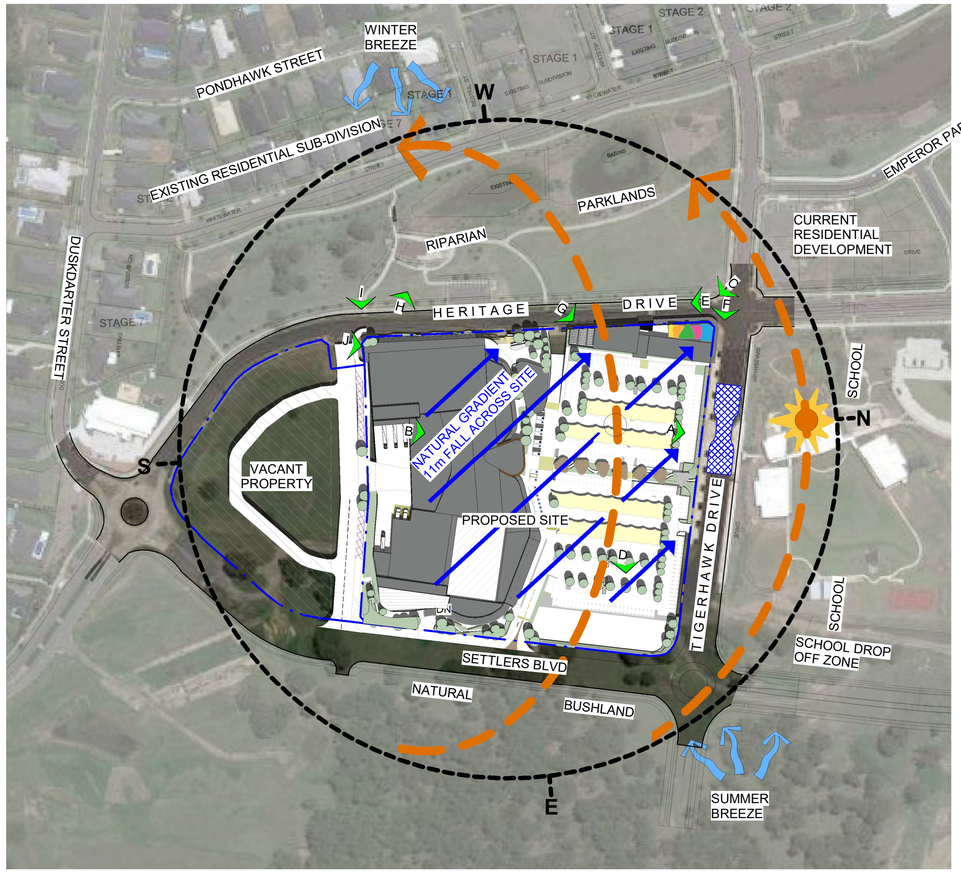
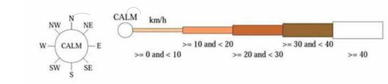
SITE ANALYSIS

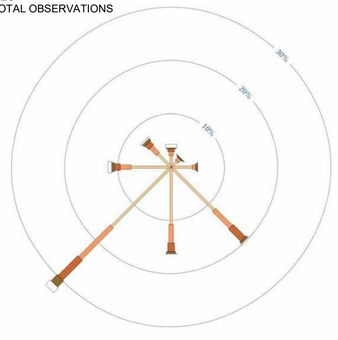


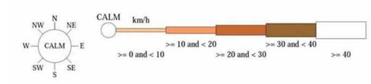
WIND ROSE - MAITLAND VISITORS CENTRE
READING TAKEN FROM CLOSEST STATION AT MAITLAND VISITORS SENTRE



3 PM DEC
1595 TOTAL OBSERVATIONS

CALM*





3 PM JUN
1595 TOTAL OBSERVATIONS

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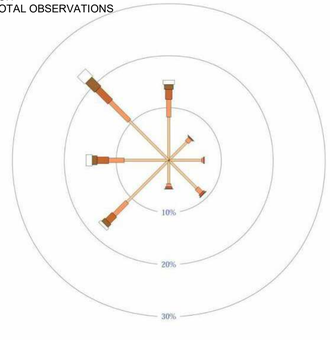
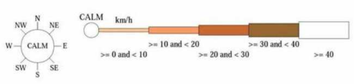
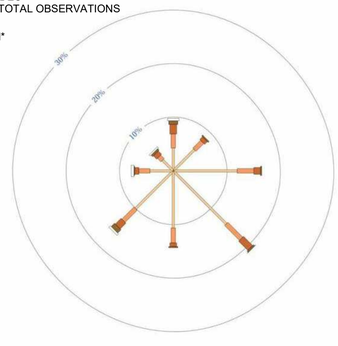
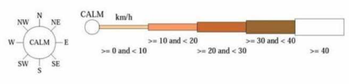




9 AM DEC
1609 TOTAL OBSERVATIONS

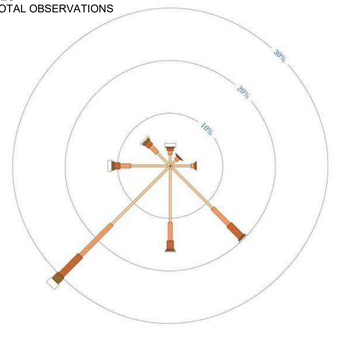
CALM*





3 PM DEC
1595 TOTAL OBSERVATIONS

CALM*



CONTEXT PHOTOS

A) NORTHERN VIEW FROM PROPOSED SITE

B) NORTHERN VIEW FROM SOUTH OF PROPOSED SITE

C) SOUTH EAST VIEW FROM CORNER OF TIGERHAWK AND HERITAGE DRIVE

D) EASTERN VIEW FROM PROPOSED SITE OF NATURAL BUSHLAND

E) SOUTH EAST VIEW FROM CORNER OF TIGERHAWK AND HERITAGE DRIVE

F) EASTERN VIEW FROM CORNER OF TIGERHAWK AND HERITAGE DRIVE

G) NORTH EASTERN VIEW FROM HERITAGE DRIVE

H) NORTH WESTERN VIEW OF RIPARIAN PARKLANDS FROM HERITAHE DRIVE

I) EASTERN VIEW OF PROPOSED SITE FROM HERITAGE DRIVE

J) NORTHERN VIEW OF PROPOSED SITE FROM THE PROPOSED DRIVEWAY

REVELOP

CHISHOLM SHOPPING CENTRE
HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
B	14-09-2021	DA ISSUE
C	05-10-2021	DA ISSUE
D	21-10-21	FOR REVIEW
E	08-11-21	FOR REVIEW

SITE ANALYSIS

A00.05 DA E
1:NTS @ A1
1:NTS @ A3

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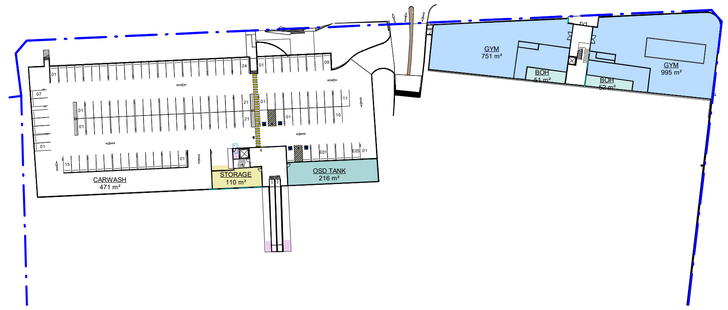
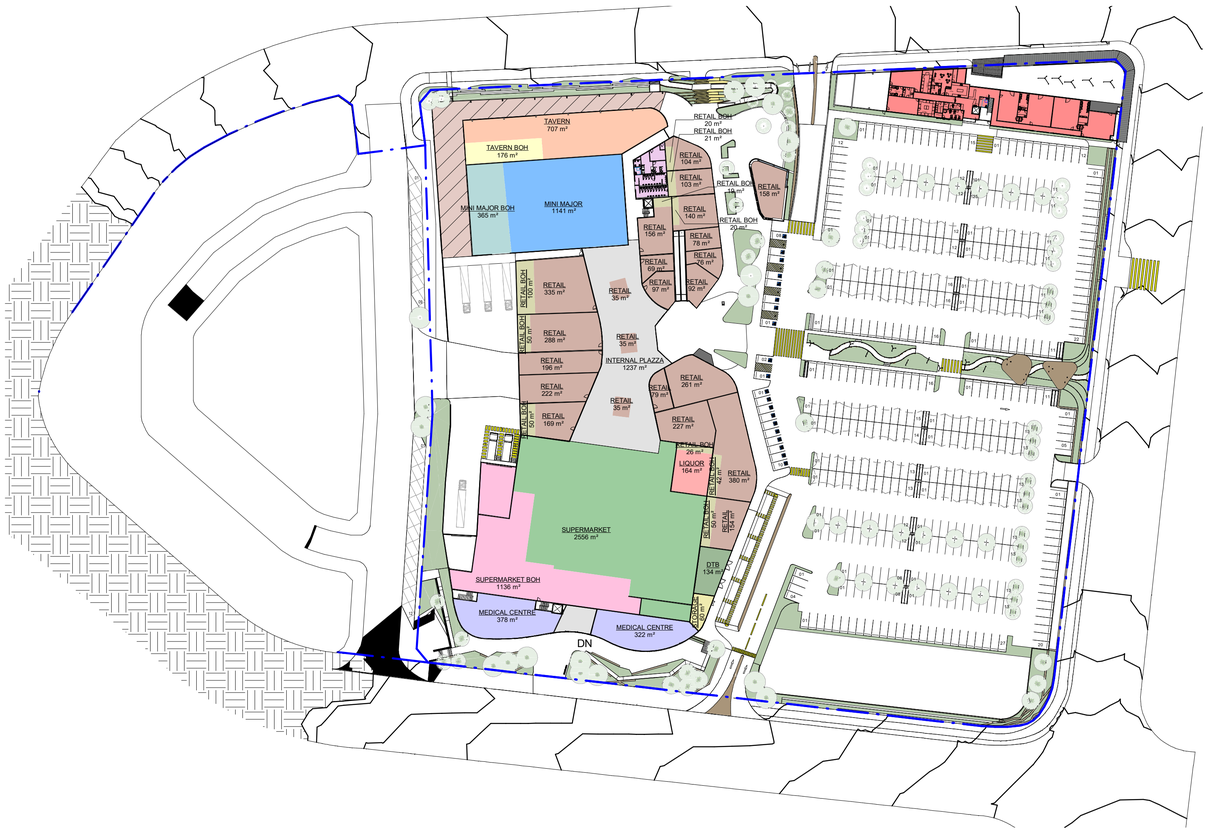


1 BASEMENT
1 : 1000



2 GROUND FLOOR(1)
1 : 1000

- AMENITIES
- BOH
- CARWASH
- CHILDCARE
- DTB
- GYM
- INTERNAL PLAZZA
- LIQUOR
- MEDICAL CENTRE
- MINI MAJOR
- MINI MAJOR BOH
- OSD TANK
- RETAIL
- RETAIL BOH
- SERVICE
- STORAGE
- SUPERMARKET
- SUPERMARKET BOH
- TAVERN
- TAVERN BOH

CAR PARKING SCHEDULE

PROPOSED BASEMENT LEVEL

CARPARKING 5400X 2600	116
DISABLED 5400X 2600	4
EV PARKING 5400X 2600	5
BIKE PARKING 5400X 2600	4
GRAND TOTAL	129

PROPOSED GROUND LEVEL

CARPARKING 5400X 2600	537
DISABLED 5400X 2600	10
PARENTS 5400X 2700	10
GRAND TOTAL	557

Area Schedule		
Name	Area	
1		BOH AREA
LIQUOR	164 m²	
MINI MAJOR	1141 m²	365 m²
RETAIL	3491 m²	398 m²
SUPERMARKET	2556 m²	1136 m²
TAVERN	707 m²	176 m²
1: 28	8060 m²	2074 m²
2		
CHILDCARE	875 m²	
GYM	1747 m²	
MEDICAL CENTRE	700 m²	
2: 5	3322 m²	
3		
AMENITIES	198 m²	
INTERNAL PLAZZA	1328 m²	
3: 5	1526 m²	
Grand total: 38	12908 m²	

SITE AREA	43,940m²
PROPOSED FSR	1:0.29
REQUIRED FSR	1:0.30

TROLLEY CORRAL SCHEDULE			
DESCRIPTION	No. OF TROLLY BAY	TROLLEYS PER BAY	No.OF TROLLEYS
1000 x 3000	33		
PROPOSED BASEMENT LEVEL			
SINGLE TROLLEY BAY	4	15	30
PROPOSED GROUND LEVEL			
SINGLE TROLLEY BAY	2	15	540
DOUBLE TROLLEY BAY	16	30	480
Grand total			

REVELOP

CHISHOLM SHOPPING CENTRE
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GLAR & CARPARKING ANALYSIS

A00.20 DA F
1:1000 @ A1
1:2000 @ A3

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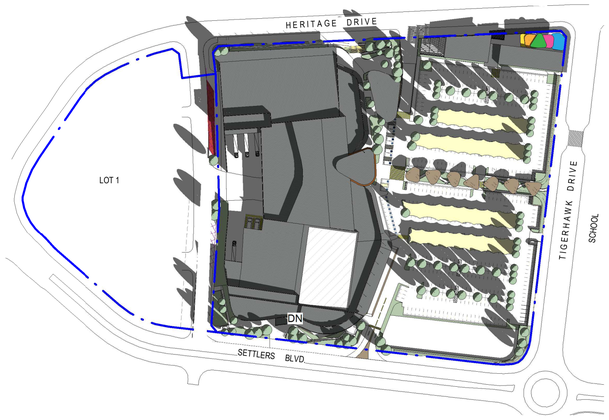
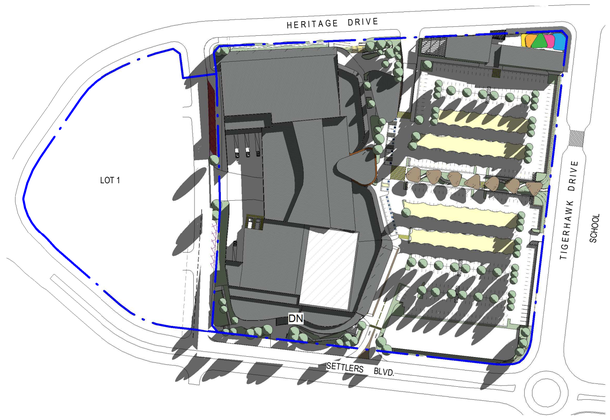
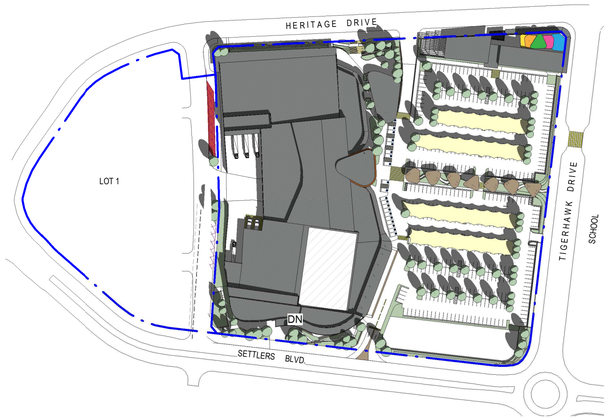


1 WINTER SOLSTICE-9AM
1 : 2000

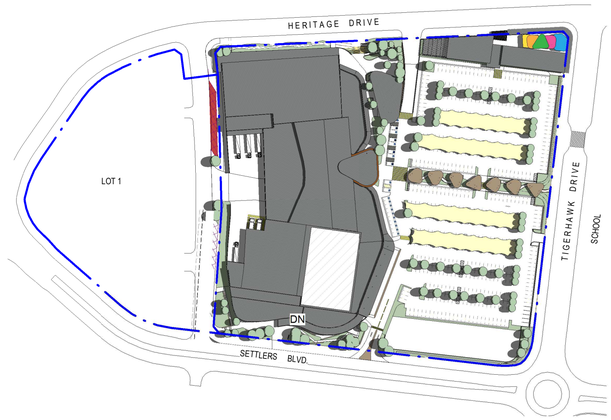
2 WINTER SOLSTICE-12PM
1 : 2000



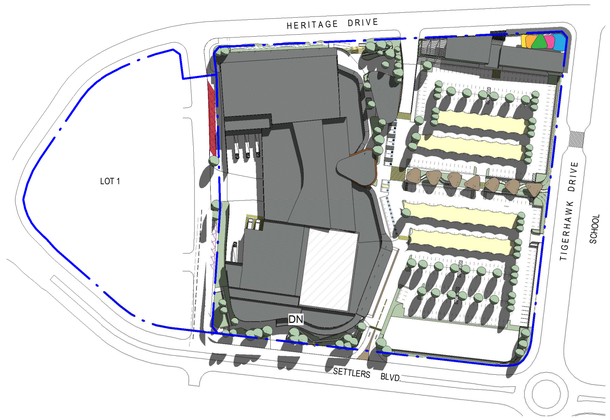
3 WINTER SOLSTICE-3PM
1 : 2000



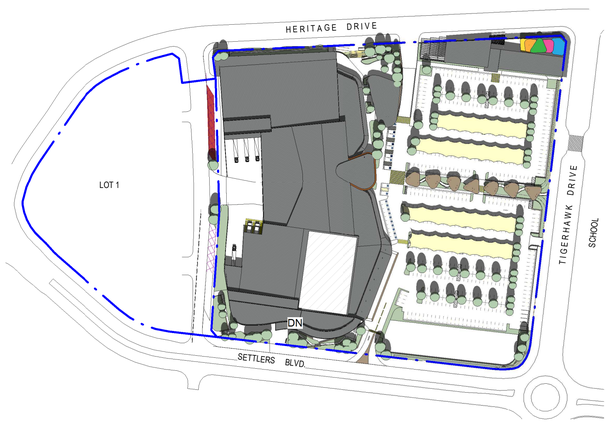
4 EQUINOXES-9AM
1 : 2000



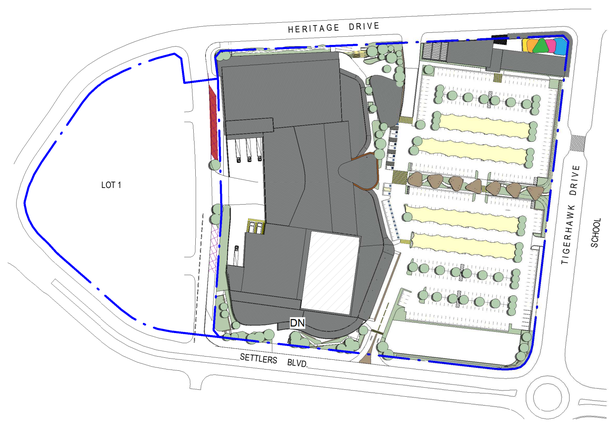
5 EQUINOXES-12PM
1 : 2000



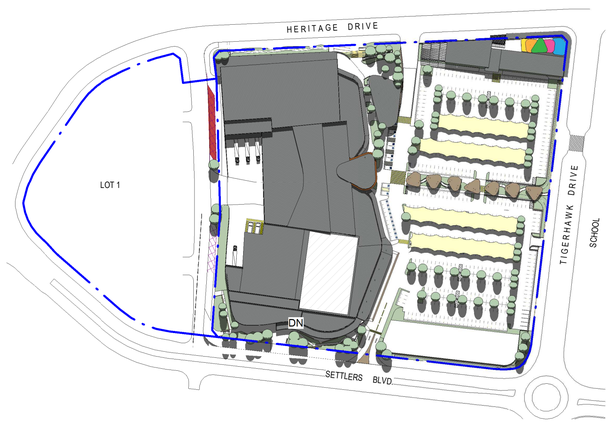
6 EQUINOXES-3PM
1 : 2000



7 SUMMER SOLSTICE-9AM
1 : 2000



8 SUMMER SOLSTICE-12PM
1 : 2000



9 SUMMER SOLSTICE-3PM
1 : 2000

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
C	21-09-2021	DA ISSUE
D	05-10-2021	DA ISSUE
E	21-10-21	FOR REVIEW
F	08-11-21	FOR REVIEW

SOLAR STUDY

A00.80 DA F

1:2000 @ A1
1:4000 @ A3

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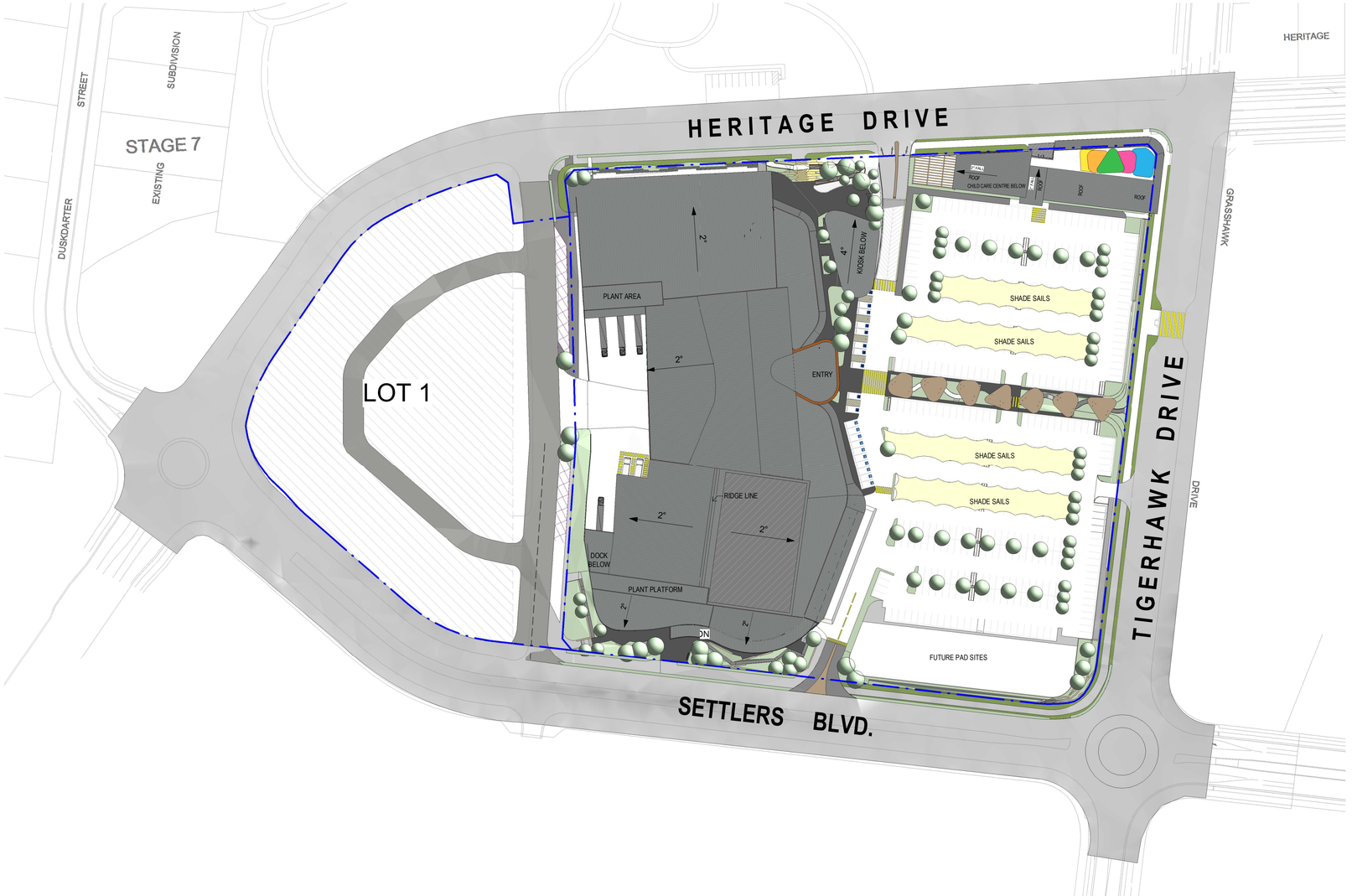

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
C	21-09-2021	DA ISSUE
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PROPOSED SITE PLAN

A02.01 DA F
1:1000 @ A1
1:2000 @ A3

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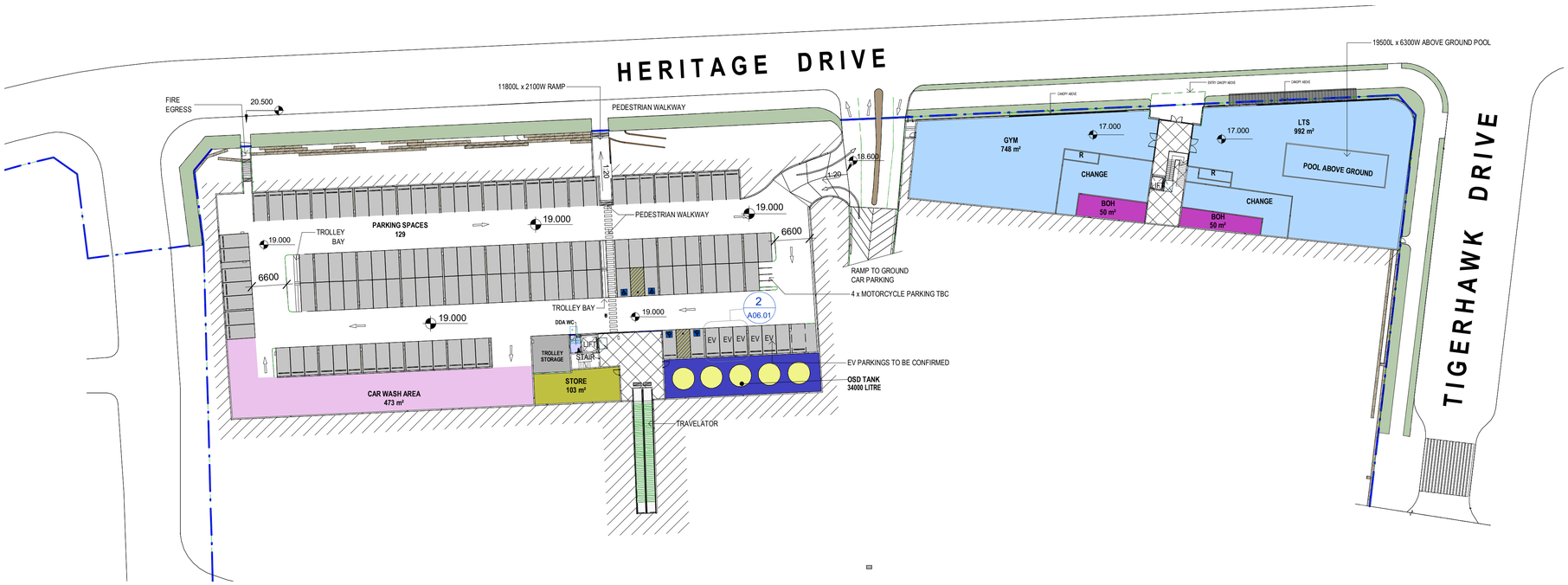
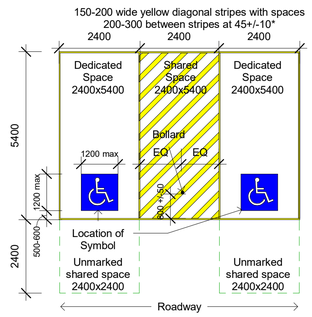


1 PROPOSED BASEMENT FLOOR PLAN
1 : 500



2 TYP. ACCESSIBLE PARKING BAY DETAIL
1 : 100

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
D	05-10-2021	DA ISSUE
E	21-10-21	FOR REVIEW
F	03-11-21	FOR REVIEW
G	08-11-21	FOR REVIEW

PROPOSED BASEMENT FLOOR PLAN AND MEZZANINE FLOOR PLAN

A06.01 DA G
1:500 @ A1
1:1000 @ A3

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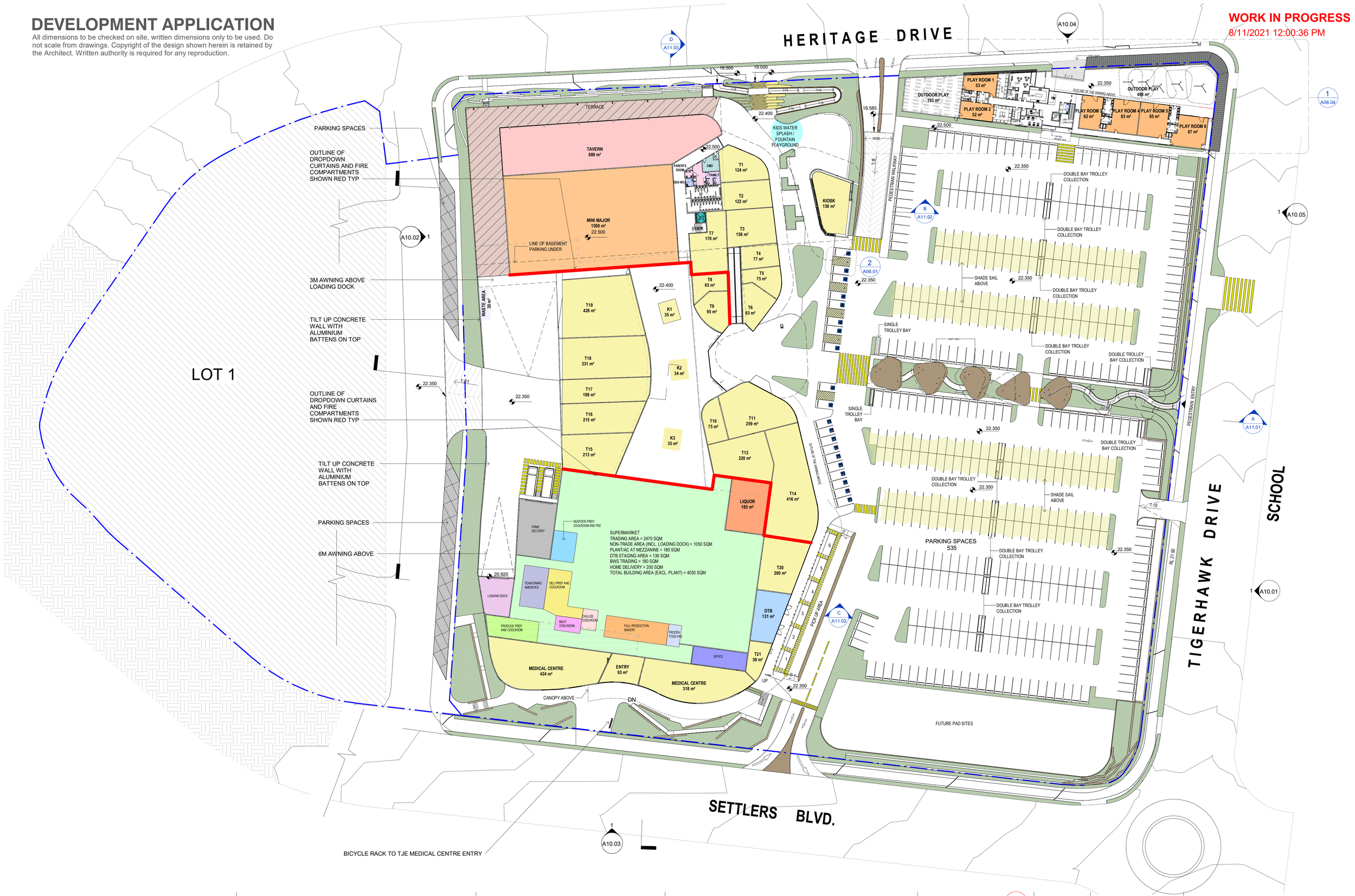

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
D	21-09-2021	DA ISSUE
E	21-10-21	FOR REVIEW
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G	08-11-21	FOR REVIEW

PROPOSED GROUND FLOOR PLAN

A06.02 DA G

1:500 @ A1
1:1000 @ A3

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WORK IN PROGRESS
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REVELOP

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D	21-10-21	FOR REVIEW
E	08-11-21	FOR REVIEW

PROPOSED ROOF PLAN

A06.03 DA E
1:200 @ A1
1:400 @ A3

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WORK IN PROGRESS
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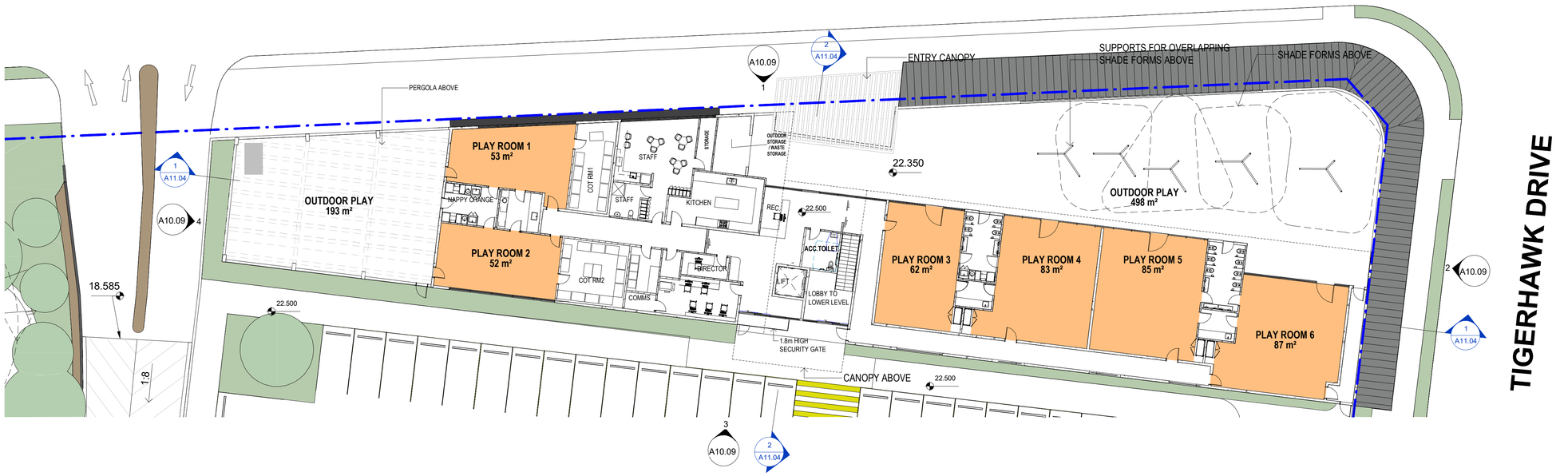
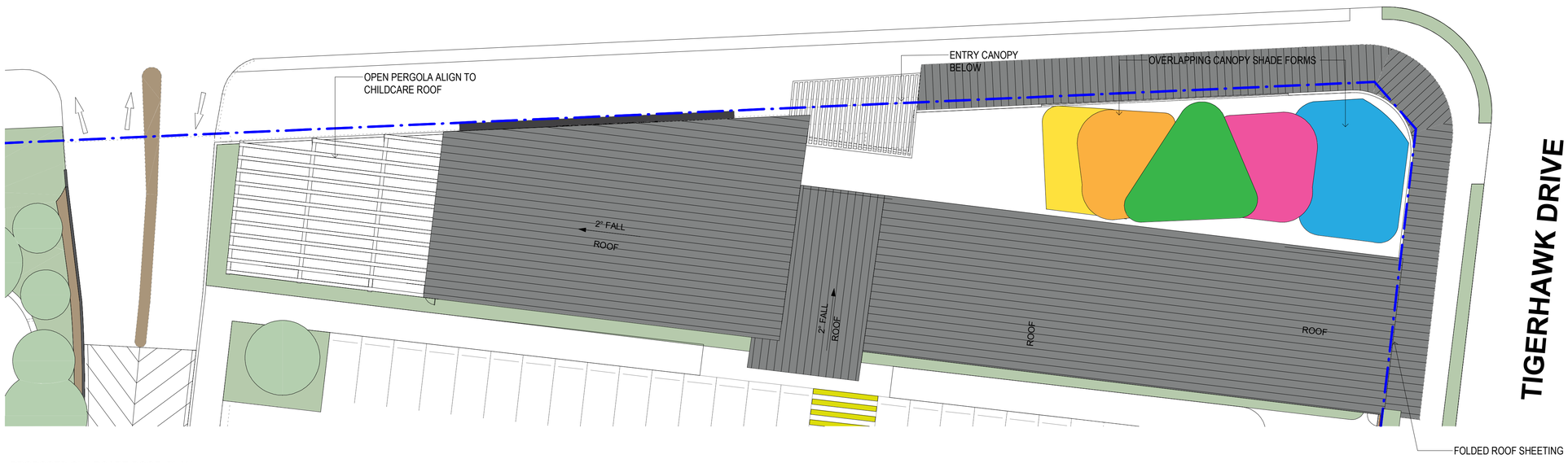


1 PROPOSED CHILDCARE GROUND FLOOR PLAN
1 : 200



2 PROPOSED CHILDCARE ROOF PLAN
1 : 200

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

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PROPOSED CHILDCARE PLAN

A06.04 DA E
1:200 @ A1
1:400 @ A3

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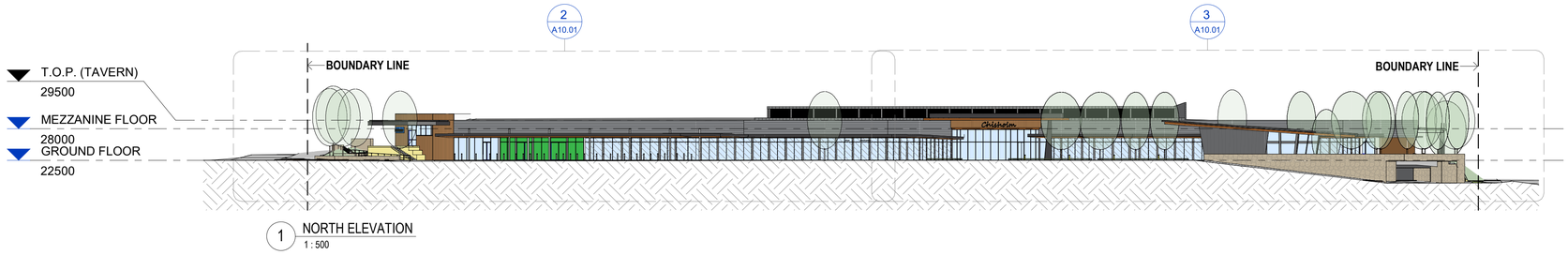
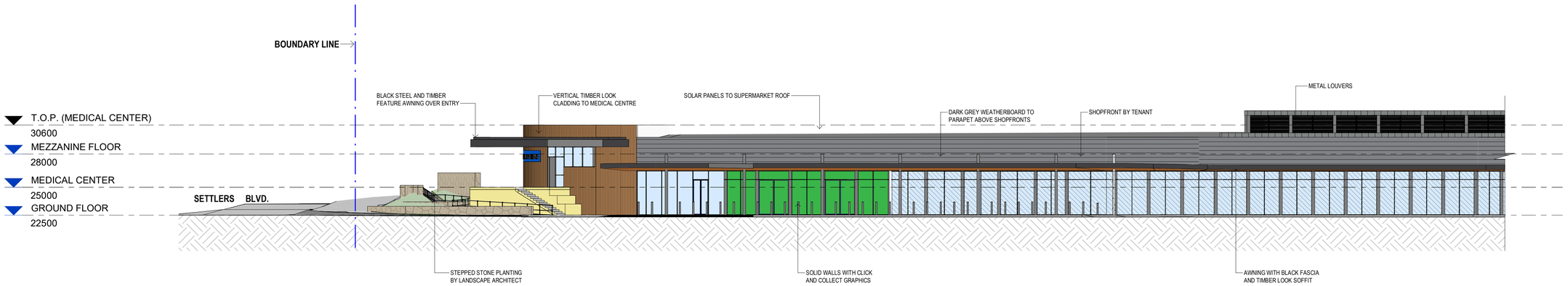
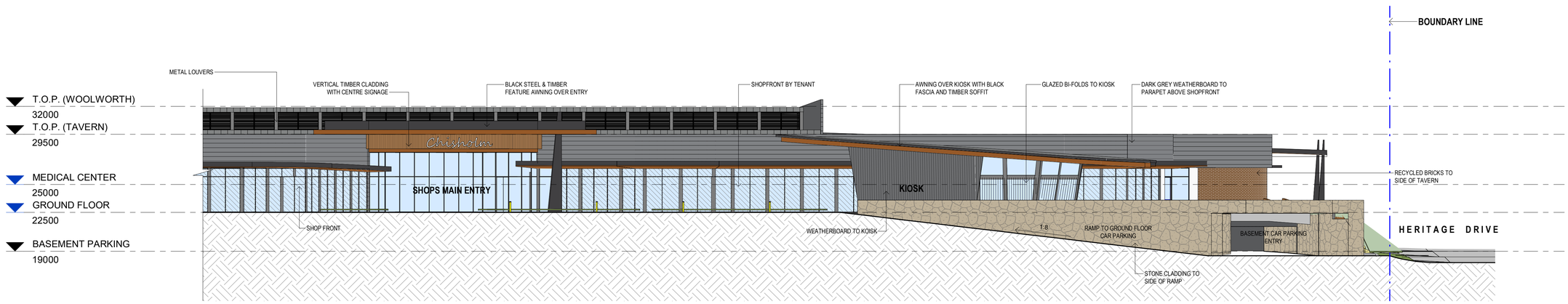


1 NORTH ELEVATION
1 : 500



2 NORTH ELEVATION PART 1
1 : 200



3 NORTH ELEVATION PART 2
1 : 200

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

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C	21-09-2021	DA ISSUE
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NORTH ELEVATION

A10.01 DA F
1:200 @ A1
1:400 @ A3

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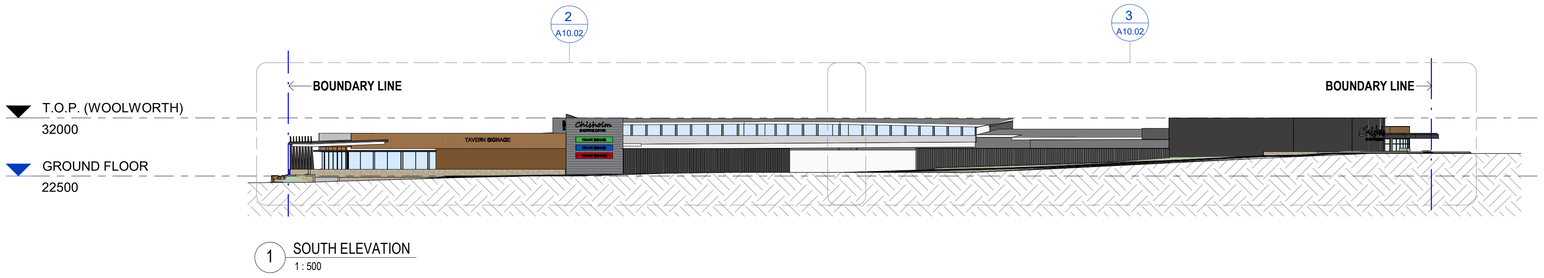
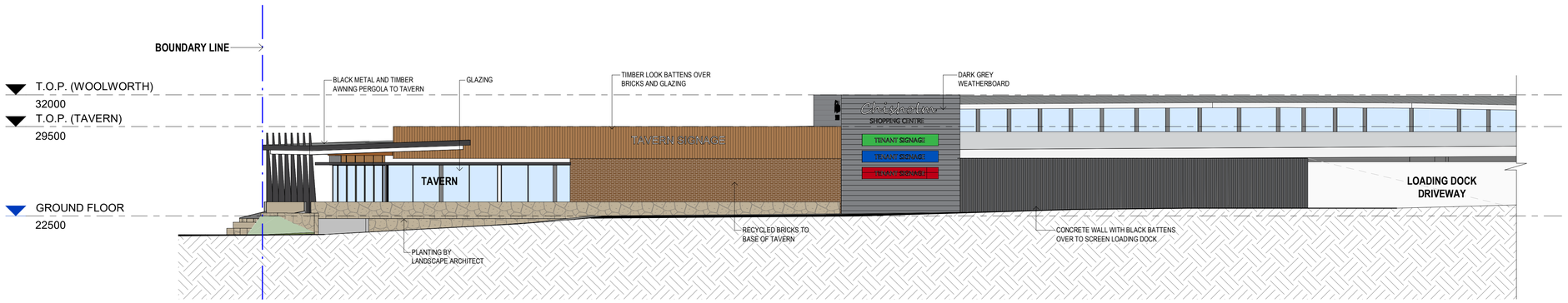
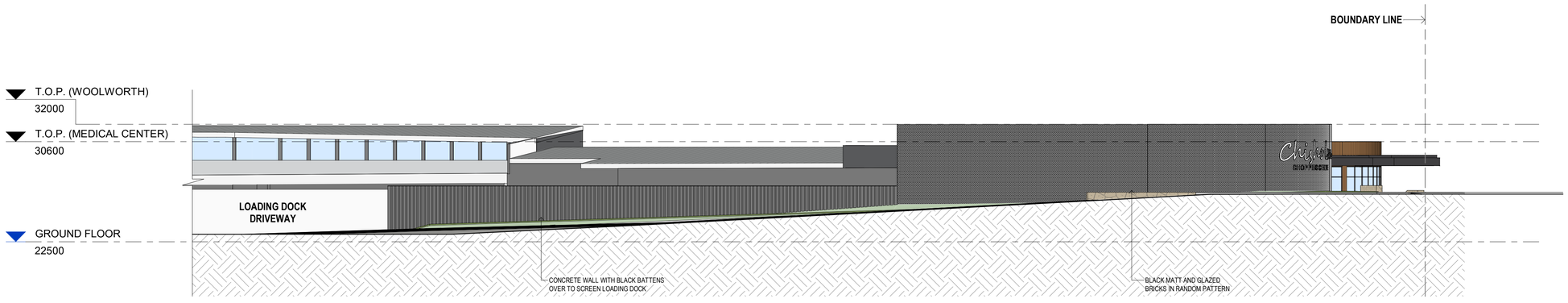


1 SOUTH ELEVATION
1 : 500



2 SOUTH ELEVATION PART 1
1 : 200



3 SOUTH ELEVATION PART 2
1 : 200

REVELOP

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HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

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E	21-10-21	FOR REVIEW
F	08-11-21	FOR REVIEW

SOUTH ELEVATION

A10.02 DA F
@ A1
@ A3

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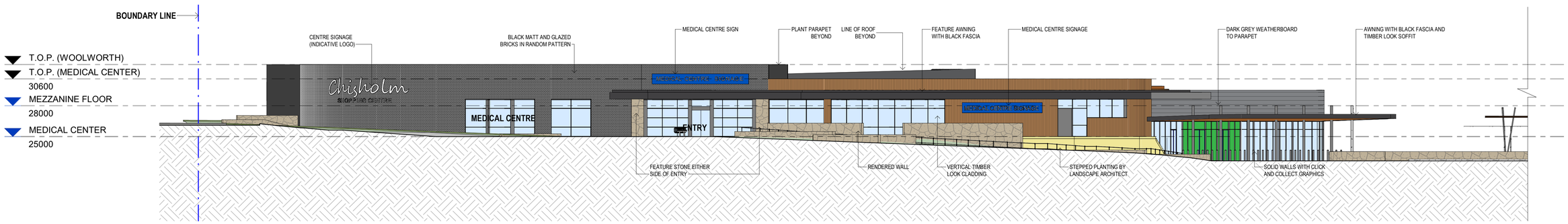
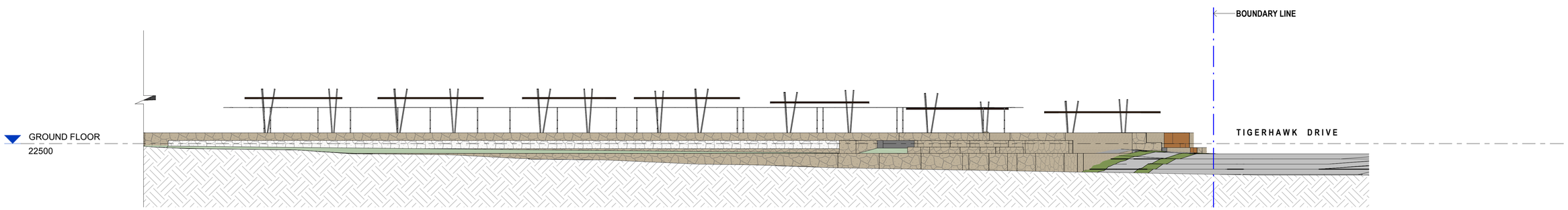
1 EAST ELEVATION
1 : 500



2 EAST ELEVATION PART 1
1 : 200



3 EAST ELEVATION PART 2
1 : 200

REVELOP

CHISHOLM SHOPPING CENTRE

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ISSUE	DATE	DESCRIPTION
C	21-09-2021	DA ISSUE
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E	21-10-21	FOR REVIEW
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EAST ELEVATION

A10.03 DA F
1:200 @ A1
1:400 @ A3

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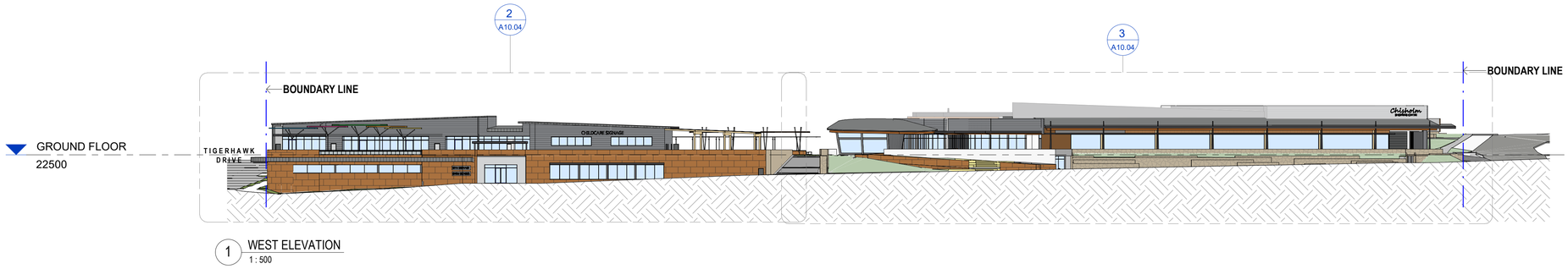
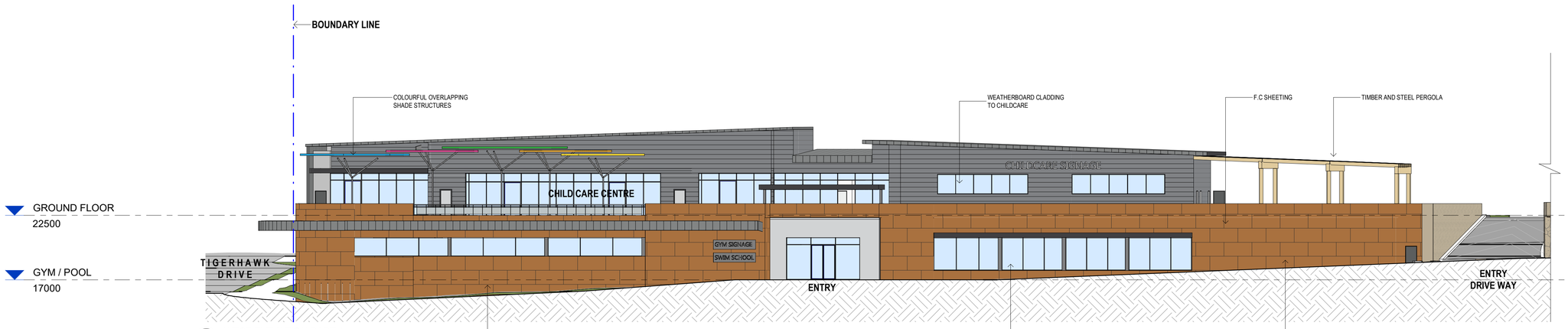
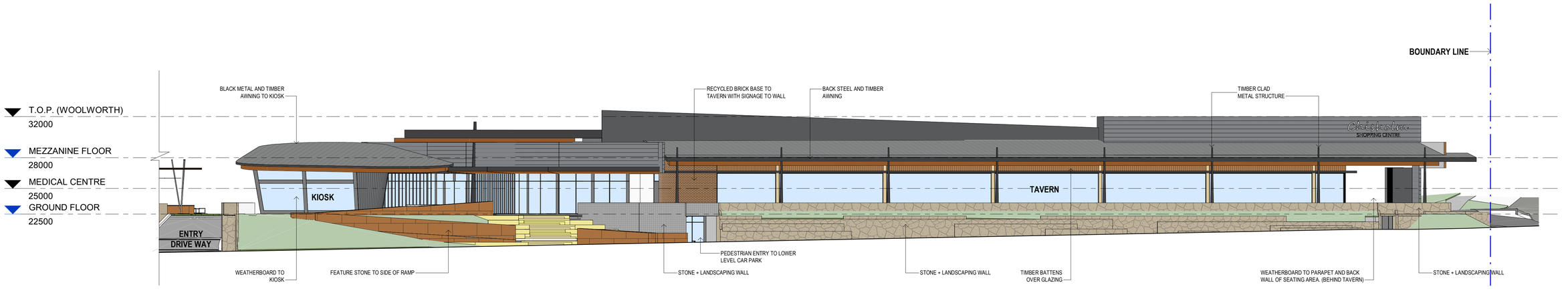


1 WEST ELEVATION
1 : 500



2 WEST ELEVATION PART 1
1 : 200



3 WEST ELEVATION PART 2
1 : 200

REVELOP

CHISHOLM SHOPPING CENTRE

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ISSUE	DATE	DESCRIPTION
D	05-10-2021	DA ISSUE
E	21-10-21	FOR REVIEW
F	03-11-21	FOR REVIEW
G	08-11-21	FOR REVIEW

WEST ELEVATION

A10.04 DA G
1:200 @ A1
1:400 @ A3

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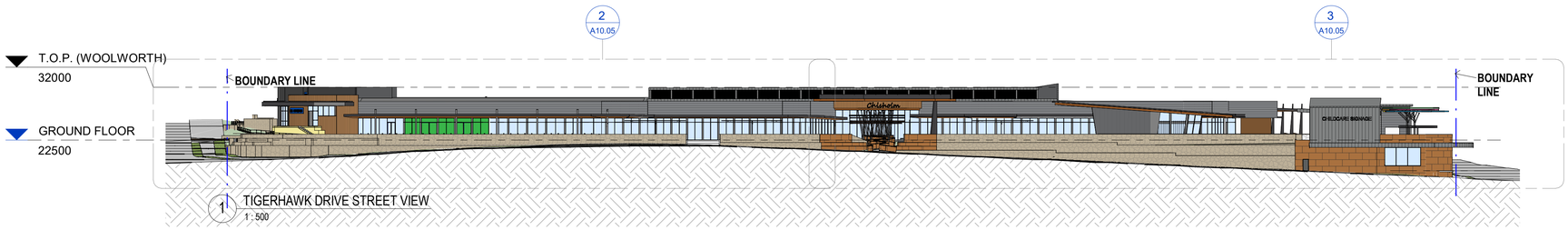
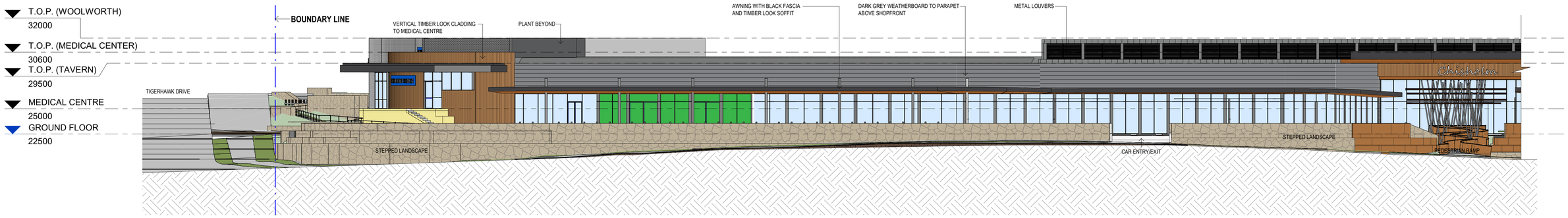
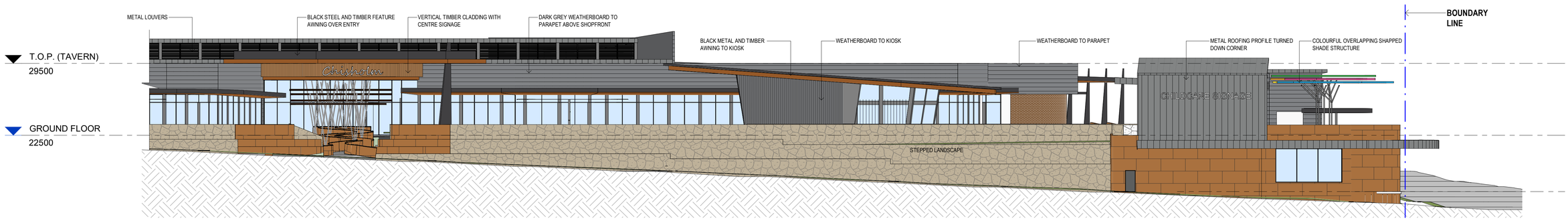


1 TIGERHAWK DRIVE STREET VIEW
1 : 500



2 TIGERHAWK DRIVE STREET VIEW - PART 1
1 : 200



3 TIGERHAWK DRIVE STREET VIEW - PART 2
1 : 200

REVELOP

CHISHOLM SHOPPING CENTRE

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TIGERHAWK DRIVE STREET VIEW

A10.05 DA F
1:200 @ A1
1:400 @ A3

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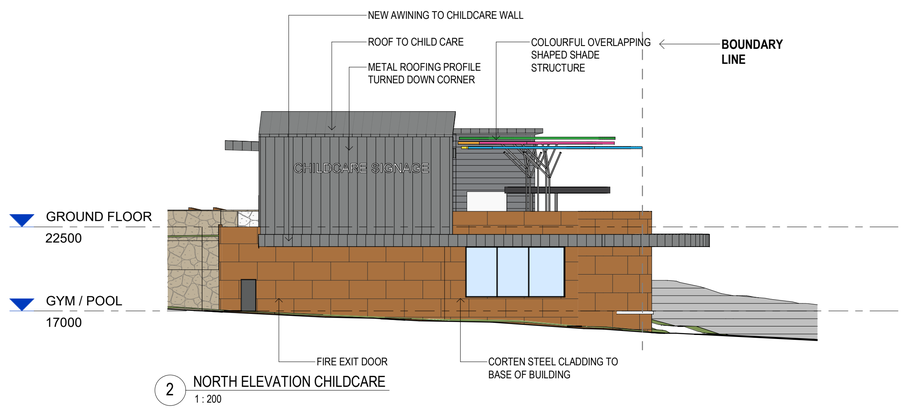
1 WEST ELEVATION CHILDCARE
1 : 200

3 EAST ELEVATION CHILDCARE
1 : 200

4 SOUTH ELEVATION CHILDCARE
1 : 200



2 NORTH ELEVATION CHILDCARE
1 : 200

REVELOP

CHISHOLM SHOPPING CENTRE

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ISSUE	DATE	DESCRIPTION
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ELEVATION CHILDCARE

A10.09 DA E

1:200 @ A1
1:400 @ A3

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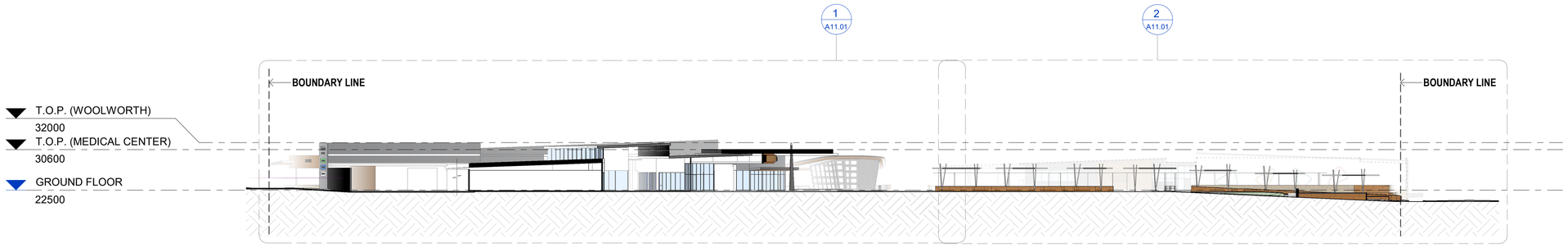
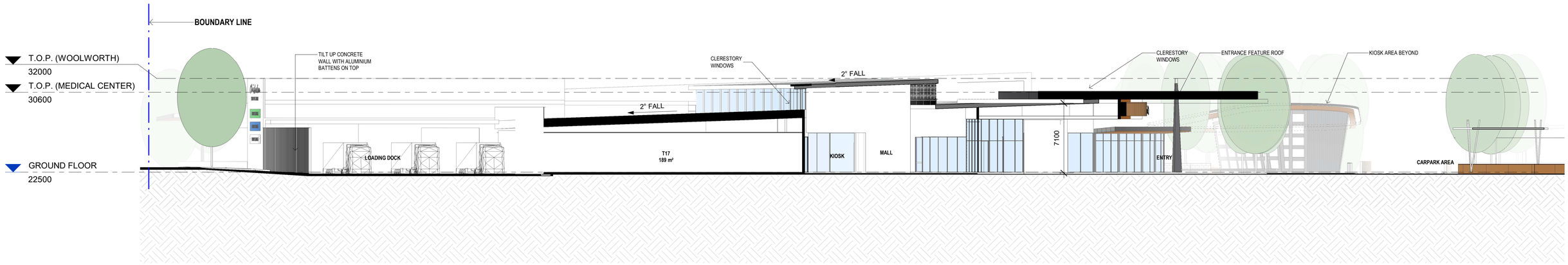
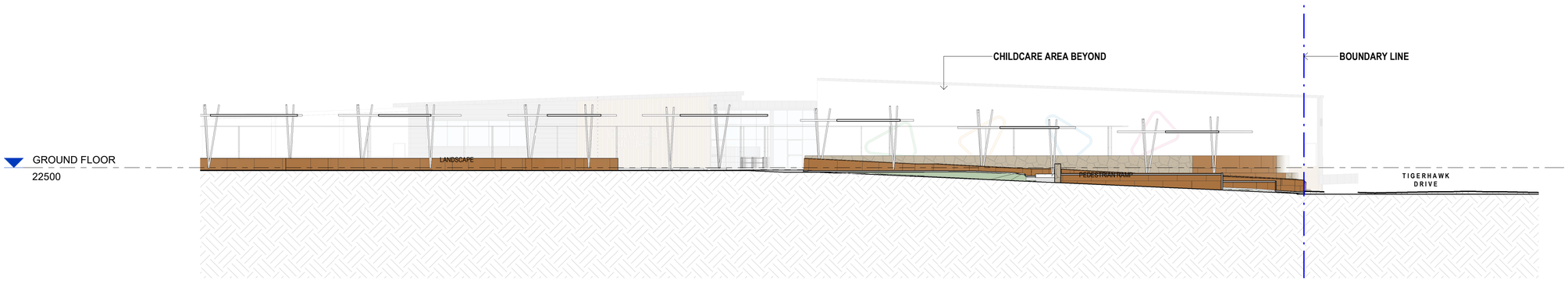


A SECTION A-A
1 : 500



1 SECTION A-A_Part 1
1 : 200



2 SECTION A-A_Part 2
1 : 200

REVELOP

CHISHOLM SHOPPING CENTRE

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SECTION 1

A11.01 DA E
1:200 @ A1
1:400 @ A3

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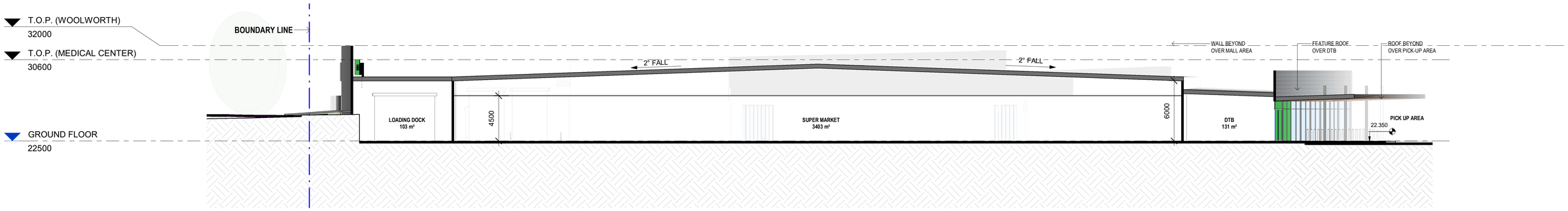
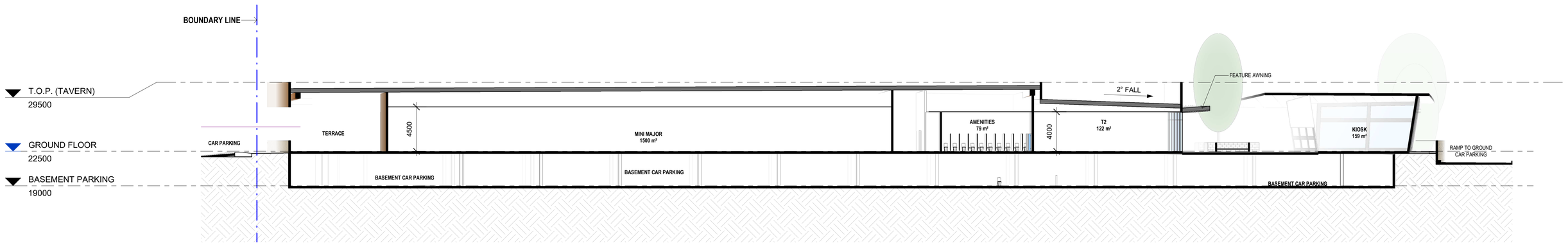
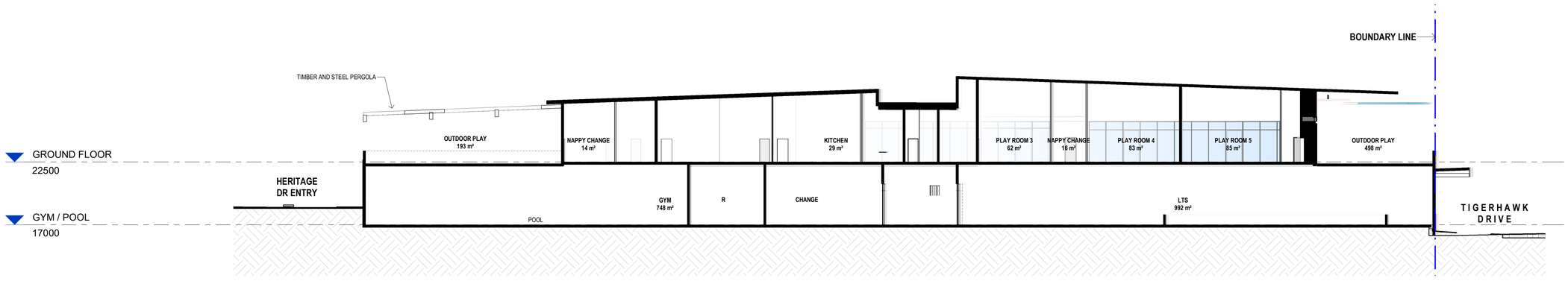


C SECTION C-C
1 : 200



B SECTION B-B
1 : 200



E SECTION E-E
1 : 200

REVELOP

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SECTION 2

A11.02 DA F
1:200 @ A1
1:400 @ A3

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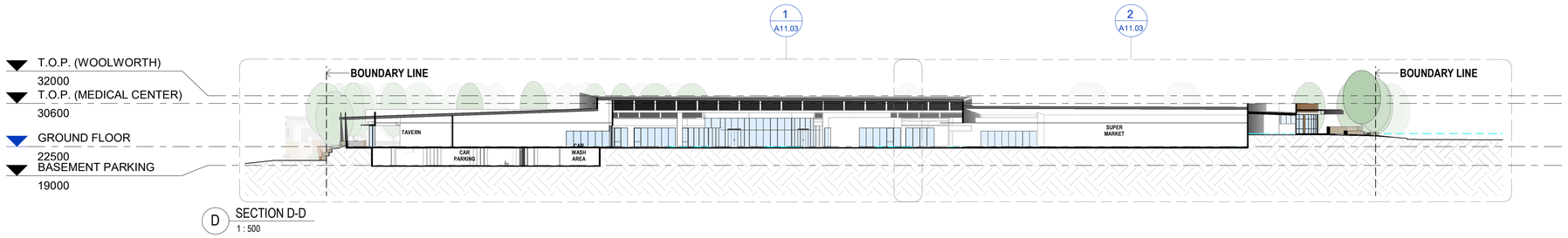
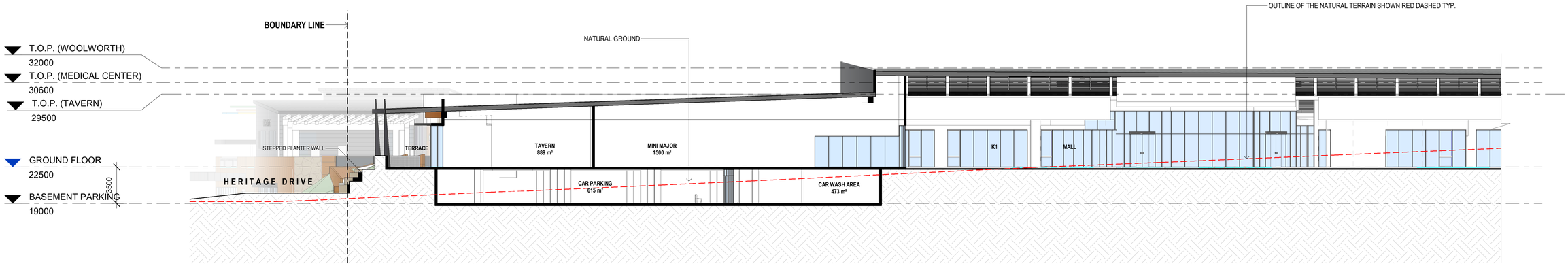
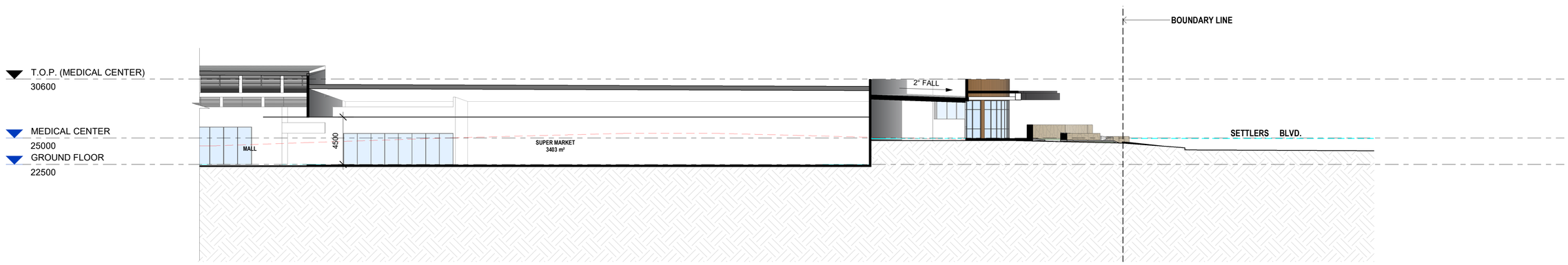


D SECTION D-D
1 : 500



1 SECTION D-D_Part 1
1 : 200



2 SECTION D-D_Part 2
1 : 200

REVELOP

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SECTION 3

A11.03 DA E
1:200 @ A1
1:400 @ A3

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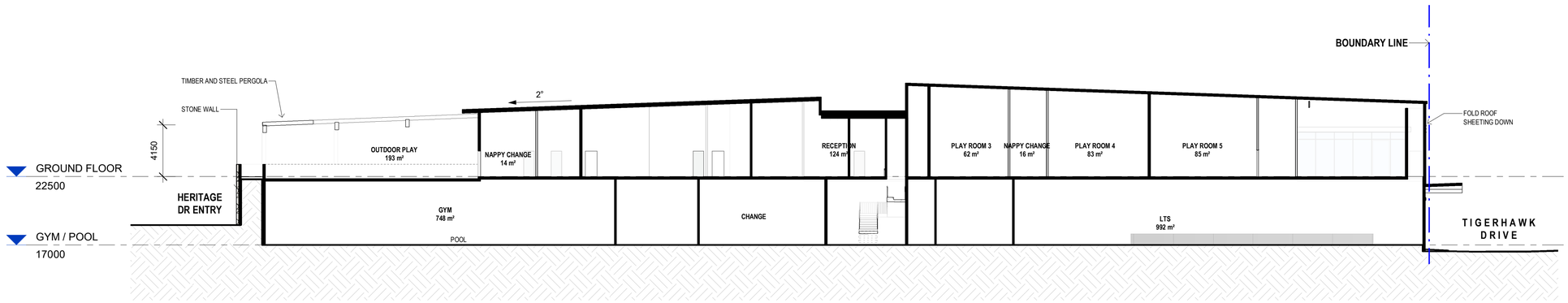
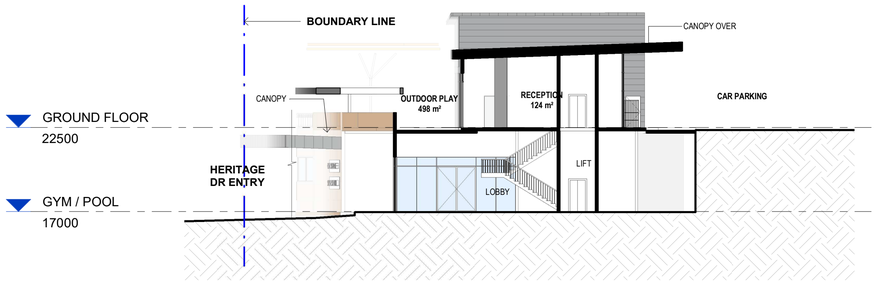


1 SECTION A
1 : 200



2 SECTION B
1 : 200

REVELOP

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C	05-10-2021	DA ISSUE
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SECTIONS CHILDCARE

A11.04 DA E

1:200 @ A1
1:400 @ A3

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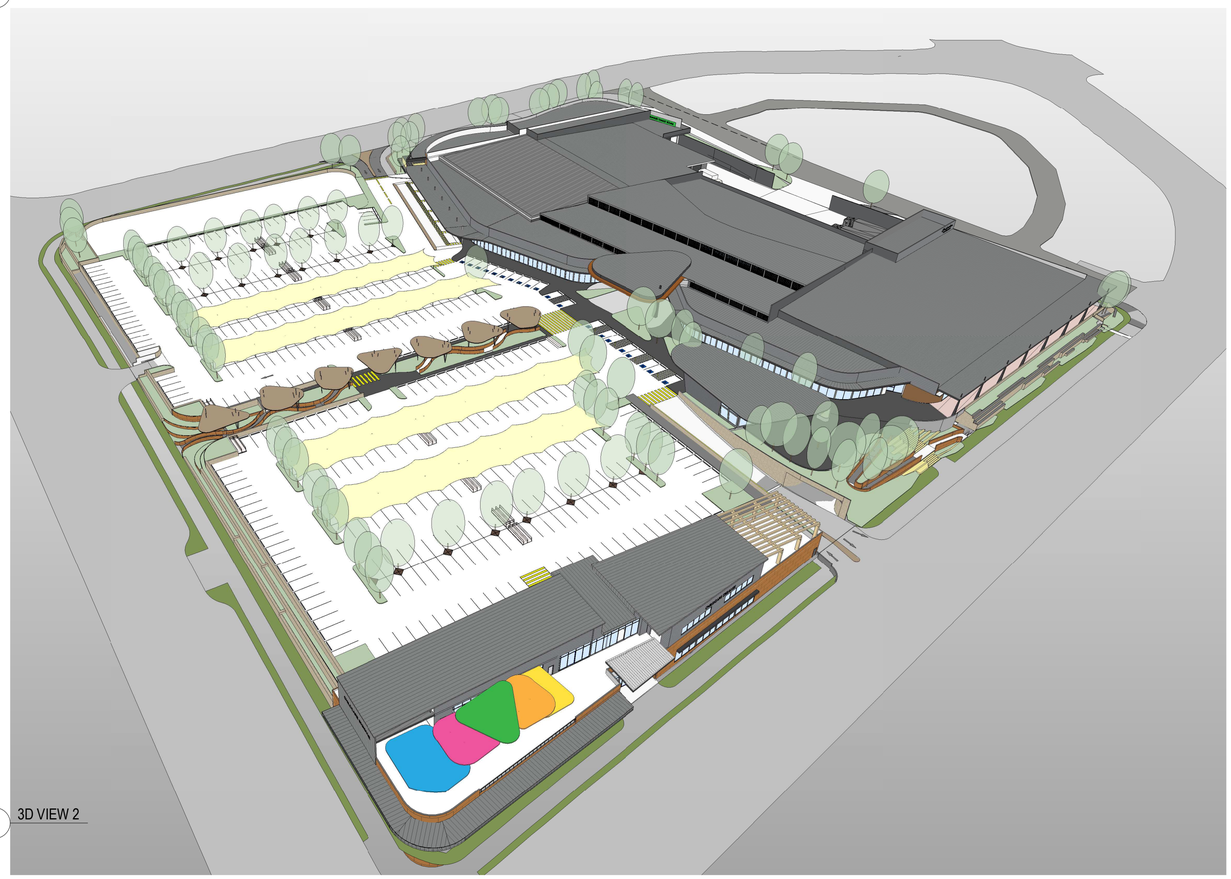
1 3D VIEW 1



2 3D VIEW 2

REVELOP

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3D VISUALIZATION

A80.01 DA F
1:NTS @ A1
1:NTS @ A3

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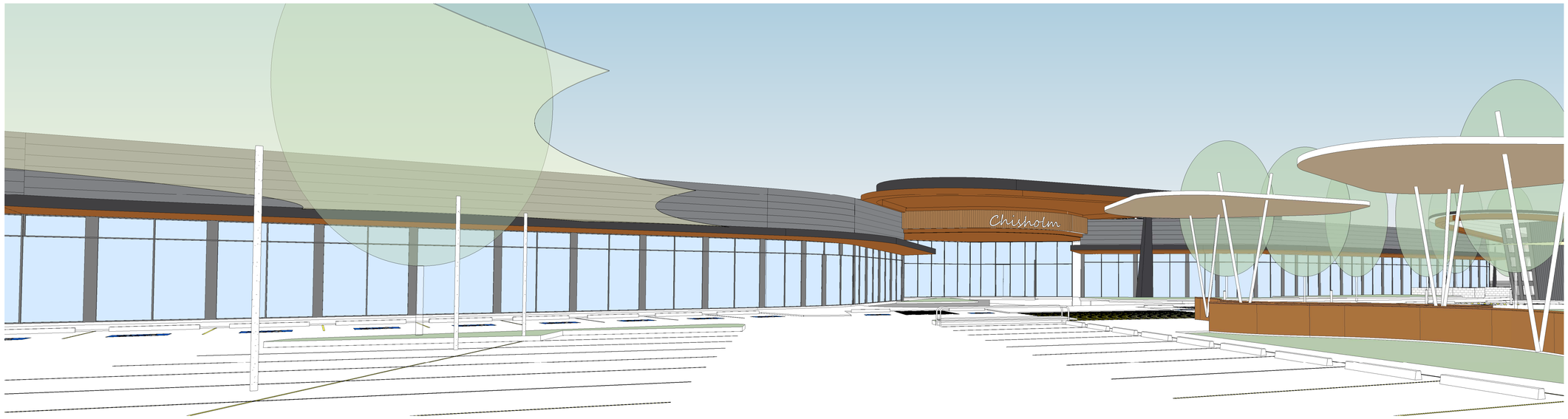

1 PERSPECTIVE 1

2 PERSPECTIVE 2

REVELOP

CHISHOLM SHOPPING CENTRE

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ISSUE	DATE	DESCRIPTION
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E	21-10-21	FOR REVIEW

PERSPECTIVES SHEET 1

A80.02 DA E

1:NTS @ A1
1:NTS @ A3

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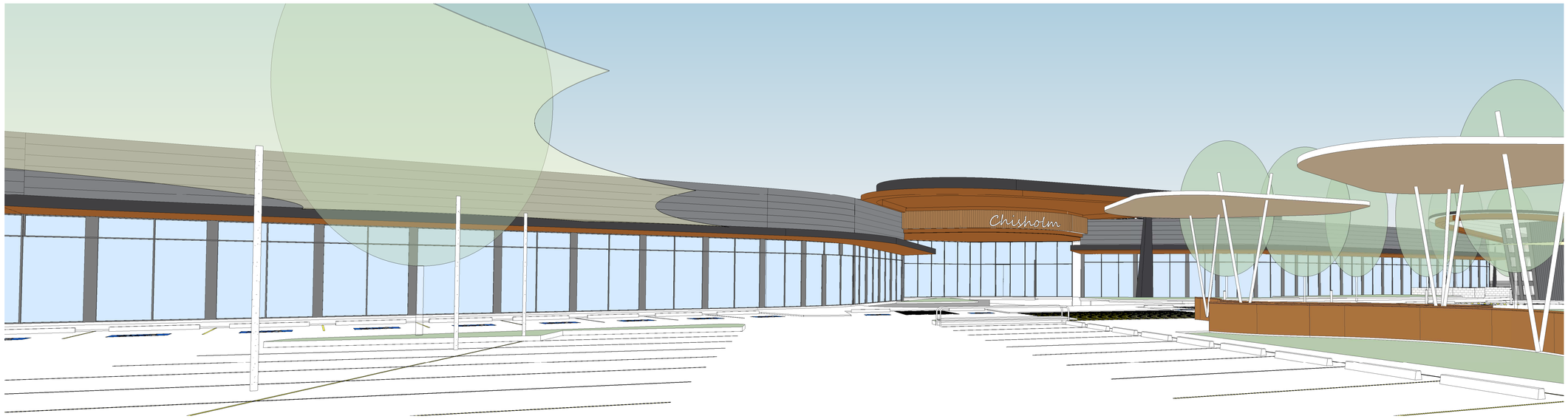

1 PERSPECTIVE 1

2 PERSPECTIVE 2

REVELOP

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ISSUE	DATE	DESCRIPTION
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PERSPECTIVES SHEET 1

A80.02 DA F
1:NTS @ A1
1:NTS @ A3

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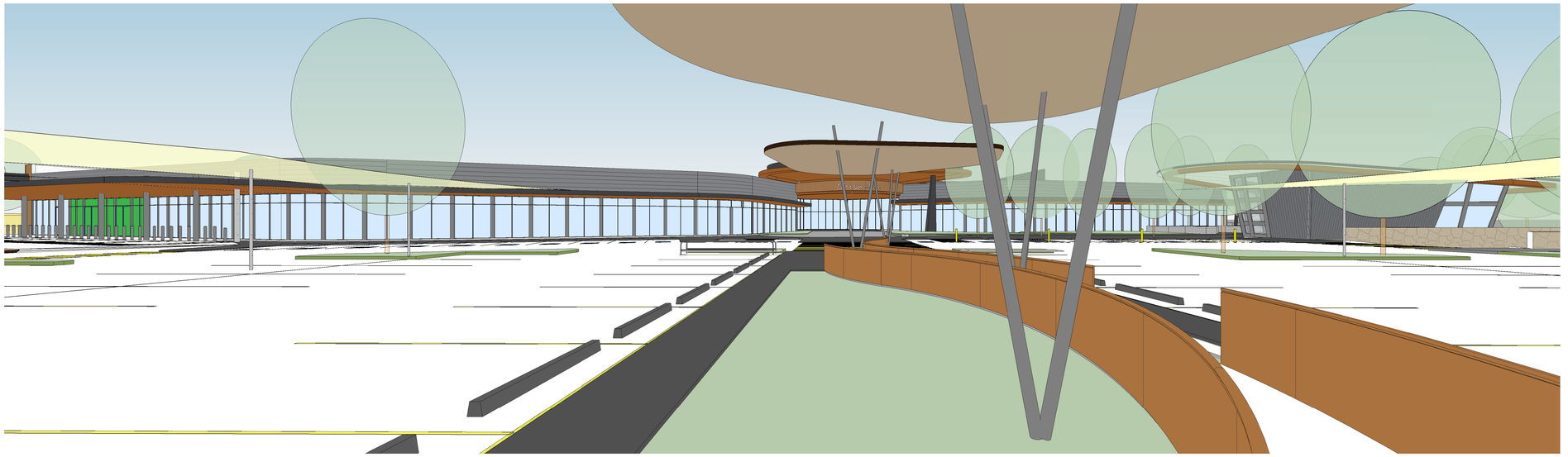
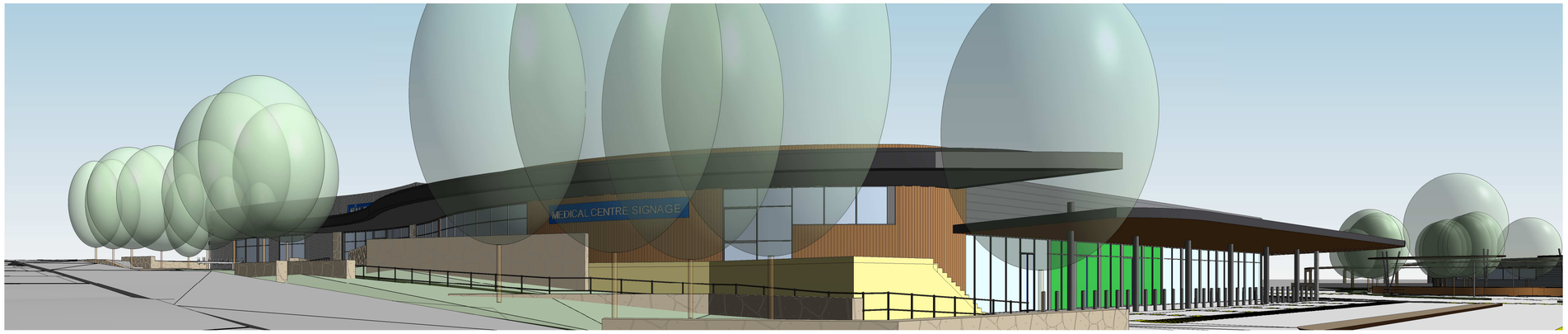


1 PERSPECTIVE 1



2 PERSPECTIVE 2

REVELOP

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PERSPECTIVES SHEET 2

A80.03 DA F
1:NTS @ A1
1:NTS @ A3

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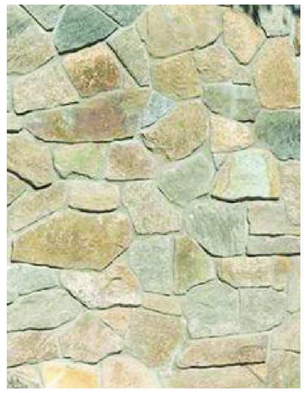
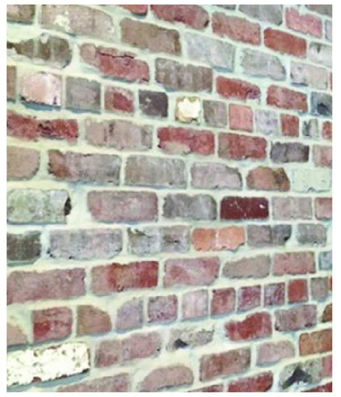
WF_01 BLACK MATT AND GLAZED BRICKS

WF_02 MID GREY WEATHERBOARD LOOK FC CLADDING



WF_03 STONE CLADDING

WF_04 & WF_06 DARK GREY WEATHERBOARD LOOK FC CLADDING



WF_05 RECYCLED BRICKS

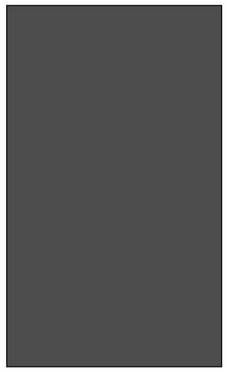
MF_01 COLORBOND WINDSPRAY ROOFING

MF_02 CORTEN STEEL

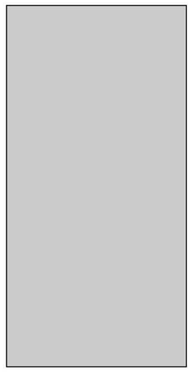
MF_03 & PF_02 BLACK BATTENS WITH GREY PAINT BEHIND

MF_04 DARK METAL CLADDING

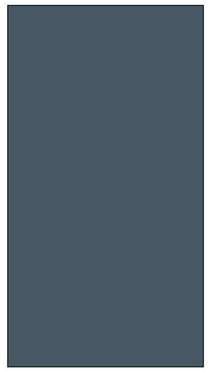
MF_05, MF_06 & PF_01 COLORBOND MONUMENT AWNING FASCIA, GLAZING FRAMING & LOUVRES.



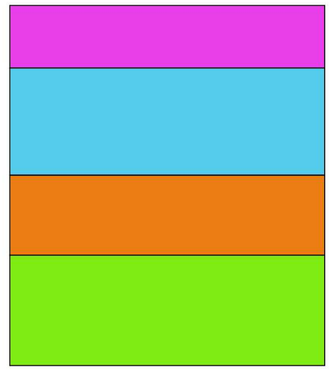
PF_03 PAINT FINISH TO RENDERED WALL



PF_04 PAINT FINISH

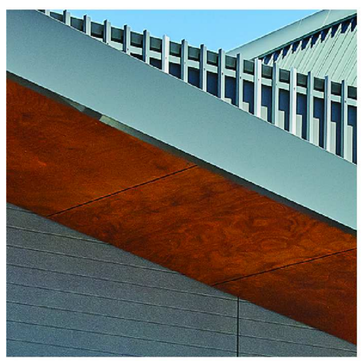


PF_05 PAINT FINISH

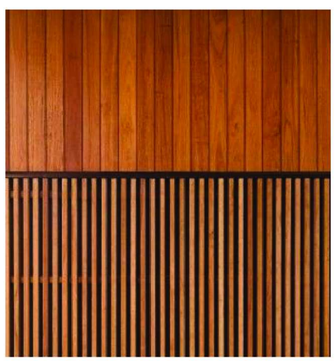


PF_06 - PF_09 COLOURFUL CHILDCARE WINDOW FRAMES

FX_02 - FX_06 COLOURFUL CHILDCARE SHADE SAILS



TF_01 TIMBER LOOK SOFFIT



TF_02, TF_05 & TF_06 TIMBER CLADDING

TF_03 TIMBER AWNING TO TAVERN

TF_04 TIMBER LOOK PERGOLA

TF_07 FEATURE TIMBER SHADE STRUCTURES

FX_01 CARPARK SHADE SAILS

REVELOP

CHISHOLM SHOPPING CENTRE
HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
A	08-11-21	FOR REVIEW

PROPOSED MATERIAL BOARD

A100.01 DA A
@ A1
@ A3

82 Alexander Street
Crows Nest, NSW 2065
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T +61 2 9437 0511
www.bngrouponline.com

BN Architecture Urban Design Masterplanning Graphics Interiors

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APPENDIX B – DETAILED SITE SURVEY PLAN (LDS)

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LEGEND

- BOUNDARY LINE
- ADJACENT BOUNDARY
- EASEMENT
- FENCE LINE
- S — SEWERMAIN
- W — WATERMAIN
- OHP — OVERHEAD ELECTRICITY
- UGP — UNDERGROUND ELECTRICITY
- T — TELECOMMUNICATIONS LINE
- OPT — OPTIC FIBRE LINE
- GAS — GAS LINE
- MAJOR COUNTOUR LINE
- MINOR CONTOUR LINE
- TOP & TOE OF BANKS
- RETAINING WALLS
- BENCH MARK
- SIP — SEWER INSPECTION POINT
- SMH — SEWER MANHOLE
- SV — STOP VALVE
- HYD — HYDRANT
- WM — WATER METER
- GRATED PIT
- PP — POWER POLE
- LP — LIGHT POLE
- ET — ELECTRICAL TURRENT
- GAS METER
- TELECOMMUNICATIONS PIT
- TRAFFIC SIGNAL
- (5) — DENOTES PHOTO LOCATION
- STREET SIGN
- TRS/0.6/8 — DENOTES TREE. HEIGHT/DIAMETER/SPREAD
- DENOTES WINDOW GROUND FLOOR (H 6.12, S 5.12) HOOD RL SILL RL
- DENOTES WINDOW UPPER FLOOR (H 16.12, S 15.12) HOOD RL SILL RL

NOTE:-

1. BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY, AND HAVE NOT BEEN SURVEYED.
2. SERVICES HAVE BEEN LOCATED ONLY WHERE VISIBLE, PRIOR TO EXCAVATION OR CONSTRUCTION ALL SERVICES ARE TO BE LOCATED BY RELEVANT AUTHORITY.
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4. APPROXIMATE SITE AREA IS AS SHOWN ON PLAN
5. DETAILS OF SURVEY ARE CORRECT TO THE DATE SHOWN. (14/10/2021)

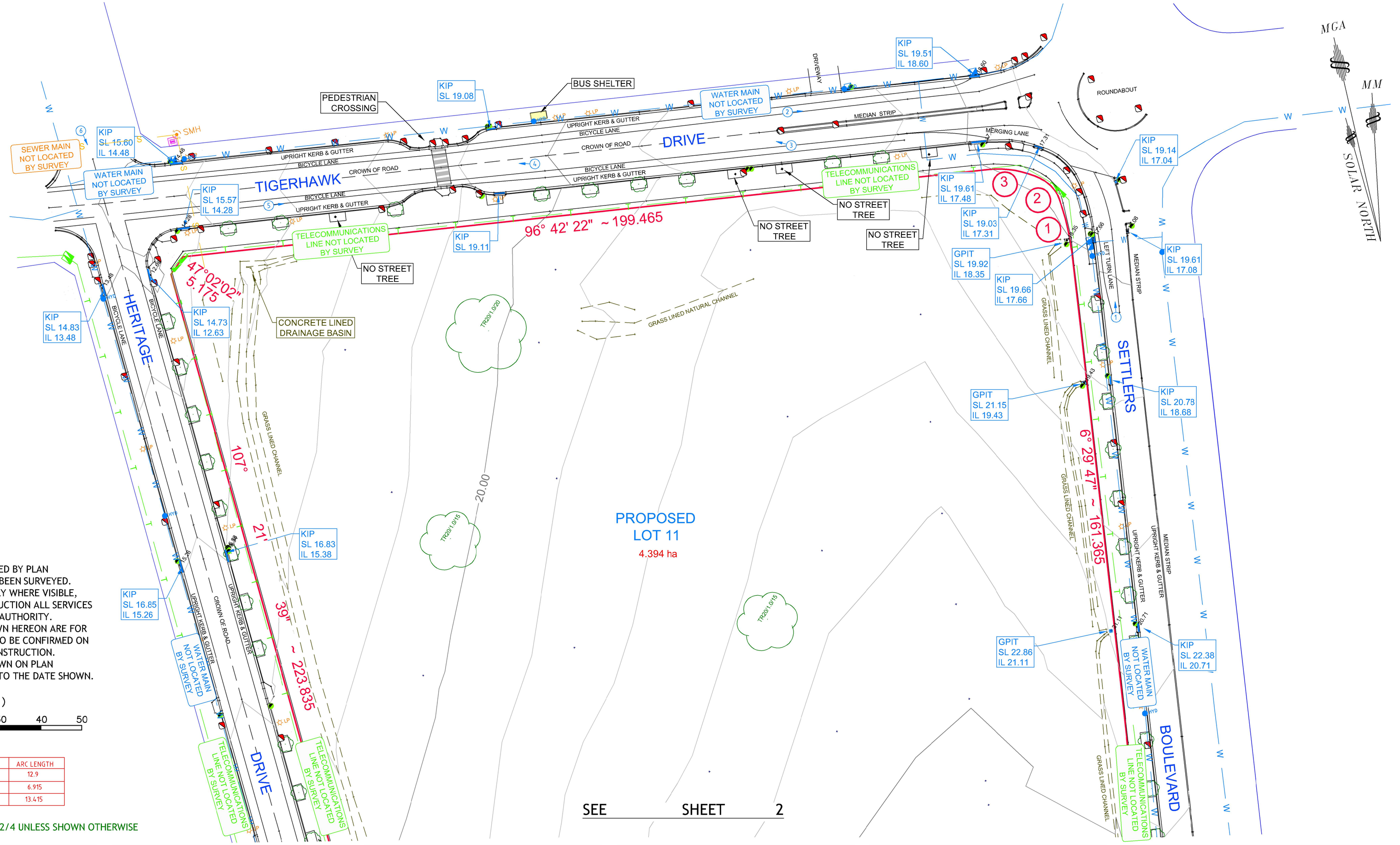
SCALE 1:500 (A1)

10 0 10 20 30 40 50

SHORT LINE TABLE

LINE	BEARING	DISTANCE	RADIUS	ARC LENGTH
1	179°16'07"	12.87	54.05	12.9
2	150°32'47"	6.745	9.05	6.915
3	112°41'00"	13.24	24.05	13.415

ALL STREET TREES ARE A NOMINAL 4/0.2/4 UNLESS SHOWN OTHERWISE



SEE SHEET 2

PHOTOGRAPH 1

PHOTOGRAPH 2

PHOTOGRAPH 3

PHOTOGRAPH 4

PHOTOGRAPH 5

PHOTOGRAPH 6

Ed.	Details of Revisions	Date
A	INITIAL ISSUE	21/10/21

Client / Council Development Consent Number

Scale: 1:500 (A1),1:1000 (A3)
Origin: SSM171234
Surveyor: S.N.
Checked: S.C.
Job Number: 6636
Datum: AHD
Contour Int: 1.0
Drawn: S.F.
Approved: J.H.
Drawing File: 6636-DET

Registered Surveyor: .....

LAND DEVELOPMENT SOLUTIONS
•Surveying..•Planning..•Engineering
PO Box 853 THE JUNCTION NSW. 2291
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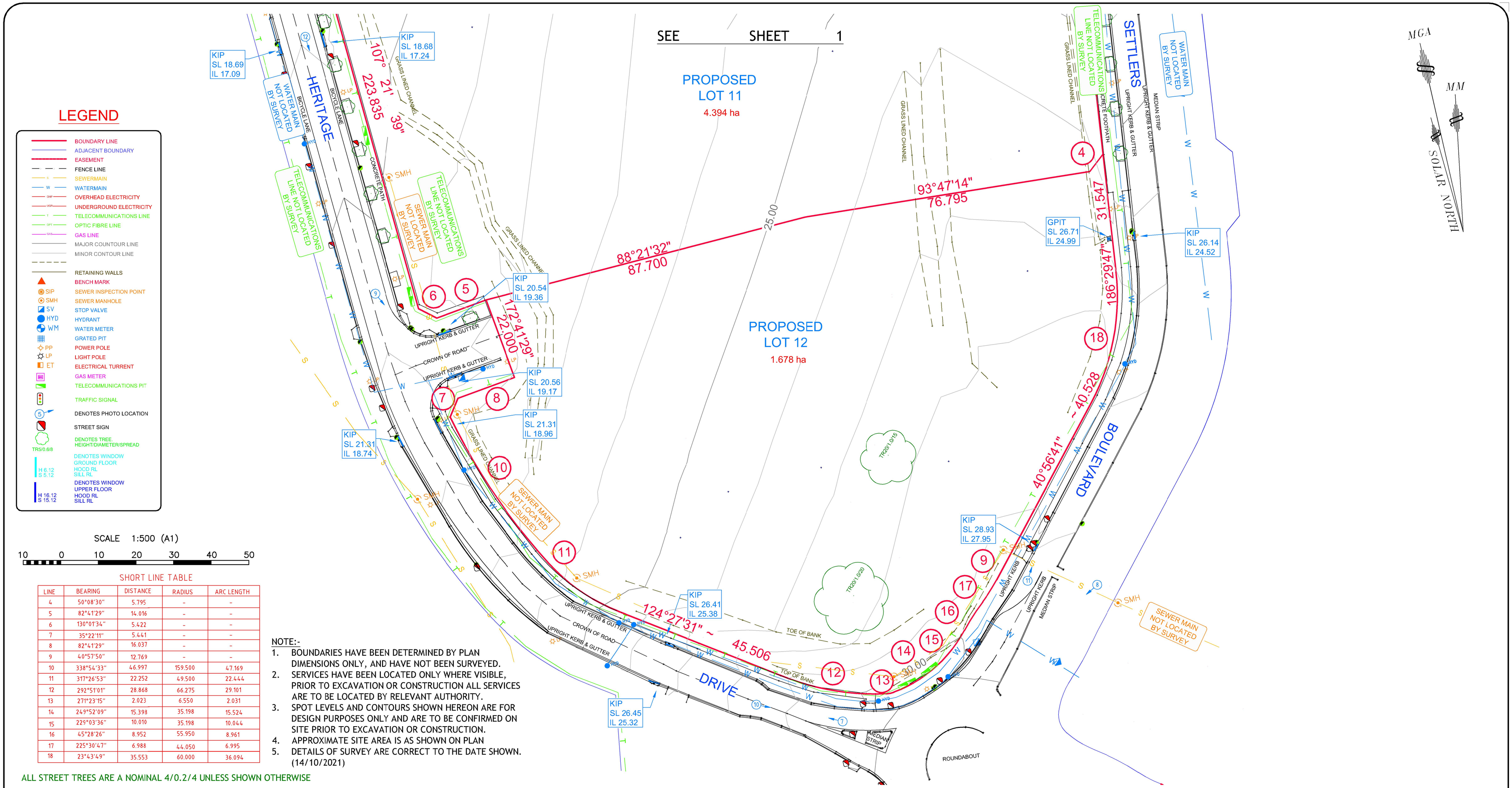
E-mail: mail@lds.net.au
ABN: 42 110 897 928

DETAIL SURVEY OF LOT 11 & 12, UNREGISTERED D.P, BEING SUBDIVIDED LOT 1, D.P. 1224700, CHISHOLM

Drawing Number	Edition
1	A

Sheet. 1.. of.. 2



LEGEND

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- TELECOMMUNICATIONS PIT
- TRAFFIC SIGNAL
- DENOTES PHOTO LOCATION
- STREET SIGN
- TR5/0.6/8 DENOTES TREE. HEIGHT/DIAMETER/SPREAD
- H 6.12 S 5.12 DENOTES WINDOW GROUND FLOOR HOOD RL SILL RL
- H 16.12 S 15.12 DENOTES WINDOW UPPER FLOOR HOOD RL SILL RL

SCALE 1:500 (A1)

10 0 10 20 30 40 50

SHORT LINE TABLE

LINE	BEARING	DISTANCE	RADIUS	ARC LENGTH
4	50°08'30"	5.795	-	-
5	82°41'29"	14.016	-	-
6	130°01'34"	5.422	-	-
7	35°22'11"	5.441	-	-
8	82°41'29"	16.037	-	-
9	40°57'50"	12.769	-	-
10	338°54'33"	46.997	159.500	47.169
11	317°26'53"	22.252	49.500	22.444
12	292°51'01"	28.868	66.275	29.101
13	271°23'15"	2.023	6.550	2.031
14	249°52'09"	15.398	35.198	15.524
15	229°03'36"	10.010	35.198	10.044
16	45°28'26"	8.952	55.950	8.961
17	225°30'47"	6.988	44.050	6.995
18	23°43'49"	35.553	60.000	36.094

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PHOTOGRAPH 7

PHOTOGRAPH 8

PHOTOGRAPH 9

PHOTOGRAPH 10

PHOTOGRAPH 11

PHOTOGRAPH 12

Ed.	Details of Revisions	Date
A	INITIAL ISSUE	21/10/21

Client / Council Development Consent Number

Scale: 1:500 (A1),1:1000 (A3) | Datum: AHD
Origin: SSM171234 | Contour Int: 1.0
Surveyor: S.N. | Drawn: S.F.
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Registered Surveyor: .....

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ABN: 42 110 897 928

DETAIL SURVEY OF LOT 11 & 12, UNREGISTERED D.P, BEING SUBDIVIDED LOT 1, D.P. 1224700, CHISHOLM

Drawing Number	Edition
1	A

Sheet. 2.. of.. 2

APPENDIX C – DRAINS MODELLING RESULTS

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PIT / NODE DETAILS Version 15

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Dept (m)	Major Safe Pond Depth (m)
PRE-DEV W	Node							0		371866.9	6374849		8		No					
PRE-DEV EA	Node							0		372274.3	6374829		9		No					
N9	Node					19.4		0		372190.9	6374923		19		No					
N8	Node					15		0		371971.6	6374946		18		No					
N28443	Node							0		371957.2	6374954		72073		No					
N28445	Node							0		372205.6	6374934		72082		No					

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length	id
Basin2	19.8	0.81		Orifice		112	20			372175	6374911	No			16
	20	0.81													
	20.1	120													
	21.91	120													
	22	0.81													
	22.2	0.81													
	22.35	2500													
	22.4	2500													
Basin3	19.8	0.81		Orifice		150	20			371990.9	6374936	No			17
	20	0.81													
	20.1	350													
	21.91	350													
	22	0.81													
	22.2	0.81													
	22.35	8500													
	22.4	8500													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
Cat6	PRE-DEV W	3.3834	0	100	0	0	0	0	-1	190	-1	-1	5	-1	-1	0.17	-1	0				1
Cat7	PRE-DEV EA	0.9675	0	100	0	0	0	0	-1	60	-1	-1	6	-1	-1	0.17	-1	0				1
POST-DEV I	Basin2	1.3968	82	18	0	0	0	0	280	270	-1	0.5	5	-1	0.012	0.17	-1	0				1
POST-DEV I	Basin3	2.7796	95	5	0	0	0	0	360	180	-1	0.5	5	-1	0.012	0.17	-1	0				1
uncap	N28443	0.2201	100	0	0	0	0	0	30	-1	-1	15	-1	-1	0.012	-1	-1	0				1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe2	Basin2	N9	10	19.85	19.75	1	Concrete, u	300	300	0.013	NewFixed	1	Basin2	0					
Pipe3	Basin3	N8	10	19.85	19.75	1	Concrete, u	300	300	0.013	NewFixed	1	Basin3	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Stor (m)	Safe Depth Minor Stor (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
HIGH OUT	Basin2	N9	0.1	21.65			4 m wide p	0.3	0.15	0.4	1	0	38358

10

OF1	Basin2	N9	0.1	22.29	10	1.6	4 m wide p	0.3	0.15	0.4	5	0	40	10
OF15149	N9	N28445	0.1				4 m wide p	0.3	0.15	0.4	1	0	72077	1
OF9488	Basin3	N8	0.1	21.45			4 m wide p	0.3	0.15	0.4	1	0	54398	10
HIGH OUT	Basin3	N8	0.1	21.45			4 m wide p	0.3	0.15	0.4	1	0	38361	10
OF2	Basin3	N8	0.1	22.23	15	1.6	4 m wide p	0.3	0.15	0.4	5	0	43	10
OF15145	N8	N28443	0.1				4 m wide p	0.3	0.15	0.4	1	0	72072	1

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover	Cover (m)	
Pipe2	Concrete, u	300	0.6	-0.68	Unsafe
Pipe3	Concrete, u	300	0.6	-5.08	Unsafe

This model has no pipes with non-return valves

DRAINS results prepared from Version 2021.02

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N9	19.4		0.031				
N8	15		0.071				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat6	0.057	0	0.057	0	45.64	0	1EY AEP, 2 hour burst, Storm 8
Cat7	0.034	0	0.034	0	17.97	0	1EY AEP, 1 hour burst, Storm 6
POST-DEV I	0.181	0.178	0.003	14.03	33.75	0	1EY AEP, 15 min burst, Storm 5
POST-DEV '	0.37	0.368	0.002	17.27	28.01	0	1EY AEP, 20 min burst, Storm 6
uncap	0.052	0.052	0	1.12	0	0	1EY AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe2	0.034	1.24	20.877	19.873	1EY AEP, 1.5 hour burst, Storm 5
Pipe3	0.057	1.45	20.034	19.914	1EY AEP, 1.5 hour burst, Storm 2

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
HIGH OUT	0	0	0.908	0	0	0	0	
OF1	0	0	1.401	0	0	0	0	

OF15149	0.034	0.034	0.908	0.033	0.02	4	0.47	1EY AEP, 1.5 hour burst, Storm 5
OF9488	0	0	0.908	0	0	0	0	
HIGH OUT '	0	0	0.908	0	0	0	0	
OF2	0	0	1.401	0	0	0	0	
OF15145	0.057	0.057	0.908	0.04	0.02	4	0.57	1EY AEP, 1.5 hour burst, Storm 2

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin2	21.58	182.4	0.034	0.034	0
Basin3	21.44	483	0.057	0.057	0

Run Log for TX15901.00_DRAINS MODEL run at 10:15:27 on 10/12/2021 using version 2021.02

Flows were safe in all overflow routes.

DRAINS results prepared from Version 2021.02

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N9	19.4		0.227				
N8	15		0.52				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat6	0.513	0	0.513	0	24.08	0	10% AEP, 30 min burst, Storm 9
Cat7	0.24	0	0.24	0	9.83	0	10% AEP, 15 min burst, Storm 6
POST-DEV I	0.434	0.412	0.022	9.91	23.84	0	10% AEP, 10 min burst, Storm 5
POST-DEV '	0.878	0.862	0.019	12.38	20.08	0	10% AEP, 15 min burst, Storm 6
uncap	0.103	0.103	0	0.85	0	0	10% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe2	0.04	1.31	21.35	19.885	10% AEP, 1 hour burst, Storm 3
Pipe3	0.071	1.5	20.056	19.94	10% AEP, 1 hour burst, Storm 3

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
HIGH OUT	0.199	0.199	0.908	0.069	0.06	4	0.93	10% AEP, 1 hour burst, Storm 3
OF1	0	0	1.401	0	0	0	0	

OF15149	0.239	0.239	0.908	0.074	0.07	4	1.01	10% AEP, 1 hour burst, Storm 3
OF9488	0.22	0.22	0.908	0.072	0.07	4	0.97	10% AEP, 1 hour burst, Storm 3
HIGH OUT '	0.22	0.22	0.908	0.072	0.07	4	0.97	10% AEP, 1 hour burst, Storm 3
OF2	0	0	1.401	0	0	0	0	
OF15145	0.511	0.511	0.908	0.11	0.15	4	1.35	10% AEP, 1 hour burst, Storm 3

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin2	22.28	246.2	0.239	0.04	0.199
Basin3	22.22	658.9	0.511	0.071	0.44

Run Log for TX15901.00_DRAINS MODEL run at 10:16:55 on 10/12/2021 using version 2021.02

Flows were safe in all overflow routes.

DRAINS results prepared from Version 2021.02

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N9	19.4		0.511				
N8	15		1.093				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat6	1.284	0	1.284	0	17.86	0	1% AEP, 20 min burst, Storm 1
Cat7	0.535	0	0.535	0	7.43	0	1% AEP, 10 min burst, Storm 7
POST-DEV I	0.799	0.748	0.06	8.04	19.34	0	1% AEP, 10 min burst, Storm 1
POST-DEV '	1.708	1.667	0.042	9.35	15.17	0	1% AEP, 10 min burst, Storm 1
uncap	0.172	0.172	0	0.7	0	0	1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe2	0.041	1.31	21.398	19.886	1% AEP, 25 min burst, Storm 9
Pipe3	0.072	1.5	20.057	19.942	1% AEP, 20 min burst, Storm 8

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
HIGH OUT	0.21	0.21	1.479	0.071	0.07	4	0.94	1% AEP, 25 min burst, Storm 9
OF1	0.242	0.242	1.401	0.052	0.09	4	1.64	1% AEP, 25 min burst, Storm 9

OF15149	0.492	0.492	1.479	0.108	0.14	4	1.32	1% AEP, 25 min burst, Storm 9
OF9488	0.231	0.231	1.479	0.073	0.07	4	0.99	1% AEP, 20 min burst, Storm 8
HIGH OUT '	0.231	0.231	1.479	0.073	0.07	4	0.99	1% AEP, 20 min burst, Storm 8
OF2	0.506	0.506	1.401	0.072	0.16	4	2.2	1% AEP, 20 min burst, Storm 8
OF15145	1.041	1.041	1.479	0.162	0.29	4	1.77	1% AEP, 20 min burst, Storm 8

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin2	22.35	355.9	0.492	0.041	0.451
Basin3	22.3	798.5	1.041	0.072	0.969

Run Log for TX15901.00_DRAINS MODEL run at 10:18:56 on 10/12/2021 using version 2021.02

Flows were safe in all overflow routes.

APPENDIX D – MUSIC SUMMARY REPORT

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Source nodes

Location	SUPER + TAVERN	CARPARK NORTH	SUPER	CARPARK EAST	SHOPS 3	CHILD	SHOPS 2	SHOPS 1	FAST 1	FAST 2	KIOSK	LOADING	CARPARK WEST	COURTYARDS	OUTDOOR	LANDSCAPE	LANDSCAPE
ID	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	24	25
Node Type	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode	UrbanSourceNode
Zoning Surface Type	Roof	Sealedroad	Roof	Sealedroad	Roof	Roof	Roof	Roof	Roof	Roof	Roof	Roof	Sealedroad	Sealedroad	Mixed	Mixed	Mixed	Mixed	Mixed
Total Area (ha)	0.242	0.52	0.492	0.495	0.126	0.09	0.144	0.129	0.039	0.028	0.019	0.171	0.702	0.504	0.136	0.186	0.069
Area Impervious (ha)	0.242	0.52	0.492	0.495	0.126	0.09	0.144	0.129	0.039	0.028	0.019	0.171	0.702	0.504	0.136	0.037852388	0
Area Pervious (ha)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.148147612	0.069
Field Capacity (mm)	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Pervious Area Infiltration Capacity coefficient - a	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Pervious Area Infiltration Capacity exponent - b	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Impervious Area Rainfall Threshold (mm/day)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pervious Area Soil Storage Capacity (mm)	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Pervious Area Soil Initial Storage (% of Capacity)	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Groundwater Initial Depth (mm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Groundwater Daily Recharge Rate (%)	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Groundwater Daily Baseflow Rate (%)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Groundwater Daily Deep Seepage Rate (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stormflow Total Suspended Solids Mean (log mg/L)	1.3	2.43	1.3	2.43	1.3	1.3	1.3	1.3	1.3	1.3	1.3	2.43	2.43	2.2	2.2	2.2	2.2
Stormflow Total Suspended Solids Standard Deviation (log mg/L)	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Stormflow Total Suspended Solids Estimation Method	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic
Stormflow Total Suspended Solids Serial Correlation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stormflow Total Phosphorus Mean (log mg/L)	-0.89	-0.3	-0.89	-0.3	-0.89	-0.89	-0.89	-0.89	-0.89	-0.89	-0.89	-0.3	-0.3	-0.45	-0.45	-0.45	-0.45
Stormflow Total Phosphorus Standard Deviation (log mg/L)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Stormflow Total Phosphorus Estimation Method	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic
Stormflow Total Phosphorus Serial Correlation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.34	0.3	0.34	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.34	0.34	0.42	0.42	0.42	0.42
Stormflow Total Nitrogen Standard Deviation (log mg/L)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Stormflow Total Nitrogen Estimation Method	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic
Stormflow Total Nitrogen Serial Correlation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseflow Total Suspended Solids Mean (log mg/L)	1.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.1	1.1
Baseflow Total Suspended Solids Standard Deviation (log mg/L)	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Baseflow Total Suspended Solids Estimation Method	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic
Baseflow Total Suspended Solids Serial Correlation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseflow Total Phosphorus Mean (log mg/L)	-0.82	-0.85	-0.82	-0.85	-0.82	-0.82	-0.82	-0.82	-0.82	-0.82	-0.82	-0.85	-0.85	-0.82	-0.82	-0.82	-0.82
Baseflow Total Phosphorus Standard Deviation (log mg/L)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Baseflow Total Phosphorus Estimation Method	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic
Baseflow Total Phosphorus Serial Correlation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseflow Total Nitrogen Mean (log mg/L)	0.32	0.11	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.11	0.11	0.32	0.32	0.32	0.32
Baseflow Total Nitrogen Standard Deviation (log mg/L)	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Baseflow Total Nitrogen Estimation Method	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic	Stochastic
Baseflow Total Nitrogen Serial Correlation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flow based constituent generation - enabled	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Flow based constituent generation - flow file																	
Flow based constituent generation - base flow column																	
Flow based constituent generation - pervious flow column																	
Flow based constituent generation - impervious flow column																	
Flow based constituent generation - unit																	
OUT - Mean Annual Flow (ML/yr)	3.26	7.01	6.63	6.67	1.7	1.21	1.94	1.74	0.526	0.378	0.256	2.31	9.47	6.8	1.83	1.19	0.318
OUT - TSS Mean Annual Load (kg/yr)	87	2.36E+03	172	2.27E+03	42.3	31.8	52.6	46.4	13.3	9.8	6.67	816	3.35E+03	1.35E+03	382	176	32.1
OUT - TP Mean Annual Load (kg/yr)	0.479	4.03	1.02	3.91	0.251	0.182	0.294	0.255	8.11E-02	5.78E-02	3.82E-02	1.41	5.52	2.77	0.757	0.418	9.22E-02
OUT - TN Mean Annual Load (kg/yr)	7.23	16.8	14.8	16	3.71	2.68	4.16	3.85	1.16	0.842	0.57	5.59	22.9	19.6	5.33	3.12	0.845
OUT - Gross Pollutant Mean Annual Load (kg/yr)	79	170	161	162	41.1	29.4	47	42.1	12.7	9.14	6.2	55.8	229	164	44.4	22.3	0
Rain In (ML/yr)	3.60462	7.74589	7.32888	7.37349	1.87689	1.34063	2.14501	1.92158	0.580942	0.417086	0.283023	2.54721	10.457	7.50755	2.02585	2.77064	1.02782
ET Loss (ML/yr)	0.341757	0.734355	0.694813	0.699048	0.17794	0.12711	0.20336	0.18217	0.055077	0.039542	0.026832	0.241489	0.991378	0.711758	0.192062	1.58411	0.710206
Deep Seepage Loss (ML/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseflow Out (ML/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.362293	0.167999
Imp. Stormflow Out (ML/yr)	3.26306	7.01153	6.63399	6.67444	1.69895	1.21354	1.94166	1.7394	0.525865	0.377544	0.256191	2.30572	9.46557	6.79579	1.83379	0.501594	0
Perv. Stormflow Out (ML/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.322653	0.149617
Total Stormflow Out (ML/yr)	3.26306	7.01153	6.63399	6.67444	1.69895	1.21354	1.94166	1.7394	0.525865	0.377544	0.256191	2.30572	9.46557	6.79579	1.83379	0.824247	0.149617
Total Outflow (ML/yr)	3.26306	7.01153	6.63399	6.67444	1.69895	1.21354	1.94166	1.7394	0.525865	0.377544	0.256191	2.30572	9.46557	6.79579	1.83379	1.18654	0.317616
Change in Soil Storage (ML/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4.00E-06	-2.00E-06
TSS Baseflow Out (kg/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.91577	2.28047
TSS Total Stormflow Out (kg/yr)	86.9987	2357.31	172.126	2265.07	42.3432	31.8395	52.5999	46.3754	13.3369	9.79582	6.67048	816.003	3350.13	1345.38	382.176	171.111	29.7955
TSS Total Outflow (kg/yr)	86.9987	2357.31	172.126	2265.07	42.3432	31.8395	52.5999	46.3754	13.3369	9.79582	6.67048	816.003	3350.13	1345.38	382.176	176.026	32.076
TP Baseflow Out (kg/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.669464	0.027886
TP Total Stormflow Out (kg/yr)	0.478588	4.03089	1.01572	3.91037	0.251055	0.181878	0.294288	0.255115	0.081099	0.057805	0.038242	1.40547	5.51919	2.76585	0.756967	0.357292	0.064272
TP Total Outflow (kg/yr)	0.478588	4.03089	1.01572	3.91037	0.251055	0.181878	0.294288	0.255115	0.081099	0.057805	0.038242	1.40547	5.51919	2.76585	0.756967	0.417756	0.092158
TN Baseflow Out (kg/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.786809	0.36448
TN Total Stormflow Out (kg/yr)	7.23105	16.7858	14.7901	15.9951	3.70944	2.67505	4.15905	3.85457	1.15597	0.841714	0.56956	5.58922	22.8784	19.56	5.32878	2.33118	0.480656
TN Total Outflow (kg/yr)	7.23105	16.7858	14.7901	15.9951	3.70944	2.67505	4.15905	3.85457	1.15597	0.841714	0.56956	5.58922	22.8784	19.56	5.32878	3.11799	0.845136
GP Total Outflow (kg/yr)	78.9592	169.664	160.529	161.507	41.111	29.365	46.984	42.0898	12.7248	9.13578	6.16928	55.7935	229.047	164.444	44.3738	22.9519	0

No imported Data Source nodes

USTM treatment nodes

Location	Detention Basin	Bioretention	Copy of Detention Basin	Copy of Bioretention	Rainwater Tank
ID	19	20	23	26	27
Node Type	DetentionBasinNode	BioRetentionNodeV4	DetentionBasinNode	BioRetentionNodeV4	RainWaterTankNode
Lo-flow bypass rate (cum/sec)	0	0	0	0	0
Hi-flow bypass rate (cum/sec)	100	100	100	100	100
Inlet pond volume	0		0		0
Area (sqm)	120	70	350	50	62.5
Initial Volume (m^3)					0
Extended detention depth (m)	2	0.2	2	0.2	0.2
Number of Rainwater tanks					5
Permanent Pool Volume (cubic metres)	0		0		170
Proportion vegetated	0		0		0
Equivalent Pipe Diameter (mm)	112		150		671
Overflow weir width (m)	10	2	16	2	10
Notional Detention Time (hrs)	1.61		2.62		7.40E-03
Orifice Discharge Coefficient	0.6		0.6		0.6
Weir Coefficient	1.7	1.7	1.7	1.7	1.7
Number of CSTR Cells	1	3	1	3	2
Total Suspended Solids - k (m/yr)	8000	8000	8000	8000	400
Total Suspended Solids - C* (mg/L)	20	20	20	20	12
Total Suspended Solids - C** (mg/L)	20		20		12
Total Phosphorus - k (m/yr)	6000	6000	6000	6000	300
Total Phosphorus - C* (mg/L)	0.13	0.13	0.13	0.13	0.13
Total Phosphorus - C** (mg/L)	0.13		0.13		0.13
Total Nitrogen - k (m/yr)	500	500	500	500	40
Total Nitrogen - C* (mg/L)	1.4	1.4	1.4	1.4	1.4
Total Nitrogen - C** (mg/L)	1.4		1.4		1.4
Threshold Hydraulic Loading for C** (m/yr)	3500		3500		0
Horizontal Flow Coefficient		3		3	
Reuse Enabled	Off	Off	Off	On	
Max drawdown height (m)					2.72
Annual Demand Enabled	Off	Off	Off	Off	Off
Annual Demand Value (ML/year)					
Annual Demand Distribution					
Annual Demand Monthly Distribution: Jan					
Annual Demand Monthly Distribution: Feb					
Annual Demand Monthly Distribution: Mar					
Annual Demand Monthly Distribution: Apr					
Annual Demand Monthly Distribution: May					
Annual Demand Monthly Distribution: Jun					
Annual Demand Monthly Distribution: Jul					
Annual Demand Monthly Distribution: Aug					
Annual Demand Monthly Distribution: Sep					
Annual Demand Monthly Distribution: Oct					
Annual Demand Monthly Distribution: Nov					
Annual Demand Monthly Distribution: Dec					
Daily Demand Enabled	Off	Off	Off	Off	On
Daily Demand Value (ML/day)					0.005
Custom Demand Enabled	Off	Off	Off	Off	Off
Custom Demand Time Series File					
Custom Demand Time Series Units					
Filter area (sqm)		70		50	
Filter perimeter (m)		30		28	
Filter depth (m)		0.3		0.3	
Filter Median Particle Diameter (mm)					
Saturated Hydraulic Conductivity (mm/hr)		100		100	
Infiltration Media Porosity		0.35		0.35	
Length (m)					
Bed slope					
Base Width (m)					
Top width (m)					
Vegetation height (m)					
Vegetation Type		Vegetated with Effective Nutrient Removal Plants		Vegetated with Effective Nutrient Removal Plants	
Total Nitrogen Content in Filter (mg/kg)		800		800	
Orthophosphate Content in Filter (mg/kg)		55		55	
Is Base Lined?		No		No	
Is Underdrain Present?		Yes		Yes	
Is Submerged Zone Present?		No		No	
Submerged Zone Depth (m)					
B for Media Soil Texture		-9999	13	-9999	13 -9999
Proportion of upstream impervious area treated					
Exfiltration Rate (mm/hr)		0	0	0	0 0
Evaporative Loss as % of PET		100	100	100	0
Depth in metres below the drain pipe					
TSS A Coefficient					
TSS B Coefficient					
TP A Coefficient					
TP B Coefficient					
TN A Coefficient					
TN B Coefficient					
Str.		0.61		0.61	
S*		0.37		0.37	
Sw		0.11		0.11	
Sh		0.05		0.05	
Emax (m/day)		0.008		0.008	
Ew (m/day)		0.001		0.001	
IN - Mean Annual Flow (ML/yr)	15.5	7.82	33.4	14	1.94
IN - TSS Mean Annual Load (kg/yr)	2.44E+03	348	6.76E+03	1.51E+03	52.6
IN - TP Mean Annual Load (kg/yr)	5.2	1.43	13.1	3.83	0.294
IN - TN Mean Annual Load (kg/yr)	28.7	17.9	73.9	35.5	4.16
IN - Gross Pollutant Mean Annual Load (kg/yr)	183	183	472	333	47

OUT - Mean Annual Flow (ML/yr)	15.4	7.64	33.3	13.9	0.284
OUT - TSS Mean Annual Load (kg/yr)	809	118	1.80E+03	639	5.09
OUT - TP Mean Annual Load (kg/yr)	2.91	1.06	6.38	2.59	3.91E-02
OUT - TN Mean Annual Load (kg/yr)	28	9.84	67.8	26.2	0.544
OUT - Gross Pollutant Mean Annual Load (kg/yr)	0	0	0	0	0
Flow In (ML/yr)	15.5345	7.81944	33.4424	14.0376	1.94166
ET Loss (ML/yr)	0.118295	0.180942	0.105148	0.111932	0
Infiltration Loss (ML/yr)	0	0	0	0	0
Low Flow Bypass Out (ML/yr)	0	0	0	0	0
High Flow Bypass Out (ML/yr)	0	0	0	0	0
Orifice / Filter Out (ML/yr)	14.7542	4.45552	32.09	4.39427	0.284083
Weir Out (ML/yr)	0.660361	3.18317	1.24044	9.52704	0
Transfer Function Out (ML/yr)	0	0	0	0	0
Reuse Supplied (ML/yr)	0	0	0	0	1.65914
Reuse Requested (ML/yr)	0	0	0	0	1.82477
% Reuse Demand Met	0	0	0	0	90.8237
% Load Reduction	0.772081	2.31161	0.134785	0.828559	85.3691
TSS Flow In (kg/yr)	2438.65	348.147	6760.49	1532.86	52.5999
TSS ET Loss (kg/yr)	0	0	0	0	0
TSS Infiltration Loss (kg/yr)	0	0	0	0	0
TSS Low Flow Bypass Out (kg/yr)	0	0	0	0	0
TSS High Flow Bypass Out (kg/yr)	0	0	0	0	0
TSS Orifice / Filter Out (kg/yr)	724.981	9.88058	1645.28	11.6142	5.09001
TSS Weir Out (kg/yr)	84.4692	108.49	155.26	627.427	0
TSS Transfer Function Out (kg/yr)	0	0	0	0	0
TSS Reuse Supplied (kg/yr)	0	0	0	0	20.9888
TSS Reuse Requested (kg/yr)	0	0	0	0	0
TSS % Reuse Demand Met	0	0	0	0	0
TSS % Load Reduction	66.8074	65.9997	73.3667	58.3104	90.3212
TP Flow In (kg/yr)	5.20037	1.43341	13.0751	3.82793	0.294288
TP ET Loss (kg/yr)	0	0	0	0	0
TP Infiltration Loss (kg/yr)	0	0	0	0	0
TP Low Flow Bypass Out (kg/yr)	0	0	0	0	0
TP High Flow Bypass Out (kg/yr)	0	0	0	0	0
TP Orifice / Filter Out (kg/yr)	2.72302	0.541573	5.96995	0.559754	0.0390728
TP Weir Out (kg/yr)	0.189728	0.517333	0.409568	2.0364	0
TP Transfer Function Out (kg/yr)	0	0	0	0	0
TP Reuse Supplied (kg/yr)	0	0	0	0	0.217818
TP Reuse Requested (kg/yr)	0	0	0	0	0
TP % Reuse Demand Met	0	0	0	0	0
TP % Load Reduction	43.9896	26.1269	51.2086	32.4397	86.7229
TN Flow In (kg/yr)	28.6749	17.9077	73.8614	35.4684	4.15905
TN ET Loss (kg/yr)	0	0	0	0	0
TN Infiltration Loss (kg/yr)	0	0	0	0	0
TN Low Flow Bypass Out (kg/yr)	0	0	0	0	0
TN High Flow Bypass Out (kg/yr)	0	0	0	0	0
TN Orifice / Filter Out (kg/yr)	26.4213	2.73105	64.7702	3.09204	0.543861
TN Weir Out (kg/yr)	1.53875	7.10585	3.01993	23.1011	0
TN Transfer Function Out (kg/yr)	0	0	0	0	0
TN Reuse Supplied (kg/yr)	0	0	0	0	2.81114
TN Reuse Requested (kg/yr)	0	0	0	0	0
TN % Reuse Demand Met	0	0	0	0	0
TN % Load Reduction	2.49295	45.0688	8.21981	26.1508	86.9234
GP Flow In (kg/yr)	183.368	182.863	472.45	332.802	46.984
GP ET Loss (kg/yr)	0	0	0	0	0
GP Infiltration Loss (kg/yr)	0	0	0	0	0
GP Low Flow Bypass Out (kg/yr)	0	0	0	0	0
GP High Flow Bypass Out (kg/yr)	0	0	0	0	0
GP Orifice / Filter Out (kg/yr)	0	0	0	0	0
GP Weir Out (kg/yr)	0	0	0	0	0
GP Transfer Function Out (kg/yr)	0	0	0	0	0
GP Reuse Supplied (kg/yr)	0	0	0	0	0
GP Reuse Requested (kg/yr)	0	0	0	0	0
GP % Reuse Demand Met	0	0	0	0	0
GP % Load Reduction	100	100	100	100	100
PET Scaling Factor		2.1		2.1	

Generic treatment nodes			
Location	Ecosol Trash Rack - 50mm	Copy of Ecosol Trash Rack - 50mm	Copy of Copy of Ecosol Trash Rack - 50mm
ID	21	22	28
Node Type	GPTNode	GPTNode	GPTNode
Lo-flow bypass rate (cum/sec)	0	0	0
Hi-flow bypass rate (cum/sec)	2	2	2
Flow Transfer Function			
Input (cum/sec)	0	0	0
Output (cum/sec)	0	0	0
Input (cum/sec)	10	10	10
Output (cum/sec)	10	10	10
Input (cum/sec)			
Output (cum/sec)			
Input (cum/sec)			
Output (cum/sec)			
Input (cum/sec)			
Output (cum/sec)			
Input (cum/sec)			
Output (cum/sec)			
Input (cum/sec)			
Output (cum/sec)			
Input (cum/sec)			
Output (cum/sec)			
Input (cum/sec)			
Output (cum/sec)			
Gross Pollutant Transfer Function			
Enabled	TRUE	TRUE	TRUE
Input (kg/ML)	0	0	0
Output (kg/ML)	0	0	0
Input (kg/ML)	1000	1000	1000
Output (kg/ML)	70	70	70
Input (kg/ML)			
Output (kg/ML)			
Input (kg/ML)			
Output (kg/ML)			
Input (kg/ML)			
Output (kg/ML)			
Input (kg/ML)			
Output (kg/ML)			
Input (kg/ML)			
Output (kg/ML)			
Input (kg/ML)			
Output (kg/ML)			
Input (kg/ML)			
Output (kg/ML)			
Total Nitrogen Transfer Function			
Enabled	TRUE	TRUE	TRUE
Input (mg/L)	0	0	0
Output (mg/L)	0	0	0
Input (mg/L)	1000	1000	1000
Output (mg/L)	700	700	700
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
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Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Total Phosphorus Transfer Function			
Enabled	TRUE	TRUE	TRUE
Input (mg/L)	0	0	0
Output (mg/L)	0	0	0
Input (mg/L)	1000	1000	1000
Output (mg/L)	650	650	650
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Input (mg/L)			
Output (mg/L)			
Total Suspended Solids Transfer Function			
Enabled	TRUE	TRUE	TRUE
Input (mg/L)	0	0	0
Output (mg/L)	0	0	0
Input (mg/L)	1000	1000	1000
Output (mg/L)	600	600	600
Input (mg/L)			

Output (mg/L)				
Input (mg/L)				
Output (mg/L)				
Input (mg/L)				
Output (mg/L)				
Input (mg/L)				
Output (mg/L)				
Input (mg/L)				
Output (mg/L)				
Input (mg/L)				
Output (mg/L)				
Input (mg/L)				
Output (mg/L)				
Input (mg/L)				
Output (mg/L)				
TSS Flow based Efficiency Enabled	Off	Off	Off	
TSS Flow based Efficiency				
TP Flow based Efficiency Enabled	Off	Off	Off	
TP Flow based Efficiency				
TN Flow based Efficiency Enabled	Off	Off	Off	
TN Flow based Efficiency				
GP Flow based Efficiency Enabled	Off	Off	Off	
GP Flow based Efficiency				
IN - Mean Annual Flow (ML/yr)	33.3	15.4	2.31	
IN - TSS Mean Annual Load (kg/yr)	1.80E+03	809	816	
IN - TP Mean Annual Load (kg/yr)	6.38	2.91	1.41	
IN - TN Mean Annual Load (kg/yr)	67.8	28	5.59	
IN - Gross Pollutant Mean Annual Load (kg/yr)	0	0	55.8	
OUT - Mean Annual Flow (ML/yr)	33.3	15.4	2.31	
OUT - TSS Mean Annual Load (kg/yr)	1.08E+03	486	490	
OUT - TP Mean Annual Load (kg/yr)	4.15	1.89	0.914	
OUT - TN Mean Annual Load (kg/yr)	47.5	19.6	3.91	
OUT - Gross Pollutant Mean Annual Load (kg/yr)	0	0	3.91	
Flow In (ML/yr)	33.3305	15.4145	2.30572	
ET Loss (ML/yr)	0	0	0	
Infiltration Loss (ML/yr)	0	0	0	
Low Flow Bypass Out (ML/yr)	0	0	0	
High Flow Bypass Out (ML/yr)	0	0	0	
Orifice / Filter Out (ML/yr)	0	0	0	
Weir Out (ML/yr)	0	0	0	
Transfer Function Out (ML/yr)	33.3305	15.4145	2.30572	
Reuse Supplied (ML/yr)	0	0	0	
Reuse Requested (ML/yr)	0	0	0	
% Reuse Demand Met	0	0	0	
% Load Reduction	0	0	0	
TSS Flow In (kg/yr)	1800.54	809.437	816.003	
TSS ET Loss (kg/yr)	0	0	0	
TSS Infiltration Loss (kg/yr)	0	0	0	
TSS Low Flow Bypass Out (kg/yr)	0	0	0	
TSS High Flow Bypass Out (kg/yr)	0	0	0	
TSS Orifice / Filter Out (kg/yr)	0	0	0	
TSS Weir Out (kg/yr)	0	0	0	
TSS Transfer Function Out (kg/yr)	1080.32	485.657	489.601	
TSS Reuse Supplied (kg/yr)	0	0	0	
TSS Reuse Requested (kg/yr)	0	0	0	
TSS % Reuse Demand Met	0	0	0	
TSS % Load Reduction	40.0004	40.0006	40.0001	
TP Flow In (kg/yr)	6.37953	2.91269	1.40547	
TP ET Loss (kg/yr)	0	0	0	
TP Infiltration Loss (kg/yr)	0	0	0	
TP Low Flow Bypass Out (kg/yr)	0	0	0	
TP High Flow Bypass Out (kg/yr)	0	0	0	
TP Orifice / Filter Out (kg/yr)	0	0	0	
TP Weir Out (kg/yr)	0	0	0	
TP Transfer Function Out (kg/yr)	4.14669	1.89332	0.913554	
TP Reuse Supplied (kg/yr)	0	0	0	
TP Reuse Requested (kg/yr)	0	0	0	
TP % Reuse Demand Met	0	0	0	
TP % Load Reduction	35.0001	34.9975	34.9999	
TN Flow In (kg/yr)	67.7901	27.9597	5.58922	
TN ET Loss (kg/yr)	0	0	0	
TN Infiltration Loss (kg/yr)	0	0	0	
TN Low Flow Bypass Out (kg/yr)	0	0	0	
TN High Flow Bypass Out (kg/yr)	0	0	0	
TN Orifice / Filter Out (kg/yr)	0	0	0	
TN Weir Out (kg/yr)	0	0	0	
TN Transfer Function Out (kg/yr)	47.4532	19.5722	3.91245	
TN Reuse Supplied (kg/yr)	0	0	0	
TN Reuse Requested (kg/yr)	0	0	0	
TN % Reuse Demand Met	0	0	0	
TN % Load Reduction	29.9998	29.9987	30.0001	
GP Flow In (kg/yr)	0	0	55.7935	
GP ET Loss (kg/yr)	0	0	0	
GP Infiltration Loss (kg/yr)	0	0	0	
GP Low Flow Bypass Out (kg/yr)	0	0	0	
GP High Flow Bypass Out (kg/yr)	0	0	0	
GP Orifice / Filter Out (kg/yr)	0	0	0	
GP Weir Out (kg/yr)	0	0	0	
GP Transfer Function Out (kg/yr)	0	0	3.90555	
GP Reuse Supplied (kg/yr)	0	0	0	
GP Reuse Requested (kg/yr)	0	0	0	
GP % Reuse Demand Met	0	0	0	
GP % Load Reduction	100	100	100	

Other nodes

Location	Junction	Junction	Receiving Node	
ID	1	2	3	
Node Type	JunctionNode	JunctionNode	ReceivingNode	
IN - Mean Annual Flow (ML/yr)	15.4	33.3	51.1	
IN - TSS Mean Annual Load (kg/yr)	486	1.08E+03	2.06E+03	
IN - TP Mean Annual Load (kg/yr)	1.89	4.15	6.95	
IN - TN Mean Annual Load (kg/yr)	19.6	47.5	70.9	
IN - Gross Pollutant Mean Annual Load (kg/yr)	0	0	3.91	
OUT - Mean Annual Flow (ML/yr)	15.4	33.3	51.1	
OUT - TSS Mean Annual Load (kg/yr)	486	1.08E+03	2.06E+03	
OUT - TP Mean Annual Load (kg/yr)	1.89	4.15	6.95	
OUT - TN Mean Annual Load (kg/yr)	19.6	47.5	70.9	
OUT - Gross Pollutant Mean Annual Load (kg/yr)	0	0	3.91	
% Load Reduction	1.92	5.36	4.11	
TSS % Load Reduction	81.8	86	81.6	
TN % Load Reduction	66.7	45.3	45	
TP % Load Reduction	66	71.5	67.7	
GP % Load Reduction	100	100	99.7	

Links

Location	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link	Drainage Link
Source node ID	2	1	6	23	21	19	22	7	13	24	25	9	18	16	5	14	11	17	8	26	12	20	27	10	4	15	28					
Target node ID	3	3	20	21	2	22	1	19	19	20	19	23	23	23	23	26	26	26	26	23	19	19	26	27	26	28	3					
Muskingum-Cunge Routing	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed	Not Routed					
Muskingum-K																																
Muskingum-theta																																
IN - Mean Annual Flow (ML/yr)	33.3	15.4	6.63	33.3	33.3	15.4	15.4	6.67	0.378	1.19	0.318	1.21	1.83	9.47	7.01	0.256	1.74	6.8	1.7	13.9	0.526	7.64	0.284	1.94	3.26	2.31	2.31					
IN - TSS Mean Annual Load (kg/yr)	1.08E+03	486	172	1.80E+03	1.08E+03	809	486	2.27E+03	9.8	176	32.1	31.8	382	3.35E+03	2.36E+03	6.67	46.4	1.35E+03	42.3	639	13.3	118	5.09	52.6	87	816	490					
IN - TP Mean Annual Load (kg/yr)	4.15	1.89	1.02	6.38	4.15	2.91	1.89	3.91	5.78E-02	0.418	9.22E-02	0.182	0.757	5.52	4.03	3.82E-02	0.255	2.77	0.251	2.59	8.11E-02	1.06	3.91E-02	0.294	0.479	1.41	0.914					
IN - TN Mean Annual Load (kg/yr)	47.5	19.6	14.8	67.8	47.5	28	19.6	16	0.842	3.12	0.845	2.68	5.33	22.9	16.8	0.57	3.85	19.6	3.71	26.2	1.16	9.84	0.544	4.16	7.23	5.59	3.91					
IN - Gross Pollutant Mean Annual Load (kg/yr)	0	0	161	0	0	0	0	162	9.14	22.3	0	29.4	44.4	229	170	6.2	42.1	164	41.1	0	12.7	0	0	47	79	55.8	3.91					
OUT - Mean Annual Flow (ML/yr)	33.3	15.4	6.63	33.3	33.3	15.4	15.4	6.67	0.378	1.19	0.318	1.21	1.83	9.47	7.01	0.256	1.74	6.8	1.7	13.9	0.526	7.64	0.284	1.94	3.26	2.31	2.31					
OUT - TSS Mean Annual Load (kg/yr)	1.08E+03	486	172	1.80E+03	1.08E+03	809	486	2.27E+03	9.8	176	32.1	31.8	382	3.35E+03	2.36E+03	6.67	46.4	1.35E+03	42.3	639	13.3	118	5.09	52.6	87	816	490					
OUT - TP Mean Annual Load (kg/yr)	4.15	1.89	1.02	6.38	4.15	2.91	1.89	3.91	5.78E-02	0.418	9.22E-02	0.182	0.757	5.52	4.03	3.82E-02	0.255	2.77	0.251	2.59	8.11E-02	1.06	3.91E-02	0.294	0.479	1.41	0.914					
OUT - TN Mean Annual Load (kg/yr)	47.5	19.6	14.8	67.8	47.5	28	19.6	16	0.842	3.12	0.845	2.68	5.33	22.9	16.8	0.57	3.85	19.6	3.71	26.2	1.16	9.84	0.544	4.16	7.23	5.59	3.91					
OUT - Gross Pollutant Mean Annual Load (kg/yr)	0	0	161	0	0	0	0	162	9.14	22.3	0	29.4	44.4	229	170	6.2	42.1	164	41.1	0	12.7	0	0	47	79	55.8	3.91					

Catchment Details

Catchment Name	TK15901
Timestep	6 Minutes
Start Date	1/01/1959
End Date	31/12/1959 23:54
Rainfall Station	66062 SYDNEY
ET Station	Monthly User Defined
Mean Annual Rainfall (mm)	1490
Mean Annual ET (mm)	1260

EPS

08 December 2021

Revelop Building and Developments Pty Ltd

Via email: emily@revelop.com.au

FLORA & FAUNA ASSESSMENT – PROPOSED CHISHOLM PLAZA AT WATERFORD COUNTY, CHISHOLM

This letter contains a Supplementary Flora and Fauna Assessment of the above proposed Chisholm Plaza development works. It has been prepared to identify any likely significant impacts to threatened species, populations or ecological communities that might occur as a result of the proposed works. The need for this supplementary flora and fauna assessment has been prompted due to the rezoning of the site, where its purpose is to support the lodgement of a new Development Application.

This assessment has been undertaken to provide specific additional assessment against the likely impacts of development and construction. Similarly, to the previous assessment undertaken by EPS for the proposed Commercial Centre, it is considered appropriate for a simplified ecological assessment to be undertaken, given the obvious high level of disturbance to the proposed development area and given previous ecological investigations that have already been completed on the site. The following comprehensive Flora and Fauna Impact Assessment has also previously been completed for the greater site in 2007 by Ecotone Ecological Consultants:

- Flora and Fauna Impact Assessment for the proposed rezoning of land at Lot 12 DP 603613 at Thornton North from rural to residential

The previous comprehensive assessment should also be referred to for more detailed information for the greater Waterford County development site.

Stages 1 – 23 at Waterford County have either been fully constructed and occupied, or are currently in the process of construction.

Level 33, 264 George St, Sydney NSW 2000
9 Yacaaba St, Nelson Bay, NSW 2315
Telephone (Sydney): 02 9258 1985
Telephone (Hunter): 02 4981 1600
ABN: 17 143 490 537
Website: www.enviroproperty.com.au

1. Proposed Works

Development of land off Heritage Drive, Tigerhawk Drive and Settlers Boulevard is proposed. Proposed works include a central access road and commercial facilities. Commercial facilities to be provided include a proposed supermarket, medical centre, retail areas, food and drink premises and associated car parking. Figure 1 illustrates the main aspects of the proposal.

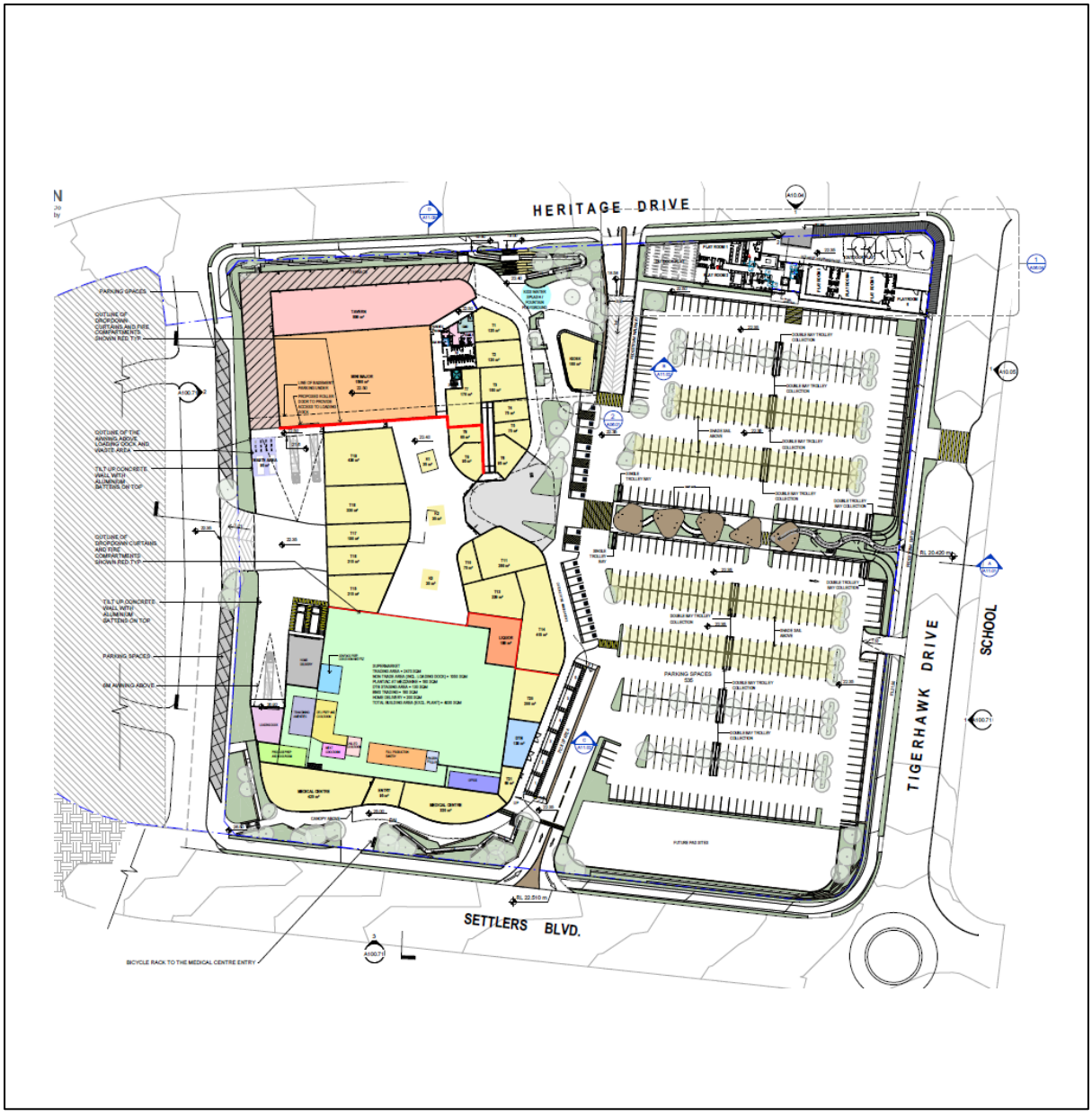

Figure 1: Proposal Overview

It is likely that approximately three (3) remnant trees of various size, including one (1) hollow-bearing tree, will need to be removed from the site to accommodate the proposed development.

2. Site Description

The site is located at Chisholm within an open agricultural landscape. It is situated on elevated areas to the south of the floodplain of Four Mile Creek, a tributary of the Hunter River. The area surrounding the site consist of recent residential and community infrastructure development (i.e. previous stages of Waterford County), open agricultural areas, and remnant forest / woodland. Also located to the north of Four Mile Creek is the Morpeth Wastewater Treatment Works.

The open grassed landscape contains few trees as shown in Plate 1 below.

Plate 1: The open grassed landscape contains few trees.

Figure 2 provides an aerial photo overview of the site location.

Figure 2: Aerial photo overview of approximate site boundary (yellow line), location and the single hollow-bearing tree.

A photo which could be broadly described as being indicative of the characteristics of the site is provided below in Plate 2.

Plate 2: View of site looking south.

3. Legislative Context

EPBC Act 1999

The primary objective of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to 'provide for the protection of the environment, especially those aspects of the environment that are Matters of National Environmental Significance' (Matters of NES). Environmental approvals under the EPBC Act may be required for an 'action' that is likely to have a significant impact on Matters of NES being:

- World Heritage Areas;
- National Heritage Places;
- Ramsar wetlands of international importance;
- Nationally listed threatened species and ecological communities;
- Listed migratory species;
- Commonwealth marine areas;
- Nuclear actions;
- Great Barrier Reef Marine Park; and
- A water resource in relation to coal seam gas development and large coal mining development.

Of potential relevance to the site are Matters of NES which include nationally listed threatened species, ecological communities and listed migratory species. Where there is the potential for a proposal to have a significant impact on any Matter of NES a Referral under the EPBC Act is submitted to Department of the Environment and Energy (DoEE) for approval.

BC Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) aims to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act is integrated with the EP&A Act and requires consideration of whether a development (Part 4 of the EP&A Act) or an activity (Part 5 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

The potential impact of development of the site on any threatened species, populations or communities is assessed using Assessments of Significance under Section 7.3 of the BC Act (also known as a five-part test). If the impacts are found to be 'significant', the NSW Biodiversity Offset Scheme (BOS) is triggered and the Biodiversity Assessment Methodology must be applied (and offsets must be provided).

The BC Act also nominates native vegetation clearing thresholds over which offsetting is required. Thresholds are outlined in Section 7.2 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). For each development, this involves determining the extent of the native vegetation

clearing in relation to the minimum lot size associated with the property to determine if the threshold has been exceeded.

The BOS is also triggered if the Biodiversity Values Map under Clause 7.3 of the BC Regulation maps the vegetation on the site as having high biodiversity value.

In summary, the BOS and related application of the BAM is triggered when:

- Native vegetation clearing for a project exceeds thresholds nominated in the BC Regulation;
- Clearing of native vegetation on land included on the Biodiversity Values Map is to occur; or
- According to the carrying out of the Assessment of Significance (5 Part Test), a significant impact is likely to occur.

This report identifies whether the BOS should apply to the project via the carrying out of the Assessment of Significance process. This is because (as described in further detail later in this letter) clearing thresholds will not be exceeded and the site is not mapped as having high biodiversity value on the Biodiversity Values Map.

Other relevant Acts

The *Fisheries Management Act 1994* (FM Act) and *Water Management Act 2000* have also been considered as part of this assessment, where relevant. Consideration of SEPP 44 – Koala Habitat Protection has also occurred.

4. Desktop Assessment

Updated searches of the NSW and Commonwealth databases were undertaken and the species and communities are included in Appendix 1. The databases reviewed consisted of:

- NSW BioNet - http://www.bionet.nsw.gov.au
- Commonwealth Department of the Environment and Energy Protected Matters search tool

A review of the Maitland vegetation mapping for the area by Hill revealed that the majority of the site was mapped as being cleared. The eastern edge of the site is mapped as containing Lower Hunter Spotted Gum Ironbark Forest (Part Clearing with regeneration occurring), however, the site visit revealed that this area was no longer treed.

5. Flora and Fauna Survey

The field work component of this report was conducted in accordance with National Parks and Wildlife Act 1974 (NP&W Act) Section 132 (c) Scientific Licence (SL100772). The licence permits the undertaking of biodiversity assessments, Species Impacts Statements, ecological surveys and abiotic sampling as part of flora and fauna survey work.

The primary guideline that guides ecological survey in the Maitland Local Government Area is the Lower Hunter Central Coast Regional Environmental Management Strategy Flora and Survey Guidelines (2012). Review of these guidelines indicates that for an impact that is likely to remove only a small amount of remnant paddock trees, a modified survey methodology is appropriate.

It was determined that an initial site inspection and recording of ecological characteristics would be an appropriate approach to determine whether additional detailed surveys (such as trapping, night work etc.) were warranted. As a previous assessment has been conducted in this area by EPS and an extensive survey had previously also been completed by Ecotone Ecological Consultants in 2007 this approach was also considered to be acceptable for the purposes of a supplementary report.

It was determined following the site inspection that additional surveys were not warranted. This was because the vegetation to be impacted directly by the proposed works was primarily exotic and unlikely to form significant habitat for threatened species and did not comprise an intact threatened ecological community.

The survey was undertaken by Alan Midgley (Ecologist) on 17 October 2017 and included the following:

- Initial inspection of the site and proposed works area;
- Inspection of all trees requiring removal (including re-checking whether any tree hollows are present);
- Inspection of the understorey vegetation to be impacted by the proposed works;
- Recording flora species observed within the proposed works area;
- Observations of any signs indicating the presence of fauna species;
- Recording all fauna observed during the inspection;
- Targeting the presence of all threatened fauna, including Koala habitat; and
- Observation of the existing drainage situation and how the proposed works might impact the Four Mile Creek floodplain.

6. Results

Flora

It was determined that the vegetation within the site was occupied almost entirely by exotic species. The understorey is comprised of regularly mown lawn. No significant remnant native understorey vegetation exists on the site.

Dominant exotic understorey species present within the site included:

- Fireweed (*Senecio madagascariensis*);
- Lamb's Tongues (*Plantago lanceolata*)
- Couch (*Cynodon dactylon*);
- Purpletop (*Verbena bonariensis*);
- Cobblers Pegs (*Bidens pilosa*);
- Kikuyu (*Cencrhus clandestinum*); and
- Bindi (*Soliva sessilis*).

No conditions considered to be suitable for threatened flora exist.

While the majority of the site was completely cleared, two (2) remnant Spotted Gum trees and one (1) Broad-leaved White Mahogany tree was observed. No native understorey was found to exist.

Examples of the cleared area that covers the site and the remaining remnant trees are provided above in Plate 1 and below in Plate 3.

Plate 3: View of a remaining remnant tree (hollow-bearing) on the site with native understorey absent.

Habitat

Little to no habitat for native flora was provided by the site. Some fauna habitat was provided by the small number of remnant trees. Such habitat includes the branches for perching and the cover provided by the vegetation for native fauna. When in flower, the Spotted Gums would also provide foraging habitat for nectarivorous species such as honeyeaters, parrots and flying foxes.

Only one (1) hollow-bearing tree, containing a small hollow (<5cm diameter), was observed (refer to Plate 3) in the north-western extent of the site. Due to the isolation of this tree, this hollow offers only very marginal potential roosting and nesting habitat to microbats and other small mammals. Suitable habitat for Koala was not recorded. No indications of Koala presence were observed. The structural diversity of the habitat was considered to be low.

The Four Mile Creek floodplain and associated waterbodies are located over 500m to the northernmost point of the site and are separated by agricultural paddocks, recently constructed roadways and mown environments. While the Four Mile Creek floodplain would provide habitat for a range of native flora and fauna, any runoff from the proposed development is to be treated appropriately in accordance with Council requirements and is not expected to be negatively impacted by the project either directly or indirectly.

Fauna

Opportunistic observations were made of the following common species, either by direct observation on-site or calling in the vicinity of the site:

- Rainbow Lorikeet;
- Australian Magpie-lark;
- Australian Raven;
- Welcome Swallow;
- Indian Myna;
- Straw-necked Ibis; and
- Kookaburra.

No reptiles, amphibians or other mammals were recorded. No threatened species were recorded. No Grey-crowned Babblers or nests were recorded.

This bird list is indicative of the highly disturbed nature of the site. These common species are likely to use the site as part of their broader habitat ranges.

7. Discussion and Impact Assessment

As outlined previously, it was determined due to the disturbed nature of the site, that additional site investigations were not necessary. The total maximum direct impact on native vegetation equates to a total of three isolated native paddock trees.

No threatened species, populations or ecological communities were considered likely to rely on the habitats provided by the site. The single hollow-bearing tree observed on the site was isolated from nearby treed areas and is unlikely to provide significant habitat to fauna species. Intact treed areas to the east of the site are likely to provide preferred habitat for fauna species.

Consideration of whether further detailed impact assessment was necessary was undertaken. Appendix 1 provides an analysis of species. No detailed EPBC Act assessment is considered warranted due to the limited nature of impacts and the primarily exotic nature of the vegetation.

A 5-part test has however been provided in Appendix 2 to assess the impacts of the project upon threatened species and ecological communities, at a State level.

8. Conclusions and Recommendations

It is considered that the proposed development is unlikely to significantly impact any threatened species or ecological communities as listed under the EPBC Act, BC Act or FM Act.

The site has been historically disturbed for agricultural activities and contains occasional remnant trees, with only a single small hollow recorded. The site is considered likely primarily to provide habitat for common species of fauna that also have extensive and better habitat in the local remnant forests.

No additional specific issues have been identified that require additional consideration when compared to the original Ecotone Ecological Consultants report that was prepared for the area in 2007 and the more recent flora and fauna assessment conducted by EPS in 2016.

It is considered that a Referral to the DoEE under the EPBC Act is not required.

It is considered under the BC Act that offsets are not required as part of the project. To trigger offsets, the minimum threshold for native vegetation clearing is > 0.25ha. As the impact footprint on native vegetation is below this threshold, the site is not mapped as being of high biodiversity value on the Biodiversity Value Map, and the 5 part test has concluded a non-significant impact, the proposal does not trigger the need for offsetting via the NSW Biodiversity Offset Scheme.

The following recommendations should be considered for implementation:

- Appropriate erosion and sediment erosion control mechanisms should be implemented during construction, particularly to avoid impacts to the receiving waters of the Four Mile Creek floodplain and nearby drainage areas; and
- Where possible, landscaping should preferably occur using species native to the local area, which could actually lead to a net gain in native vegetation on the development area when compared to the current habitat condition;
- Retention of existing paddock trees should be considered, where safe and appropriate; and
- Where removal of the hollow-bearing tree is required, an ecologist should be present during tree removal to monitor and manage any potential resident fauna.

If you require any further information, please contact the undersigned on 4981 1600.

Yours sincerely,

Toby Lambert
Director - Ecology

EPS

Appendix 1

Threatened Species Assessment

Species, populations and communities with a likelihood of occurrence of greater than Moderate have had potential impacts formally assessed using a 5-part test under the *Environmental Planning and Assessment Act 1979* (see Appendix 8).

E1 - Endangered; E2 - Endangered Population; E3 - Endangered ecological community; E4 Critically endangered; P - Protected; K - Known occurrence; PR - Predicted occurrence; V - Vulnerable

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Amphibians						
Litoria aurea	Green and Golden Bell Frog	E1, P	V	Distributed from NSW north coast near Brunswick Heads, southwards along NSW coast to Victoria where it extends into east Gippsland. Inhabits marshes, dams and stream-sides, particularly those containing bulrushes or spikerushes. Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Birds						
Anseranas semipalmata	Magpie Goose	V	-	Mainly found in shallow wetlands (less than 1m deep) with dense growth of rushes or sedges. Often seen grazing on land; feeds on grasses, bulbs and rhizomes. Most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	Low. No suitable habitat.	Low.
Oxyura australis	Blue-billed Duck	V, P	-	This species is endemic to south-eastern and south-western Australia. It prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. They feed on the bottom of swamps.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Stictonetta naevosa	Freckled Duck	V, P	-	Found primarily in south-eastern and south-western Australia. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	Low. No suitable habitat.	Low.
Ephippiorhynchus asiaticus	Black-necked Stork, Jabiru	E1, P	-	Widespread in coastal and subcoastal northern and eastern Australia, south to central-eastern NSW. Mainly found on shallow, permanent, freshwater terrestrial wetlands, and surrounding marginal vegetation, including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters, as well as extending into adjacent grasslands, paddocks and open savannah woodlands.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P	C	Distributed along the coastline of Australia, also extending inland along some larger waterways. Habitat includes large areas of open water. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland and forest. Breeding territories are close to water, mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest, closed scrub or in remnant trees on cleared land.	Low. No suitable habitat.	Low.
Hamirostra melanosternon	Black-breasted Buzzard	V, P, 3	-	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands.	Low. No suitable habitat.	Low.
Pandion cristatus	Eastern Osprey	V, P, 3	-	Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Erythrotriorchis radiatus	Red Goshawk	E4	V	Occurs sparsely through northern and eastern Australia from Western Australian Kimberley division to north eastern Queensland and south to far north-eastern NSW with scattered records in central Australia. Inhabit open woodland and forest preferring mosaic of vegetation types. Often found in riparian habitats along or near watercourses or wetlands.	Low. No suitable habitat.	Low.
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	Distributed from southern Victoria through south and central-eastern New South Wales. In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.	Low. No suitable habitat.	Low.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Feeds almost exclusively on the seeds of *Casuarina sp*. and *Allocasuarina sp.* Open forest and woodlands up to 1000m with feed trees present.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Glossopsitta pusilla	Little Lorikeet	V, P		Forages in flowering eucalypts and Melaleuca sp. Riparian habitats are particularly used, due to higher soil fertility and greater productivity. Nests in tree hollows.	Moderate. Some foraging habitat in Eucalypt paddock trees.	Low.
Grantiella picta	Painted Honeyeater	V	V	Nomadic species and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	Low. No suitable habitat.	Low.
Lathamus discolor	Swift Parrot	E1, P, 3	E	Migrates to south-eastern mainland Mar-Oct. Winter-flowering trees such as *Eucalyptus robusta*, *Corymbia maculata*, *C. gummifera*, *E. sideroxylon* and *E. albens* are important. Breeds in Tasmania.	Moderate. Some foraging habitat in Spotted Gum paddock trees.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Neophema pulchella	Turquoise Parrot	V	-	Range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Low. Minor habitat present.	Low.
Ninox connivens	Barking Owl	V, P, 3	-	Woodland and open forest including fragmented remnants and partly cleared farmland. Preferentially hunts small arboreal mammals such as squirrel gliders and ringtail possums. But as prey decreases becomes reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Large tree hollows are used for nesting.	Low. Minor foraging habitat.	Low.
Ninox strenua	Powerful Owl	V, P, 3	-	Endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	Low. Minor foraging habitat.	Low.
Tyto novaehollandiae	Masked Owl	V, P, 3		Extends from the coast where it is most abundant to the western plains. Lives in dry eucalypt forests and woodlands from sea level to 1100m.	Low. Minor foraging habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Occupies in mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.	Low. Minor foraging habitat.	Low.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (Eastern subspecies)	V, P	-	Inhabits open Box-Gum Woodlands on the slopes and Box-Cypress pine and open Box Woodlands on alluvial plains. Live in family groups that consist of a breeding pair and young from previous breeding seasons. Have broad white eyebrow and a pale grey crown-stripe are other distinguishing characters.	Moderate. Some marginal foraging and nesting habitat around Eucalypt paddock trees. Previously recorded in immediate locality.	Low.
Daphoenositta chrysoptera	Varied Sittella	V	-	Eucalypt forests and woodlands, particularly those with rough-barked species, mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low. Minor foraging habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	This species habitat is within woodlands and dry sclerophyll forests dominated by Eucalypts and Mallee associations. This species feeds on insects and other invertebrates captured on the wing. Occasionally feeds on nectar, fruit and seeds. Distribution of this species is widespread in NSW from the coast to inland including the western slopes and plains.	Low. Minor foraging habitat.	Low.
Petroica boodang	Scarlet Robin	V	-	Dry eucalypt forests and woodland with open grassy understorey with few scattered shrubs. Occurs in both mature and regrowth forests and occasionally occurs in mallee, wet forests, wetlands and tea-tree swamps.	Low. Minor foraging habitat.	Low.
Anthochaera phrygia	Regent Honeyeater	CE	CE	Dry open forest and woodland. Particularly box-ironbark woodland and riparian forests of river sheoak. Feeds on the nectar from a wide range of eucalypts and mistletoes.	Moderate. Some foraging habitat in Spotted Gum paddock trees.	Low.
Botaurus poiciloptilus	Australasian Bittern	E1	E	Inhabits terrestrial and estuarine wetlands, generally where there is permanent water. The species prefers wetlands with dense vegetation, including sedges, rushes and reeds.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Rostratula australis	Australian Painted Snipe	E1	E	Restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin. In NSW many records are from the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Low. No suitable habitat.	Low.
Mammals						
Phascogale tapoatafa	Brush-tail Phascogale	V, P	-	Mostly found in dry sclerophyll open forest with sparse groundcover, east of the Great Dividing Range. However, has been recorded in heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with small entrances (2.5 - 4cm).	Low. Site consists of few isolated paddock trees, with only one isolated tree containing a small hollow. Species is not generally known to occur in the locality.	Low.
Dasyurus maculatus maculatus	Spotted-tail Quoll, Tiger Quoll	V, P	E	A variety of vegetation such as rainforest, open forest, woodland, coastal heath, inland riparian forest. Have home ranges 750 - 3500 ha. Den sites may be located in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky cliffs.	Low. No suitable habitat and not likely to occur due to disturbed nature of the site.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Phascolarctos cinereus	Koala	V, P	V	Found in eucalypt woodlands and forest foraging on preferred food trees.	Low. No pockmarks on trees or scats recorded. No suitable habitat. No recent local records in the locality.	Low.
Potorus tridactylus tridactylus	Long-nosed Potoroo	V, P	V	Very limited distribution and extremely rare. A small population has been found in far S.E NSW. Typically inhabits moist forest types from montane wet sclerophyll forests over 1000m altitude to lowland forests at 150m. Primary food source is the fruit-bodies of hypogeous (underground fruiting) fungi. Fruit and some small invertebrates are also eaten. During the day it shelters in a crude nest under dense understorey vegetation.	Low. Negligible suitable habitat.	Low.
Petaurus norfolcensis	Squirrel Glider	V, P	-	Inhabits mature or old growth box, box-ironbark woodlands and river red gum forest west of the Great Dividing Range. Prefers mixed species stands with a shrub or Acacia midstorey. Uses tree hollows as den sites.	Low-moderate. Although previously recorded in the area, the site contains few isolated paddock trees, with only one isolated tree containing a small hollow.	Low.
Petauroides volans	Greater Glider	-	V	The Greater Glider occurs in eucalypt forests and woodlands along the east coast of Australia. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows.	Low. Site consists of few isolated paddock trees, with only one isolated tree containing a small hollow. Species is not generally known to occur in the locality.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Pseudomys novaehollandiae	New Holland Mouse	-	V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	Low. No suitable habitat.	Low.
Pteropus poliocephalus	Grey-headed Flying Fox	V, P	V	This species is generally found within 200 km of Australia's eastern coast. Generally occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy.	Moderate. Some potential foraging habitat in isolated Spotted Gum paddock trees. Previously recorded in immediate locality.	Low.
Chalinobolus dwyeri	Large-eared Pied Bat	V, P	V	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features. Also found in well-timbered areas containing gullies.	Moderate. Marginal foraging habitat only.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Saccolaimus falviventris	Yellow-bellied Sheathtail Bat	V, P	-	Wide-ranging species found across northern and eastern Australia. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.
Mormopterus norfolkensis	Eastern Freetail-bat	V, P	-	The Eastern Freetail-bat is found along the east coast from south QLD to southern NSW. Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V, P	-	Found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Miniopterus australis	Little Bentwing-bat	V, P	-	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, *Melaleuca* swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V, P	-	Forages in a range of habitat types. Roosts in caves, derelict mines, culverts and other man-made structures. Form maternity colonies that are faithful to particular caves.	Moderate. Marginal foraging habitat only.	Low.
Myotis macropus	Southern Myotis	V, P	-	Forages over streams and pools catching insects and small fish by raking their feet across the water surface. Roost close to water in caves, mine shafts, tree hollows and man-made structures.	Low. Aquatic habitat absent.	Low.
Scoteanax rueppellii	Greater Broad-nosed Bat	V, P	-	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. This species usually roosts in tree hollows.	Moderate. Marginal foraging habitat with only one isolated tree containing a small hollow.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Vespadelus troughtoni	Eastern Cave Bat	V, P	-	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	Low. No suitable habitat.	Low.
Flora						
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum, Silvertop Ash, Red Bloodwood and Black Sheoak; appears to prefer open areas in the understorey and is often found in association with the Large Tongue Orchid and the Tartan Tongue Orchid.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Grevillia parviflora subsp. parviflora	Small-flower Grevillia	V	V	Low spreading to erect shrub, usually less than a metre high. Narrow erect leaves that are 2-3.5mm long and less than 1.3mm wide with silky hairs on the underside and a sharp pointed tip. Sporadically distributed throughout the Sydney Basin with sizeable populations around Picton, Appin and Bargo. Separate populations are also known from Putty to Wyong and Lake Macquarie. Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules.	Low. No suitable habitat.	Low.
Prasophyllum sp. Wybong	a leek-orchid	-	CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. Known to occur in open eucalypt woodland and grassland.	Low. No suitable habitat.	Low.
Rutidosis heterogama	Heath Wrinklewort	V	V	Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Low. No suitable habitat.	Low.
Tetratheca juncea	Black-eyed Susan	V	V	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the LGAs of Newcastle, Wyong, Lake Macquarie, Port Stephens, Great Lakes and Cessnock. Occurs in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However it has also been recorded in heathland and moist forest. Associated to Awaba Soil landscape which has low nutrient soils. Low shrub that grows in clumps of single or multiple stems. Flowers face downwards and usually have four petals which range from white to pink to dark purple in colour.	Low. No suitable habitat.	Low.

Scientific Name	Common Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Maundia triglochinoides	-	V	-	Restricted to coastal NSW and extending to southern QLD, grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30-60cm deep on heavy clay soils with low nutrients. Flowering occurs during the warmer months (Nov – Jan). Associated with wetland species.	Low. No suitable habitat.	Low.
Callistemon linearifolius	Netted Bottle Brush	V	-	Recorded from the Georges River to Hawkesbury River in the Sydney area to north of Nelson Bay area of NSW, also recorded in Yengo National Park. Grows in dry Sclerophyll forests on the coast and adjacent ranges. Flowers spring-summer.	Low. No suitable habitat.	Low.
Thesium australe	Austral Toadflax	V	V	Found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Grows in association with *Themeda triandra*.	Low. No suitable habitat.	Low.

Ecological Community Assessment

Species, populations and communities with a likelihood of occurrence of greater than Moderate have had potential impacts formally assessed using a 5-part test under the *Environmental Planning and Assessment Act 1979* (see Appendix 8).

E1 - Endangered; E2 - Endangered Population; E3 - Endangered ecological community; E4 Critically endangered; P - Protected; K - Known occurrence; PR - Predicted occurrence; V - Vulnerable

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Bioregions	E3	CE	Found in the Central Hunter Valley between Singleton and Muswellbrook occurring in area of relatively low rainfall and high temperatures. Associated with Permian lithology and situated on gently undulating hills, slopes and valleys and occasionally on rocky knolls. Characterised by the presence of Narrow-leaved Ironbark (*Eucalyptus crebra*), Kurrajong (*Brachychiton populneus subsp. populneus*) and Grey Box (*Eucalyptus moluccana*). Other tree species such as Rough-barked Apple (*Angophora floribunda*) and Black Cypress Pine (*Callitris endlicheri*) may be present and occasionally dominate or co-dominate. The understorey in intact sites is often present and common shrub species include Velvet Mock Olive (*Notelaea microcarpa var. microcarpa*), Coffee Bush (*Breynia oblongifolia*), Blackthorn (*Bursaria spinosa subsp. spinosa*), *Cassinia quinquefar*ia and Sticky Hop-bush (*Dodonaea viscosa*). Subshrubs may also be common and include Narrawa Burr (*Solanum cinereum*), *Phyllanthus virgatus* and Small-leaf Bluebush (*Maireana microphylla*).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the NSW North Coast and Sydney Bioregions	E3	CE	Found in the Central Hunter Valley mainly between Maitland and Muswellbrook, occurring in areas of undulating country including low rises and slopes on all aspects. Mostly occurs on clayey soils on Permian sediments, may also occur on alluvial and colluvial soils in valleys. Characterised by Narrow-leaved Ironbark (*Eucalyptus crebra*), Spotted Gum (*Corymbia maculata*) and Grey Box (*Eucalyptus moluccana*) forming an open forest. Other tree species such as Red Ironbark (*Eucalyptus fibrosa*) and Forest Red Gum (*Eucalyptus tereticornis*) may be present, and occasionally dominate or co-dominate. A sparse layer of small trees including Bulloak (*Allocasuarina luehmannii*) or Silver-stemmed Wattle (*Acacia parvipinnula*) may be present in some areas. The shrub layer varies from sparse to moderately dense. Common shrub species include Gorse Bitter Pea (*Daviesia ulicifolia subsp. ulicifolia*), Grey Bush-pea (*Pultenaea spinosa*), Coffee Bush (*Breynia oblongifolia*), Needlebush (Hakea sericea) and Blackthorn (Bursaria spinosa subsp. spinosa). Ground cover can be sparse to moderately dense and consists of numerous forbs, a few grass species and occasional ferns and sedges. Common species include Poison Rock Fern (*Cheilanthes sieberi subsp. sieberi*), Barbed Wire Grass (*Cymbopogon refractus*), Whiteroot (*Pratia purpurascens),* Many-flowered Mat-rush (*Lomandra multiflora subsp. multiflora*), Pomax umbellata, Glycine tabacina, Blue Flax-lily (*Dianella revoluta*), Slender Wire Lily (*Laxmannia gracilis*), Vernonia cinerea var. cinerea, Slender Tick-trefoil (*Desmodium varians*) and Kidney Weed (*Dichondra repens*).	Low. No suitable habitat.	Low.
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	V	Coastal Saltmarsh occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. Characteristic plants include *Baumea juncea*, Sea Rush (*Juncus krausii subsp. australiensis*), Samphire (*Sarcocornia quinqueflora subsp. quinqueflora*), Marine Couch (*Sporobolus virginicus*), Streaked Arrowgrass (*Triglochin striata*), Knobby Club-rush (*Ficinia nodosa*), Creeping Brookweed (*Samolus repens*), Swamp Weed (*Selliera radicans*), Seablite (*Suaeda australis*) and Prickly Couch (*Zoysia macrantha*).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Freshwater Wetlands on Coastal floodpplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	-	Found along the majority of the NSW coast, however distinct from the Sydney Freshwater Wetlands. Associated with coastal areas subject to periodic flooding. Standing water persists for at least part of the year in most years. Typically occurs on silts, muds or humic loams in low-lying parts of the floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes. May also occur in backbarrier landforms where floodplains adjoin coastal sandplains. Dominated by herbaceous plants and have very few woody species. Those that lack standing water most of the time are usually dominated by dense grassland or sedgeland vegetation, often forming a turf less than 0.5 metre tall and dominated by amphibious plants including *Paspalum distichum* (water couch), *Leersia hexandra* (swamp rice-grass), *Pseudoraphis spinescens* (mud grass) and *Carex appressa* (tussock sedge). Where they are subject to regular inundation and drying the vegetation may include large emergent sedges over 1 metre tall, such as *Baumea articulata, Eleocharis equisetina* and *Lepironia articulata*, as well as emergent or floating herbs such as *Hydrocharis dubia* (frogbit), *Philydrum lanuginosum* (frogsmouth), *Ludwigia peploides subsp. montevidensis* (water primrose), *Marsilea mutica* (nardoo) and *Myriophyllum spp*. (milfoils). As standing water becomes deeper or more permanent, amphibious and emergent plants become less abundant, while floating and submerged aquatic herbs become more abundant. These latter species include *Azolla filiculoides var. rubra, Ceratophyllum demersum* (hornwort), *Hydrilla verticillata* (water thyme), *Lemna spp.* (duckweeds), *Nymphaea gigantea* (giant waterlily), Nymphoides indica (water snowflake), *Ottelia ovalifolia* (swamp lily) and *Potamageton spp*. (pondweeds). The threatened aquatic plants, *Aldrovanda vesiculosa* and *Najas marina*, also occur within this community.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	E3	-	Found within the Central Hunter Valley geographic distribution, occurring on floodplains and floodplain rises. This community is known to contain the endangered River Red Gum population. Characterised by very tall woodland, occurring on floodplain and associated rises along the Hunter River and tributaries. Generally dominated by *Eucalyptus camaldulensis* (River Red Gum) in combinations with *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus melliodora* (Yellow Box) and *Angophora floribunda* (Rough-barked Apple). Within the community stands of *Casuarina cunninghamiana* subsp. *cunninghamiana* (River Oak) and *Casuarina glauca* (Swamp Oak) can form a part of this community. Dominant groundcovers include *Cynodon dactylon* (Couch), *Alternanthera denticulata* (Lesser Joyweed), *Austrostipa verticillata* (Slender Bamboo Grass), *Dichondra repens* (Kidney Weed), *Lepidium pseudohyssopifolium* (Peppercress), *Pratia concolor* (Poison Pratia), *Urtica incisa* (Stinging Nettle), *Einadia hastata* (Berry Saltbush), *Amaranthus macrocarpus* var. *macrocarpus* (Dwarf Amaranth), *Cyperus fulvus* (Sticky Sedge), *Cynoglossum australe* (Australian Hound's Tongue), *Cyperus gracilis* (Slender Flat-sedge), *Glycine tabacina* (Variable Glycine), *Geranium solanderi* (Native Geranium) and *Microlaena stipoides* var. *stipoides* (Weeping Rice Grass).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Lowland Red Gum Forest in the Sydney Basin and NSW North Coast Bioregions	E3	-	Found between Muswellbrook, Beresfield, Mulbring and Cessnock in the Lower Hunter, occurring on the Permian sediments of the Hunter Valley on gentle slopes of depressions and drainage flats. Characterised by the open forest of *Eucalyptus tereticornis* (Forest Red Gum) and *E. punctata* (Grey Gum). Other frequently occurring canopy species are *Angophora floribunda* (Rough-barked Apple), *E. crebra* (Narrow-leaved Ironbark), *E. moluccana* (Grey Box) and *Corymbia maculata* (Spotted Gum). The understorey is open and consists of the common shrub species include *Breynia oblongifolia* (Coffee Bush), *Leucopogon juniperinus* (Prickly Beard-heath), *Daviesia ulicifolia* (Gorse Bitter Pea) and *Jacksonia scoparia* (Dogwood). The ground cover typically comprises grasses and herbs with common species being *Microlaena stipoides* var. *stipoides* Forest Weeping Grass, *Pratia purpurascens* (Whiteroot), *Lomandra multiflora* (Many-flowered Mat-rush), *Cymbopogon refractus* (Barbed Wire Grass), *Cheilanthes sieberi* (Poison Rock Fern) and *Dichondra repens* (Kidney Weed).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	E3	CE	Found in the Hunter Valley from Bulga to Bylong/Goulburn River National Park and known to occur in Singleton, Muswellbrook and the Upper Hunter local government areas. Occurring on colluvial soils on exposed footslopes associated with the interface between Triassic Narrabeen sandstones and Permian sediments. Characterised by the typically dominated by *Eucalyptus dawsonii* (Slaty Gum) and/or *Eucalyptus moluccana* (Grey Box). *Acacia salicina* (Cooba) and *Allocasuarina luehmannii* (Bulloak). Other trees which may be present include *Brachychiton populneus* subsp. *populneus* (Kurrajong), *Callitris endlicheri* (Black Cypress Pine), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus punctata* (Grey Gum). The understorey includes species such as *Olearia elliptica* (Sticky Daisy Bush), *Acacia cultriformis* (Knife-leaved Wattle), *Canthium odoratum* (Shiny-leaved Canthium), *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Dodonaea viscosa* subsp. *cuneata* (Wedge-leaf Hopbush), *Acacia decora* (Western Golden Wattle) and *Solanum brownii* (Violet Nightshade). The groundcover is typically sparse to very sparse and is relatively species poor. The most frequently occurring species include *Dichondra repens* (Kidney Weed), *Lomandra multiflora* subsp. *multiflora* (Many-flowered Mat-rush), *Aristida ramosa* (Wire Grass), *Brunoniella australis* (Blue Trumpet), *Cymbopogon refractus* (Barbed Wire Grass), *Desmodium brachypodum* (Large Tick-trefoil), *Fimbristylis dichotoma* (Common Fringe-rush) and *Sida corrugata* (Corrugated Sida).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Valley Vine Thicket in the New South Wales North Coast and Sydney Basin Bioregion	E3	-	Hunter Valley Vine Thicket has a highly restricted geographic distribution in the central Hunter Valley. The community occurs mostly as patches of less than 10ha, with a few larger patches exceeding 100 ha. The largest occurrence is at Brushy Hill adjacent to Glenbawn Dam, north east of Scone. The only stand known to occur in a conservation reserve is at Mt Dangar within the Goulburn River National Park. Hunter Valley Vine Thicket has been recorded from the local government areas of Muswellbrook, Singleton, and Upper Hunter but may occur elsewhere within the Sydney Basin Bioregion and NSW North Coast Bioregion. The canopy may include *Elaeodendron australe* (Red Olive Plum), *Geijera parviflora* (Wilga), *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Alectryon oleifolius* subsp. *elongatus* (Western Rosewood), *Melia azedarach* (White Cedar) and *Brachychiton populneus* subsp. *populneus* (Kurrajong). Emergent eucalypts are common and include *Eucalyptus albens* (White Box), *E. dawsonii* (Slaty Box) and *E. crebra* (Narrow-leaved Ironbark). A shrub stratum is usually present and includes *Olearia elliptica* subsp. *elliptica* (Sticky Daisy Bush) and *Rhagodia parabolica* (Mealy Saltbush). Vines are common and include *Cissus opaca* (Small-leaved Water Vine), *Marsdenia flavescens* (Hairy Milk Vine), *Parsonsia eucalyptophylla* (Gargaloo) and *Pandorea pandorana* subsp. *pandorana* (Wonga Vine). Ground cover is generally sparse and includes *Urtica incisa* (Stinging Nettle) and *Austrostipa verticillata* (Slender Bamboo Grass).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Hunter Valley Weeping Myall Woodland of the Sydney Basin Bioregion	E3	CE	Found in the Hunter Valley associated with heavy clay soils on depositional landforms in the south-western part of the Hunter River valley floor. Characterised by the dense open tree canopy about 15 m tall and with the most common tree being *Acacia pendula* (Weeping Myall), which may occur with *Eucalyptus crebra* (Narrow-leaved Ironbark), *A. salicina* (Cooba) and/or trees within the *A. homalophylla - A. melvillei* complex. Understorey shrubs may include *Canthium buxifolium* (Stiff Canthium), *Dodonaea viscosa* (Sticky Hopbush), *Geijera parviflora* (Wilga), *Notelaea microphylla* var. *microphylla* (Native Olive) and *Senna zygophylla* (Silver Cassia). However, the shrub stratum is absent from some stands. The groundcover varies from dense to sparse, and is comprised of grasses such as *Austrodanthonia fulva* (a wallaby grass) and *Themeda australis* (Kangaroo Grass), and low shrubs and herbs such as *Chrysocephalum apiculatum* (Common Everlasting), *Einadia nutans* subsp. *nutans* (Climbing Saltbush), *Enchylaena tomentosa* (Ruby Saltbush), *Maireana microphylla* (Eastern Cotton Bush) and *Ptilotus semilanatus*.	Low. No suitable habitat.	Low.
Kurri Sand Swamp Woodland in the Sydney Basin	E3	-	Known to occur in the Kurri Kurri–Cessnock area of the Cessnock LGA in the lower Hunter Valley. Kurri Sand Swamp Woodland is a low woodland or heathland, generally with a low open canopy rarely exceeding 15 m in height and a shrubby understorey. The overstorey is usually dominated by *Eucalyptus parramattensis* subsp. *decadens* (Parramatta Red Gum) and *Angophora bakeri* (Narrow-leaved Apple) while other tree species that occur less frequently include *E. racemosa* (Narrow-leaved Scribbly Gum), *E. fibrosa* (Red Ironbark), *E.* sp. aff. *agglomerata* and *Corymbia gummifera* (Red Bloodwood). The shrub layer is typified by *Banksia spinulosa* (Hairpin Banksia), *Dillwynia retorta*, *Jacksonia scoparia* (Dogwood), *Hakea dactyloides* (Finger Hakea), *Acacia ulicifolia* (Prickly Moses), *Grevillea parviflora* subsp. *parviflora*, *Melaleuca nodosa* (Prickly-leaved Paperbark), *A. elongata* (Swamp Wattle) and *Lambertia formosa* (Mountain Devil). The common ground species include *Entolasia stricta* (Wiry Panic), *Ptilothris deusta*, *Pimelea linifolia* (Slender Rice Flower), *Aristida warburgii*, *Lomandra cylindrica* (Needle Mat-rush), *Lomandra glauca* (Pale Mat-rush) and *Anisopogon avenaceus* (Oat Speargrass).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	CE	Found along the NSW east coast, this EEC is considered very rare and occurs in many small stands. Predominantly rainforest species, where the canopy is dominated by scattered emergent individuals of sclerophyll species, such as *Angophora costata, Banksia intergrifolia, Eucalyptus botryoides and Eucalyptus tetricornis*. Several floristic variations between strands and in particular areas localised variants may be recognised.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion	E3	-	Occurs principally on Permian geology in the central to lower Hunter Valley. The Permian substrates most commonly supporting the community belong to the Dalwood Group, the Maitland Group and the Greta and Tomago Coal Measures, although smaller areas of the community may also occur on the Permian Singleton and Newcastle Coal Measures and the Triassic Narrabeen Group. Characterised by the dominant Spotted Gum (*Corymbia maculata*) and Broad-leaved Ironbark (*Eucalyptus fibrosa*), while Grey Gum (*E. punctate*) and Grey Ironbark (*E. crebra*) occur occasionally. A number of other eucalypt species occur at low frequency, but may be locally common in the community. One of these species, *E. canaliculata*, intergrades extensively in the area with *E. punctata*. The understorey is marked by the tall shrub, *Acacia parvipinnula*, and by the prickly shrubs, *Daviesia ulicifolia, Bursaria spinosa, Melaleuca nodosa* and *Lissanthe strigosa*. Other shrubs include *Persoonia linearis, Maytenus silvestris* and *Breynia oblongifolia*. The ground layer is diverse; frequent species include *Cheilanthes sieberi, Cymbopogon refractus, Dianella revoluta, Entolasia stricta, Glycine clandestina, Lepidosperma laterale, Lomandra multiflora, Microlaena stipoides, Pomax umbellata, Pratia purpurascens, Themeda australis* and *Phyllanthus hirtellus*.	Low. This area contains few isolated paddock trees, which are consistent with this community. It is likely that this area formerly existed as this community, however, in its current state it is disturbed exotic grassland with few native trees and an absent native understorey.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions	V2	-	Found in the Lower Hunter Valley, mainly occurring on the Barrington footslopes but is known to occur or have occurred in the Muswellbrook, Singleton, Dungog and Upper hunter local government areas. This community occurs on the Carboniferous sediments in gullies and on steep hillslopes with south facing aspects. Characterised by the common canopy trees, *Elaeocarpus obovatus* (Hard Quandong), *Baloghia inophylla* (Brush Bloodwood), *Streblus brunonianus* (Whalebone Tree), *Mallotus philippensis* (Red Kamala), *Capparis arborea* (Brush Caper Berry), *Olea paniculata* (Native Olive) and *Dendrocnide excelsa* (Giant Stinging Tree). Emergent trees 20 to 30m tall such as *Brachychiton populneus* subsp. *populneus* (Kurrajong), *Corymbia maculata* (Spotted Gum), *Brachychiton discolor* (Lacebark) and *Ficus rubiginosa* (Port Jackson Fig) are often present. Other tree and tall shrub species that are often present include *Guioa semiglauca* (Guioa), *Alectryon tomentosus* (Hairy Alectryon), *Alectryon subcinereus* (Wild Quince), *Melia azedarach* (White Cedar), *Melicope micrococca* (Hairy-leaved Doughwood), *Scolopia braunii* (Flintwood), *Claoxylon australe* (Brittlewood), *Elaeodendron australe* var. *australe* (Red Olive Plum), *Diospyros australis* (Black Plum) and *Pararchidendron pruinosum* var. *pruinosum* (Snow Wood). The understorey is dense with common species including *Notelaea longifolia* (Large Mock Olive), *Breynia oblongifolia* (Coffee Bush), *Clerodendrum tomentosum* (Hairy Clerodendrum) and *Pittosporum revolutum* (Hairy Pittosporum). Vines are abundant and include *Pandorea pandorana* subsp. *pandorana* (Wonga Vine), *Geitonoplesium cymosum* (Scrambling Lily), *Cayratia clematidea* (Native Grape), *Jasminum volubile* (Stiff Jasmine) and *Maclura cochinchinensis* (Cockspur Thorn). The ground cover is variable and is comprised of forbs, grasses and ferns. The common species include *Commelina cyanea* (Scurvy Weed), *Dichondra repens* (Kidney Weed), *Oplismenus aemulus* (Basket Grass) and *Adiantum aethiopicum* (Common Maidenhair).	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Lowland Rainforest in the New South Wales north Coast and Sydney Basin Bioregions	E3	CE	The Hawkesbury River notionally marks the southern limit of this EEC in the NSW North Coast and Sydney Basin Bioregions. This EEC is a community of subtropical rainforest and some related, structurally complex forms of dry rainforest. Lowland Rainforest in a relatively undisturbed state has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Includes palms, vines, and vascular epiphytes. In disturbed strands of this community the canopy may be broken or the canopy be smothered by exotic vines.	Low. No suitable habitat.	Low.
River-flat Eucalypt Forest of Coastal Floodplains of the NSW North Coast, Sydney Basin and South East corner Bioregions	E3	-	Found in many local government areas in NSW, including Singleton, Maitland and Cessnock, this community is associated with silts, clay-loams and sandy loams on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Characterised by an open tree layer of *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney, *E. ovata* (swamp gum) occurs on the far south coast, *E. saligna* (Sydney blue gum) and *E. grandis* (flooded gum) may occur north of Sydney, while *E. benthamii* is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including *Melaleuca decora, M. styphelioides* (prickly-leaved teatree), *Backhousia myrtifolia* (grey myrtle), *Melia azaderach* (white cedar), *Casuarina cunninghamiana* (river oak) and *C. glauca* (swamp oak). Scattered shrubs include *Bursaria spinosa*, *Solanum prinophyllum, Rubus parvifolius, Breynia oblongifolia, Ozothamnus diosmifolius, Hymenanthera dentata, Acacia floribunda* and *Phyllanthus gunnii*. The groundcover is composed of abundant forbs, scramblers and grasses including *Microlaena stipoides, Dichondra repens, Glycine clandestina, Oplismenus aemulus, Desmodium gunnii, Pratia purpurascens, Entolasia marginata, Oxalis perennans* and *Veronica plebeia.*	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East corner Bioregions	E3	-	Found on the coastal floodplains of NSW occurring on the fringes of coastal estuaries on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Associated with grey-black clay-loams and sandy loams where the groundwater is saline or sub-saline. Characterised by a sparse layer of *Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (lilly pilly), *Glochidion* spp. (cheese trees) and *Melaleuca* spp. (paperbarks) may be present as subordinate species, and are found most frequently in stands of the community northwards from Gosford. Tree diversity decreases with latitude, and *Melaleuca ericifolia* is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea, Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater. Under less saline conditions prominent ground layer plants include forbs such *Centella asiatica, Commelina cyanea, Persicaria decipiens* and *Viola banksii*; graminoids such as *Carex appressa, Gahnia clarkei, Lomandra longifolia, Oplismenus imbecillis*; and the fern *Hypolepis muelleri*.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East corner Bioregions	E3	-	Found on humic clay loams and sandy loams on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Characterised by the open to dense tree layer of *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybutt). Other trees may be scattered throughout at low abundance or may be locally common at few sites, including *Callistemon salignus* (sweet willow bottlebrush), *Casuarina glauca* (swamp oak) and *Eucalyptus resinifera* subsp. *hemilampra* (red mahogany), *Livistona australis* (cabbage palm) and *Lophostemon suaveolens* (swamp turpentine). A layer of small trees may be present, including *Acacia irrorata* (green wattle), *Acmena smithii* (lilly pilly), *Elaeocarpus reticulatus* (blueberry ash), *Glochidion ferdinandi* (cheese tree), *Melaleuca linariifolia* and *M. styphelioides* (paperbarks). Shrubs include *Acacia longifolia, Dodonaea triquetra, Ficus coronata, Leptospermum polygalifolium* subsp. *polygalifolium* and *Melaleuca* spp. The groundcover is composed of abundant sedges, ferns, forbs, and grasses including *Gahnia clarkei, Pteridium esculentum, Hypolepis muelleri, Calochlaena dubia, Dianella caerulea, Viola hederacea, Lomandra longifolia, Entolasia marginata* and *Imperata cylindrica*. On sites downslope of lithic substrates or with soils of clay-loam texture, species such as *Allocasuarina littoralis, Banksia oblongifolia, B. spinulosa, Ptilothrix deusta* and *Themeda australis*, may also be present in the understorey.	Low. No suitable habitat.	Low.
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E3	-	Found on the Warriewood and Tuggerah soil landscapes, this community is largely restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sandplains. Characterised by the lack of saline influence and complex vegetation types restricted of freshwater swamps in coastal areas. Species include sedges and aquatic plants such as *Baumea* species, *Eleocharis sphacelata*, *Gahnia* species, *Ludwigia peploides* subsp. *montevidensis* and *Persicaria* species. Areas of open water may occur where drainage conditions have been altered and there may also be patches of emergent trees and shrubs.	Low. No suitable habitat.	Low.

Community Name	NSW status	Comm. status	Habitat Description	Likelihood of occurrence	Potential Impacts
Warkworth Sands Woodland in the Sydney Basin Bioregion	E3	CE	Confined to a small area near Warkworth occurring on Aeolian sand deposits south of Singleton. Characterised by the low woodland dominated by *Angophora floribunda* (Rough-barked Apple) and *Banksia integrifolia* subsp. *integrifolia* (Coast Banksia). Other tree species may be present such as *Eucalyptus tereticornis* (Forest Red Gum) and *E. glaucina* (Slaty Red Gum). The understorey consists of shrub and ground layer species, including *Acacia filicifolia* (Fern-leaved Wattle), *Melaleuca thymifolia* (Thyme Honey-myrtle), *Brachyloma daphnoides* (Daphne Heath), *Pteridium esculentum* (Bracken), *Pimelea linifolia* (Slender Rice Flower), *Imperata cylindrica* var. *major* (Blady Grass), *Chrysocephalum apiculatum* (Common Everlasting) and *Glycine clandestina*. Small drainage lines within the area occupied by this community may support the presence or higher abundance of certain species (such as *Melaleuca thymifolia*) and the absence or lower abundance of others (such as *Banksia integrifolia* subsp. *integrifolia*)	Low. No suitable habitat.	Low.
White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E3	CE	Found from the Queensland border in the north, to the Victorian border in the south. It occurs in the tablelands and western slopes of NSW. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. Commonly co-occurring eucalypts include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), Candlebark (*E. rubida*), Snow Gum (*E. pauciflora*), Argyle Apple (*E. cinerea*), Brittle Gum (*E. mannifera*), Red Stringybark (*E. macrorhyncha*), Grey Box (*E. microcarpa*), Cabbage Gum (*E. amplifolia*) and others. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include Kangaroo Grass (*Themeda australis*), Poa Tussock (*Poa sieberiana*), wallaby grasses (*Austrodanthonia* spp.), spear-grasses (*Austrostipa* spp.), Common Everlasting (*Chrysocephalum apiculatum*), Scrambled Eggs (*Goodenia pinnatifida*), Small St John's Wort (*Hypericum gramineum*), Narrow-leafed New Holland Daisy (*Vittadinia muelleri*) and blue-bells (*Wahlenbergia* spp.).	Low. No suitable habitat.	Low.

Appendix 2

5 Part Test

Considerations of the effects of the proposed development under Part 7.3 of the BC Act for threatened species or ecological communities considered to have a greater than or equal to moderate likelihood of occurrence (see Appendices 1 for likelihood of occurrence assessment) are given below. These are as follows:

- Little Lorikeet *Glossopsitta pusilla*
- Swift Parrot *Lathamus discolor*
- Grey-crowned Babbler *Pomatostomus temporalis temporalis*
- Regent Honeyeater *Anthochaera phrygia*
- Grey-headed Flying Fox *Pteropus poliocephalus*
- Large-eared Pied Bat *Chalinobolus dwyeri*
- Yellow-bellied Sheathtail Bat *Saccolaimus falviventris*
- Eastern Freetail-bat *Mormopterus norfolkensis*
- Eastern False Pipistrelle *Falsistrellus tasmaniensis*
- Little Bentwing-bat *Miniopterus australis*
- Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*
- Greater Broad-nosed Bat *Scoteanax rueppellii*

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

The potential habitat to be impacted by the proposal is very small, comprising only three (3) isolated paddock trees. The structural layers of habitat are not present within this area due to historical agricultural and grazing use. Compared to the intact areas of high quality Lower Hunter Spotted Gum Ironbark forest in the locality, the importance of the area on site as habitat for any of the assessed threatened species is considered to be low. Only one (1) hollow-bearing tree, containing a small hollow (<5cm diameter), was observed (refer to Plate 3) in the north-western extent of the site. Due to this trees isolation, this hollow offers only very marginal potential roosting and nesting habitat to microbats and other small mammals. It is considered that the proposal is unlikely to have an adverse effect on the life cycle of any species such that a viable local population of these species is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

No endangered ecological community likely to occur within the subject site.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The proposal will remove or modify mostly exotic vegetation with few isolated native paddock trees, with only a single hollow-bearing tree requiring removal.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The vegetation is already primarily cleared and the proposed development is unlikely to disrupt any habitat connectivity as the paddock trees are isolated from a much larger patch of better quality habitat to the east.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The proposal will require the clearing of only a few native isolated paddock trees. It is not considered to be important habitat for threatened species or for any ecological community.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Areas of Outstanding Biodiversity Value (AOBV) declared in accordance with the BC Act were not identified within the investigation area.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Relevant key threatened processes could be considered to be:

- Clearing of native vegetation;
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants;

- Loss of Hollow-bearing Trees;
- Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*;
- Predation by the European Red Fox *Vulpes vulpes*; and
- Predation by the Feral Cat *Felis catus*.

Due to the already highly disturbed nature of the site, these key threatening processes are not likely to be significantly exacerbated by the proposed development.

Relevant Clause	Control	Proposal	Complies
B.5 – Tree Management	(1) Clearing of native vegetation is declared by this clause to exceed the biodiversity offsets scheme threshold if the area proposed to be cleared is the area set out in Column 2 of the Table to this clause opposite the minimum lot size applicable to the land to be cleared in Column 1 of that Table.	Although identified as beyond the minimum lot size in an urban release area, only three trees were identified at the site. Removal of these trees is necessary for the proposed development and an Arborist report at **Appendix V** identified that it is unlikely for the removal of the trees to have any significant impact on threatened species or ecological communities.	Yes
B.6 – Waste Not – Site Waste Minimisation & Management	2.1 Documentation to be submitted All applications relating to residential developments, as well as commercial and industrial premises are to include a Site Waste Minimisation and Management Plan (SWMMP) as part of documentation submitted to Council. The development plans should also clearly indicate the location of waste management facilities, including recycling bins and the like.	An Operational Waste Management Plan has been prepared by Elephant's Foot at **Appendix H**. Two waste locations are identified on the Architectural Plans at **Appendix C,** one within the childcare centre and one located at the centre fronting the future link road.	Yes
	a) Site Waste Minimisation and Management Plans (SWMMP) A SWMMP outlines measures to minimise and manage waste generated during demolition and construction processes, as well as the ongoing use of the site. The SWMMP is to nominate the following: ▪ The volume and type of waste and recyclables to be generated.	The Waste Management Plan has assessed the components of waste generated and appropriately nominated the potential volume and types of waste detailed in **Appendix H.** Waste storage before collection will be at the two identified locations on the architectural plans and treatment will occur by a private collection vehicle to treat appropriately. Disposal of residual waste will be a last resort and recyclables will be recovered where possible. A private contractor will be the nominated waste service provider and they will have frequent collection times.	Yes

Relevant Clause	Control	Proposal	Complies
	▪ The storage and treatment of waste and recyclables on site. ▪ The disposal of residual waste and recyclables. ▪ The operational procedures for ongoing waste management once the development is completed, including the nominated waste management service provider.		
	3.1 Demolition of Buildings or Structures I. An area shall be allocated for the storage of materials for use, recycling and disposal, giving consideration to slope, drainage, location of waterways, stormwater outlets, vegetation and access and handling requirements. II. Waste and recycling materials are to be separated. III. Measures are to be implemented to prevent damage by the elements, health and odour risks, and windborne litter.	Nil demolition of building or structures proposed.	N/A
	4.1 Construction of Buildings or Structures I. An area shall be allocated for the storage of materials for use, recycling and disposal, giving consideration to slope, drainage, location of waterways, stormwater outlets, vegetation and access and handling requirements. Signage is to be incorporated into this area in order for the clear definition of the space.	All waste collected from the site during construction will be removed and processed by an accredited contractor responsible for improving waste separation and recycling efficiencies. Waste reports will be produced monthly, and reuse and recycle volumes will be tracked. Further information is found at **Appendix H.**	Yes

Relevant Clause	Control	Proposal	Complies
	II. Waste and recycling materials are to be separated. Signage shall clearly indicate which bins or disposal units are for waste and those for recycling. III. Measures are to be implemented to prevent damage by the elements, health and odour risks, and windborne litter. IV. The use of prefabricated components and recycled materials should be considered when possible.		
	5.1 Commercial Developments and Change of Use I. The waste area should provide separate containers for the separation of general waste from recyclables. II. If Council is not the provided waste contractor, then a valid contract with a licensed waste facility is to be kept by the premises or the body corporate managing the site for the collection of waste and recyclables.	A waste area will be located at the loading dock for the retail, gym, tavern and medical centre and the childcare centre will have its own waste area. These areas will have three containers, general waste, paper/cardboard recycling, comingled recycling. A valid private contractor will be engaged for the management of waste disposal from the dedicated facilities to the appropriate disposal area.	Yes
C.1 – Child Care Centres	2. Development 2.1 Location To ensure that child care centres provide a safe and healthy environment for staff and children, Council will not consider any application that proposes the location of a child care centre:	The location of the child care centre has been considered from a safety perspective with consideration of the surrounding environment. There is no service station located within a 200m proximity of the site. The site is not within 125m of a classified Road.	Yes

Relevant Clause	Control	Proposal	Complies
	i. within 200m of a service station unless the application is supported by a preliminary hazard analysis (PHA) under State Environmental Planning Policy 33 and a risk assessment (biophysical and societal) taking into account the sensitivity of the use. ii. within 125m of a classified road (as defined in the MLEP 2011) without the submission of a report detailing the results of air quality and noise level testing. iii. within 100m of heavy industry (as defined in the MLEP 2011) without the submission of a report detailing the results of air quality and noise level testing. iv. within 100m of rural industries, swamps or creeks v. within 100m or in view of a sex services premises or restricted premises vi. within an aircraft noise exposure level area from the aerodrome that is 20ANEF or greater vii. within 100m of above ground high voltage transmission lines, unless the application is supported by a hazard risk assessment which addresses the potential impacts on human health.	The site is not within any industrial land and is surrounded by residential zoning. The site is not within 100m of rural industries, swamps or creeks. The site is not within 100m or in view of sex services or restricted premises. Maitland Airport is the closest airport located to the site and is not exposed to 20ANEF or greater. The site is not located within 100m of above ground high voltage transmission lines.	
	f) Whilst child care centres are a permitted land use in a number of residential zones under the Maitland LEP 2011, they are also a commercial activity which in turn must not result in any adverse impacts upon	The child care centre is within the B1 Neighbourhood Centre zone. The site is adjoining a residential zone, however, is	Yes

Relevant Clause	Control	Proposal	Complies
	the residential environment. In this regard Council will limit the size, location, operating hours and other matters as necessary to ensure that a proposed child care centre is consistent the zone objectives, that is, the proposal is compatible with the character of the area and of domestic scale and character.	appropriately separated from residential land to minimise amenity impacts. The centre will be compatible with the character of the area and is consistent with the zone objectives.	
	2.2 Parking and Accessibility h) A child care centre will not be supported in any area which has significant impact on amenity within a neighbourhood area. A Statement of Environmental Effects must consider the impacts of the child care establishment on the local community. (Refer to Appendix 4.0 for details)	The mixed use space provides great accessibility for parents and guardians dropping their children off. It provides the opportunity for parents and guardians to use the centre for essential and non-essential goods and services and also benefits from the medical centre location on site. The proposed childcare centre is opposing the St Aloysius Catholic Primary School and subset St Nicholas Early Education Chisolm. The cumulative impacts of parking and accessibility will not be negatively impacted due to the increase in parking spaces provided as per the guidelines.	Yes
	i) Proposed child care centres located within a 500m radius of an existing child care establishment must include an assessment of the cumulative impact, including the requirement of a traffic study.	The proposed childcare centre is opposing the St Aloysius Catholic Primary School and subset St Nicholas Early Education Chisolm to the north as well as Little Zak's Academy Chisolm to the northeast. The cumulative impacts of traffic have been assessed in the Traffic Report at **Appendix E.** It concludes through estimated weekday PM and AM peak hour traffic that 63 vehicles are expected from the child care centre and this expected traffic generation is not considered unreasonable.	Yes

Relevant Clause	Control	Proposal	Complies
	j) Minimum onsite parking shall be provided in accordance with Child Care Centre parking requirements in NSW Road & Traffic Authority's, Guide to Traffic Generating Developments current at the time (currently at the rate of one space for every four children in attendance. Note that the minimum parking requirements in the RTA guide is inclusive of client and staff parking.	The parking proposed is 1 spot for every 4 children. The proposed parking arrangement on-site is considered appropriate and detailed further in the Traffic Report at **Appendix E.**	Yes
	k) Where requested by Council, a traffic and car park study should be provided demonstrating that the level of traffic generation by the child care centre is within the technical and environmental capacity of the existing road system. The traffic study should take into account major traffic generating developments (including other child care centres) within the affected area.	The Traffic Report (see **Appendix E)** demonstrates that the traffic generation for the child care centre will peak at times 7am to 9am and 4pm to 6pm. With 0.8 vehicle trips in the AM peak and 0.7 peak vehicle trips in the PM peak. These rates are only for the weekday considering the child care centre will be closed on weekends. Parking assessment for the child care centre has generated a necessary 1 space per 4 children of the 100 children capacity. This brings the spaces provided for use of the child care centre to 60 spaces.	Yes
	l) Access and facilities for the disabled are to be provided in accordance with the Australian Standard AS 1428 Part 1 and Chapter C.1: Accessible Living in this DCP.	Access and facilities have been designed as per the Australian Standard AS 1428 and in addition is enhanced to ensure the site is accessible for all abilities. The details are provided in **Appendix E**.	Yes
	m) One of the allotted vehicle parking spaces shall be provided for disabled parking / service vehicles close to the main entrance of the child care centre.	With the combined locality of the child care centre with shopping centre, medical centre and other uses, there are multiple disabled parking for all premises provided at an easily accessible location to the child care centre and other premises. Additionally, one space will be provided at the closest proximity to the child care centre.	Yes

Relevant Clause	Control	Proposal	Complies
	n) Design of the car park surface and borders should incorporate adequate facility for people with prams or mobility aids.	The design of car parks ensure they achieve beyond minimum requirements for various abilities and needs including size and location.	Yes
	o) Parking area dimensions and parking layout shall comply with Australian standard 2890.1 – 2004 User Class 3 (being 2.6 metres wide). A minimum aisle width of 6.5m shall be provided.	**Appendix E** details the compliance aimed to achieve for the proposed development and the design requirement to achieve a 2.6m wide aisle.	Yes
	p) Where 90 degree on-site parking is provided adjacent to the building, pathway access between the car spaces and the building entry point. In such cases vehicle wheel stops must be provided.	Wheel stops will be provided in appropriate locations and are identified in the Architectural Plans at **Appendix C**.	Yes
	q) Carparks should be provided with separate entrance and exit driveways (adequately signposted) and separated by a distance that ensures safe, reasonable operation of the car park.	The carpark will be provided with two entrance and exit driveways to Heritage Drive and Settlers Boulevard and an entrance will be provided at Tigerhawk Drive.	Yes
	r) A footpath must be provided not less than one (1) metre wide across the frontage of the child care establishment building and extend the full length of the car park where the footpath connects directly to the car park.	A footpath greater than 1 metre wide will be provided for access to the childcare centre with an awning provided across a major part of it.	Yes
	s) Pedestrian access between public street frontage to the child care centre site and the building should be segregated from vehicle movement areas.	The entry point to the childcare centre is on the footpath to the road and is separated from vehicle movement. Once on the footpath there will be no need for pedestrians to pass by vehicle movement.	Yes

Relevant Clause	Control	Proposal	Complies
	t) A minimum of two (2) parallel car parking spaces should be provided adjacent to the child care centres building entrance to enhance convenience and safety for parents and children.	Sufficient car parking is proposed adjacent to the child care centre to provide safe entrance and exit for dropping and picking up children.	Yes
	u) Parking areas shall not be located within the building line setback unless the depth of landscaping between the street boundary and the car park is a minimum of 3.0m and the landscaping effectively screens the parking areas from the street. It must be demonstrated that car parking areas will not negatively impact on the streetscape and will not compromise the domestic scale and character of residential areas.	The parking area is provided behind the setback area.	Yes
	v) Design of site elements and access ways between site elements are to cater for the needs of all users, particularly those with disabilities.	The access points, car park and footpaths have been designed to be accessible for all varied needs and requirements, as per the Australian standards.	Yes
	2.3 Acoustic Privacy d) Where Council is of the opinion that noise has the potential to adversely affect the amenity of neighbouring premises, it may direct the applicant to submit with the Development Application a report prepared by an accredited acoustic consultant demonstrating that the LAeq(15 minute) noise level emitted from the site (including playground activity noise and indoor activity noise) does not exceed the Rating Background Level by more than 5dBA at the proposed site and predicted noise traffic levels are	A Noise Emission Report has been prepared by Acoustic Logic and is at **Appendix O.** It concluded that the indoor and outdoor noise expected to be generated from the activities at each premise will not typically exceed the Rating Background Level by more than 5dBA.	Yes

Relevant Clause	Control	Proposal	Complies
	below the level set by the EPA in its Environmental Criteria for Road Traffic Noise.		
	e) Where necessary, selected noise treatments such as acoustic cladding, windows and flooring or the provision of acoustic fencing or landscaping to shield nearby premises from the noise should not impact adversely upon the amenity of surrounding properties or the streetscape and character of the locality.	The proposed setbacks provide distance with landscaping to all frontages. The frontage that is closest to surrounding land uses that may cause issues is in the north west corner. The Child care centre will be the closest to this residential location and will have minimal acoustic impacts, especially considering the times of the day when the volume is the greatest.	Yes
	f) Where feasible, appropriate noise mitigation treatments shall be implemented to minimise noise being generated by arrivals and departures, including traffic noise. These treatments could include the careful positioning of arrival and departure access points away from residential property boundaries, the appropriate placement of buildings constructed on site to shield the noise or the provision of acoustic fencing or landscaping.	The main entrances and exits are located on Heritage Drive and Settlers Boulevard where open space and parks are opposing, minimising the impacts of any noise issues.	Yes
	g) Outdoor playgrounds for the child care centre should not be located adjacent to the living/bedroom areas of adjoining residents and consideration should be given to noise minimisation related to hard- paved areas and pathways within the children’s play area. All external pedestrian gates shall be fitted with appropriate door closers to provide a slow and regulated closing of the gate to prevent the generation of impact sound.	The outdoor playground will not be located adjacent to residence, although it is located diagonally across the road. Noise will be kept to a minimum with specified play time in the outdoor play area as well as the design with the awning to keep noise to a minimum.	Yes

Relevant Clause	Control	Proposal	Complies
	h) For proposals that are located on or within close proximity to a main or arterial road, and/or railway line, a noise assessment must be submitted with the development application which demonstrates that the LAeq(1 hour) ambient noise level at any location within the boundary of the centre during the hours when the centre is operating shall not exceed the “Recommended Maximum” noise level indicated for “school playground” in the table “Amenity criteria” nominated in the EPA’s NSW Industrial Noise Policy”.	The site situated around local roads only and is not located near a railway line.	Yes
	2.4 Site Layout, Building Form and Appearance c) In established residential areas, development proposals for new buildings must have due regard to aspects such as scale, height, bulk, form, density and appearance to ensure that development is appropriate to its surroundings and will maintain and enhance the streetscape character and the general amenities of the locality.	The built form has considered its bulk, scale, form and density for the locality to ensure it appropriately suits the surrounding area. Its scale and bulk has been designed similarly to the opposing school to provide an appealing transition between the two sites.	Yes
	d) A development application will need to demonstrate that the site layout would not adversely affect adjoining or opposite properties by way of noise, light, smell or general activities.	The proposed layout has considered the existing and future surrounding development to ensure there are no negatively impacted sites or areas from the activity from the proposed development. This includes designing the building to ensure unattractive facilities are unidentifiable from the outside road.	Yes
	e) A detailed site analysis plan must be provided with any development application showing the location and proximity of adjoining areas of private	Refer to the architectural plans at **Appendix C.**	Yes

Relevant Clause	Control	Proposal	Complies
	open space and habitable room windows to any residential properties.		
	f) The front setback of a child care centre in a new residential area should be 6m. In all other areas or in older residential areas the front set back should be the average of the existing setbacks of the two properties on either side of the site.	The front setback to the child care centre is 6 metres.	Yes
	g) The design and layout of the child care centre must respond to the character of the existing neighbourhood and streetscape. Existing residential character of the locality must be maintained through the use of appropriate finishes material, landscaping, fencing and plantings.	The child care centre complements the opposite school with a modern update. The village centre, tavern and other proposed uses are all similarly designed with the same materials and finishes.	Yes
	h) The child care centre must have a domestic scale and character from public view in all residential zones.	The child care centre is viewed from the residential zone and its character and form has been designed to be modern and adaptable to the suburban surroundings.	
	i) The design of buildings should relate to the slope of the land to minimise earthworks and disturbance to the land.	The slope of the land is minimal and has been assessed in detail and reported in the Geotechnical Report at **Appendix T**.	
	2.5 Landscape and Planting e) Development Applications for childcare centres must include a detailed landscaping and planting scheme showing existing and proposed planting (including a schedule of species). Appropriate landscaping / planting is to be used to provide screening and privacy to dwellings and private open space areas on adjoining sites; to soften car parking	A Landscape Plan has been prepared at **Appendix D**. It has been appropriately designed around the Childcare centre with a hedge integrated with the building façade aligned with the required setback. With low planting along the rear of the childcare centre where it intersects with the car park.	

Relevant Clause	Control	Proposal	Complies
	areas and to enhance the visual amenity of the development in the streetscape.		
C.11 Vehicular Access & Traffic	2.1 General Principles In determining the parking and traffic requirements for a development proposal, the following principles shall be followed: ▪ the minimum standards as set out in this plan; ▪ the likely demand for of-street parking generated by the development; ▪ the availability of public transport in the vicinity to service the proposed development; ▪ the probable mode of transport to be used by employees and/or customers; ▪ the likely peak times of usage of the proposed development; ▪ the existing traffic volumes on the surrounding street network including, where relevant, the potential future traffic volumes; and ▪ the equity of requiring off-street parking for individual developments within areas such as Maitland City Centre and Morpeth, where historical parking deficiencies have occurred.	The Traffic Impact Assessment at **Appendix E** and Access Report at **Appendix F**, provide detail on the proposed development and their response to the principles. It considers the compliance and ensure all proposed works are beyond minimum standards. It is assumed the predominant mode of transport will be private vehicles and the peak times are analysed thoroughly to ensure traffic generation is appropriate. Off-street parking and car parks are provided as necessary.	
	2.2 Calculation of Parking Requirements	Parking spaces for the shopping centre are designed in accordance with User Class 3A facilities as follows:	No – justified, refer to

<table>
<tr><th>Relevant Clause</th><th>Control</th><th>Proposal</th><th>Complies</th></tr>
<tr>
<td></td>
<td>
<table>
<tr><td>Childcare Centre</td><td>1 space per 4 children in attendance or there part of.</td><td>Parking must be provided in a convenient location allowing safe movement of children to and from the centre.</td></tr>
<tr><td>Neighbourhood Shop</td><td>1 space per 25m^2 GFA</td><td></td></tr>
</table>
<table>
<tr><td>Registered Clubs/ Pubs (including sexual entertainment establishments)</td><td>Outside the Maitland CBD.
1 space per 10m^2 of public or licensed floor area (bar, lounge, dining room, games room) shall be provided.

Within the Maitland CBD - See Appendix C - Map 2.

1 space per 15m^2 of public or licensed floor area (bar, lounge, dining room, games room) shall be provided.
+</td><td>Parking must be provided to satisfy the peak cumulative parking requirements of the development as a whole. Council may consider relaxing this requirement depending on the characteristics of the proposed development. For this purpose a comparison survey of similar developments, in similar locations should be provided with the development application.</td></tr>
</table>
<table>
<tr><td>Shops
(Shops greater than 1000m2 include supermarkets, department stores, regional shopping complexes etc)</td><td>Shops less than 1000m2 – 1 space per 25m2 GFA.

In Maitland City Centre – See Appendix C - Map 1 – 1 space per 35 m2 GFA for new floor space

Shops greater than 1000m2 – 1 space per 16m2 GFA</td><td>Additional concessions apply to shops in Central Maitland – refer to Section 2.2.4 of DCP
Where it can be demonstrated that the time of peak demand for parking associated with the proposed shopping centre and the existing adjacent land uses do not coincide, or where common usage reduces total demand, a lower level of parking provision may apply. If the proposed development is an extension of an existing retail development which results in a total floor area above 1000m2, additional</td></tr>
</table>
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<td>

2.7m wide spaces and 6.2m aisle width or
2.6m wide spaces and a 6.6m aisle width.

Noting one-way aisles within the supermarket can be 2.6m in width with a 6.2m wide aisle.

Through analysis of the parking standards and consideration of the peak times, the proposed parking spaces are as follows.

PROPOSED BASEMENT LEVEL
<table>
<tr><td>CARPARKING 5400X 2600</td><td>116</td></tr>
<tr><td>DISABLED 5400X 2600</td><td>4</td></tr>
<tr><td>EV PARKING 5400X 2600</td><td>5</td></tr>
<tr><td>BIKE PARKING 5400X 2600</td><td>4</td></tr>
<tr><td>GRAND TOTAL</td><td>129</td></tr>
</table>
PROPOSED GROUND LEVEL
<table>
<tr><td>CARPARKING 5400X 2600</td><td>537</td></tr>
<tr><td>DISABLED 5400X 2600</td><td>10</td></tr>
<tr><td>PARENTS 5400X 2700</td><td>10</td></tr>
<tr><td>GRAND TOTAL</td><td>557</td></tr>
</table>
</td>
<td>Traffic Report at Appendix E.</td>
</tr>
<tr>
<td></td>
<td>3. GUIDELINES FOR THE DESIGN, LAYOUT AND CONSTRUCTION OF ACCESS AND PARKING AREAS

3.1 Access to the Site</td>
<td>The site is designed to ease access and provide space for visitors to the commercial land uses, medical centre and child care centre.</td>
<td>Yes</td>
</tr>
</table>

Relevant Clause	Control	Proposal	Complies
	A development should be designed to provide adequate on-site manoeuvring and circulating areas to ensure that all vehicles can enter and leave the site in a forward direction. Access to or from a site shall be located where it causes the least interference to vehicular and pedestrian traffic on the road frontage.	There are several entry points to the site and the main entry point for pedestrian access is clearly defined with a crossing where vehicle interference occurs.	
	3.2 Sight Distances Consideration must be given to maintaining adequate sight distances for all access driveways. Any vehicle entering or leaving the driveway must be visible to approaching vehicles and pedestrians. AS 2890.1 Off Street Car Parking gives minimal and desirable sight distances for a range of road frontage speeds.	Consideration has been given for adequate sight of each accessway to ensure there is visibility of both pedestrians and vehicles.	Yes
	3.3 Entrance / Exit to the Site Requirements specified by the Roads and Traffic Authority are summarised in Tables 1 and 2 in Appendix B, and in general the following shall apply: ▪ separate entrance and exit driveways should be provided for developments requiring more than 50 car parking spaces or where the development generates a high turnover of traffic such as a service station or other drive- in retail facilities;	Two entrance and exits are proposed for the development. There will be clear signage of the two entrance and exit locations.	Yes

Relevant Clause	Control	Proposal	Complies
	▪ entry and exit driveways shall be clearly signposted; ▪ the number of access points from a development site to any one street frontage should be limited to one ingress and one egress; and ▪ the potential for on-street queuing should be minimised by ensuring that adequate standing areas are available for vehicles entering the car park and loading areas.	Access points provide one ingress and one egress. Heritage Drive provides one additional egress is provided for Heritage Drive to allow visitors to leave the site turning both left and right. It also helps to provide a lane for those exiting the basement car park. The two entrance's have provided adequate standing area upon entrance with room for queueing before a pedestrian crossing or car park to avoid any traffic spilling onto the road.	
	3.4 Location of Parking Areas Parking facilities for visitors and customers shall be provided where clearly visible from the street so their use is encouraged. Parking spaces for employees and for longer duration parking may be located more remotely from the street. Within the development site, the location of the parking area should be determined having regard to: ▪ a) site conditions such as slope and drainage; ▪ b) visual amenity of the proposed and adjacent development; ▪ c) the relationship of the building to the parking area; and	The location of parking is very clearly visible to visitors both in the site or outside. The basement parking provides a protected space for longer duration parking, away from the street. The car parking location has been determined with consideration of site conditions. No major constraints are evident from assessment of the site. The design of the proposed works ensures positive visual amenity for the locality and surrounds. The building and parking have been well considered with ease of access to both the above ground and underground parking. The parking area is located away from potential future residential development to the south of the site.	Yes

Relevant Clause	Control	Proposal	Complies
	d) the proximity of the parking area to any neighbouring residential areas.		
	3.5 Parking Space and Aisle Dimensions a parking space which has a wall or obstruction on one side – an additional 300mm width to that shown is required; and, for the end space in a blind aisle, the width is to be increased to 3.6 metres.	Parking spaces that have a wall or obstruction on one side will provide an additional 300mm width than those that don't. No blind aisle parking spaces are provided.	Yes
	3.6 Construction Requirements In general, all car parking areas, manoeuvring areas and unloading areas shall be constructed with a base course of adequate depth to suit design traffic, and shall be sealed with either bitumen, asphaltic concrete, concrete or interlocking pavers.	The parking areas and loading dock will be paved suitably with asphalt and concrete.	Yes
	3.7 Landscaping Parking areas shall be appropriately landscaped to achieve a satisfactory appearance, particularly for those car parks with large areas of bitumen, to provide shade and to provide a buffer between neighbouring land uses. Landscaping should be used throughout the car park and on the perimeters. In general, there should be no more than 10 parking bays before a break with planting. Species should be selected and located to avoid maintenance problems, so that they do not hinder visibility at entry or exit points and so that they do	The Landscape Plans at **Appendix D** outlines the landscape works proposed for the parking area to ensure shade and appearance are appealing to visitors and those passing by. Species are carefully chosen for the appropriate placement and achievable maintenance for the continued appearance and visibility especially at entry and exit points.	Yes

Relevant Clause	Control	Proposal	Complies
	not cause damage to paved areas by root systems or create excessive leaf or branch litter. Wheel stops are to be provided along the front of parking bays to prevent vehicles from damaging landscaped areas, buildings and/or fencing and other vehicles.	Wheel stops will be provided at the necessary locations throughout the parking lot to avoid any damage to landscaping.	
	3.8 Directional Signs and Marking Parking areas are to be clearly signposted and line-marked. Entry and exit points are to be clearly delineated and parking spaces for specific uses (disabled, visitors, employees etc) clearly signposted. “One way” markings must be clearly set out on the pavement in such a manner as to be easily readable and understandable to users of the car park. Council may designate areas within the car park where no stopping or no parking signposting is to be installed to facilitate the free movement of vehicles and pedestrians.	The parking area will be clearly marked for all visitors to understand entry and exit points and the area of each parking bay. It is understood that signs will be incorporated if council deem no stopping or no parking signs necessary.	Yes
	3.9 Principles for Crime Prevention Design of car parking areas should consider the principles of effective lighting. Lighting is to be provided in off-street car parks in accordance with the requirements of AS 2890.1, 1993 – Parking Facilities Off Street Parking. Lighting may also be required over the street frontage of the development, particularly at entry or exit points in	The proposed development has considered the effects of lighting and appropriate lighting will be provided throughout the parking lots as outlined in the Crime Prevention Through Environmental Design Report at **Appendix L**.	Yes

Relevant Clause	Control	Proposal	Complies
	accordance with AS/NZS 1158, 1997 – Road Lighting.	The CPTED report states the recommendations for the lighting design to comply with the Australian Standards.	
	a) Provision of clear sightlines between public and private places;	Proposed works will ensure sightlines will between public and private places for the safety of visitors.	
	b) Landscaping that makes the car park attractive but does not provide offenders with a place to hide or entrap victims;	Landscaping is designed to provide for an attractive visual amenity, without providing barriers to commit crime.	
	c) In some cases restricted access to the car park, particularly after business hours through the use of physical barriers should be considered;	Clear transitions between public and private will be provided with a fence and landscaping spanning around majority of the site. Access points are clearly identified through openings.	
	d) Design with clear transitions and boundaries between public and private space through the provision of clear access points;	The site is within its own block and it is clear of the site line through the pedestrian path and road definition. Further design is used to outline the area including fencing and landscaping.	
	e) Clear design cues on who is to use the space and what it is to be used for – care should be taken to ensure that gates and enclosures do not make public areas into private areas and consideration should be given to suitable signage (eg need to lock vehicles);		
	f) Strategies to prevent vandalism through appropriate design, eg durable lighting materials and minimisation of exposed walls;	The materials that are proposed intend to minimise potential vandalism with appropriate lighting.	
	g) Management strategies for site cleanliness, rapid repair of vandalism and graffiti, the replacement of burned out lighting, the removal or refurbishment of decayed physical elements and the continued maintenance of landscaped areas.	Proposed works will establish a maintenance plan that ensures the site retains appearance and repairs any vandalism.	

Relevant Clause	Control	Proposal	Complies
	4. LOADING/UNLOADING REQUIREMENTS 4.1 General On-site loading and unloading facilities must be provided for all businesses, commercial, industrial, retail and storage uses and any other where regular deliveries of goods are made to or from the site.	A loading dock is provided at the rear of the site for all loading and unloading for the village centre. It will also provide spaces for storage.	Yes
	4.2 Number and Size of Loading Bays The number and dimensions of the on-site loading bays must be designed having regard to the nature and scale of the proposed development, the estimated frequency of deliveries, the type of delivery vehicle likely to be involved and the types of goods being loaded/unloaded. Accordingly, these details are required to be submitted with the Development Application for Council's consideration.	The loading dock has been designed to service the development with the following vehicles: ▪ B99 delivery Van; ▪ 6.4m length Small Rigid Vehicle; ▪ 8.8m length Medium Rigid Vehicle; ▪ 12.5m length Heavy Rigid Vehicle	Yes
	4.3 Design and Layout of Loading Bays The loading areas must be designed to ensure that standard design vehicles can manoeuvre into and out of all loading areas without causing conflict to the movement of traffic on-site or in the adjacent streets. The loading bay(s) should be a physically defined area (by signposting and/or pavement marking) which is not used for other purposes such as	The capacity of the loading dock from the New Link Road can accommodate parking for three (3) x 20m length Articulated Vehicle spaces (two on the western side and one on the eastern side). The loading bay is a defined area at the rear of the site amongst the waste and home delivery's area. The loading area will be fully within the site boundaries and defined area and will not crossover into any other area.	Yes

<table>
<tr><th>Relevant Clause</th><th>Control</th><th>Proposal</th><th>Complies</th></tr>
<tr><td></td><td>customer parking or the storage of goods and equipment.

The loading areas must be designed to ensure that vehicles stand entirely within the site during all loading and unloading operations.

In addition to the above requirements, the Roads and Traffic Authority’s “Guide to Traffic Generating Developments” details recommended dimensions for loading areas based on the various types of service vehicles and other requirements for ramps, internal roadway etc (refer to Table 1 in Appendix B).</td><td>Assessment of the traffic generation rates are provided in the Traffic and Parking plan at Appendix E. With calculations for shopping centres, clubs, gymnasiums and child care centres with results as per the table below.

PM weekday peak hour traffic generation

<table>
<tr><th>Land Use</th><th>Scale</th><th>Rate</th><th>Vehicle Trips</th><th>Directional Split(1)</th></tr>
<tr><td colspan="5">PM Peak Hour Period</td></tr>
<tr><td>Supermarket</td><td>3,500m² GLFA</td><td>155 A(SM) per 1000m²</td><td>543</td><td>271 in, 272 out</td></tr>
<tr><td>Liquor</td><td>185m² GLFA</td><td>155 A(SM) per 1000m²</td><td>29</td><td>14 in, 15 out</td></tr>
<tr><td>Major Retail</td><td>1,500m² GLFA</td><td>51 A(F) per 1000m²</td><td>77</td><td>38 in, 39 out</td></tr>
<tr><td>Shops</td><td>3,695m² GLFA</td><td>46 A(SS) per 1000m²</td><td>170</td><td>85 in, 85 out</td></tr>
<tr><td>Tavern</td><td>890m² GFA</td><td>10 per 100m² LFA</td><td>89</td><td>45 in, 44 out</td></tr>
<tr><td>Medical Centre</td><td>745m² GLFA</td><td>22 A(OM) per 1000m²</td><td>16</td><td>8 in, 8 out</td></tr>
<tr><td>Food and Drink Premises</td><td>160m² GLFA</td><td>46 A(SS) per 1000m²</td><td>7</td><td>3 in, 4 out</td></tr>
<tr><td>Child Care Centre(2)</td><td>100 children</td><td>0.7 trips per child</td><td>63</td><td>32 in, 31 out</td></tr>
<tr><td>Gymnasium(2)</td><td>800m² GFA</td><td>9 per 100m² GFA</td><td>65</td><td>32 in, 33 out</td></tr>
<tr><td>Swim School(2)</td><td>1,040m² GLFA
20 children</td><td>2 trips per child</td><td>36</td><td>18 in, 18 out</td></tr>
<tr><td>Car Wash</td><td>475m² GLFA</td><td>22 A(OM) per 1000m²</td><td>11</td><td>5 in, 6 out</td></tr>
<tr><td>TOTAL</td><td>-</td><td>-</td><td>1,106</td><td>551 in, 555 out</td></tr>
</table>

AM weekday peak hour traffic generation</td><td></td></tr>
</table>

Relevant Clause	Control	Proposal	Complies

Land Use	Scale	Rate	Vehicle Trips	Directional Split[1]
AM Peak Hour Period				
Supermarket	3,500m² GLFA	77.5 A(SM) per 1000m²	272	136 in, 136 out
Liquor	185m² GLFA	77.5 A(SM) per 1000m²	14	7 in, 7 out
Major Retail	1,500m² GLFA	25.5 A(F) per 1000m²	39	20 in, 19 out
Shops	3,695m² GLFA	23 A(SS) per 1000m²	85	43 in, 42 out
Tavern	890m² GFA	Closed	0	0 in, 0 out
Medical Centre	745m² GLFA	11 A(OM) per 1000m²	8	4 in, 4 out
Food and Drink Premises	160m² GLFA	23 A(SS) per 1000m²	4	2 in, 2 out
Child Care Centre[2]	100 children	0.8 trips per child	72	36 in, 36 out
Gymnasium[2]	800m² GFA	6.3 per 100m² GFA	45	23 in, 22 out
Swim School[2]	1,040m² GLFA 20 children	2 trips per child	36	18 in, 18 out
Car Wash	475m² GLFA	11 A(OM) per 1000m²	5	3 in, 2 out
TOTAL	-	-	**580**	**292 in, 288 out**

Weekend peak hour traffic generation

<table>
<tr><th>Relevant Clause</th><th>Control</th><th>Proposal</th><th>Complies</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Land Use</th><th>Scale</th><th>Rate</th><th>Vehicle Trips</th><th>Directional Split[1]</th></tr>
<tr><th colspan="5">Weekend Midday Peak Hour Period</th></tr>
<tr><td>Supermarket</td><td>3,500m² GLFA</td><td>147 A(SM) per 1000m²</td><td>514</td><td>257 in, 257 out</td></tr>
<tr><td>Liquor</td><td>185m² GLFA</td><td>147 A(SM) per 1000m²</td><td>27</td><td>14 in, 13 out</td></tr>
<tr><td>Major Retail</td><td>1,500m² GLFA</td><td>13 A(F) per 1000m²</td><td>20</td><td>10 in, 10 out</td></tr>
<tr><td>Shops</td><td>3,695m² GLFA</td><td>107 A(SS) per 1000m²</td><td>396</td><td>198 in, 198 out</td></tr>
<tr><td>Tavern</td><td>890m² GFA</td><td>10 per 100m² LFA</td><td>89</td><td>45 in, 44 out</td></tr>
<tr><td>Medical Centre</td><td>745m² GLFA</td><td>2 per 100m² GFA[2]</td><td>15</td><td>8 in, 7 out</td></tr>
<tr><td>Food and Drink Premises</td><td>160m² GLFA</td><td>107 A(SS) per 1000m²</td><td>17</td><td>9 in, 8 out</td></tr>
<tr><td>Child Care Centre[3]</td><td>100 children</td><td>N/A</td><td>N/A</td><td>0 in, 0 out</td></tr>
<tr><td>Gymnasium[3]</td><td>800m² GFA</td><td>9 per 100m² GFA</td><td>65</td><td>33 in, 32 out</td></tr>
<tr><td>Swim School[3]</td><td>1,040m² GLFA 20 children</td><td>2 trips per child</td><td>36</td><td>18 in, 18 out</td></tr>
<tr><td>Car Wash</td><td>475m² GLFA</td><td>2 per 100m²</td><td>10</td><td>5 in, 5 out</td></tr>
<tr><td>TOTAL</td><td>-</td><td>-</td><td>1,189</td><td>597 in, 592 out</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td>5. CAR PARKING FOR PERSONS WITH A DISABILITY

Special parking spaces for persons with a disability are to be made available in the provision of car parking facilities, in accordance with Australian Standard AS2890.1 – 1993. In general, where 10 or more vehicle spaces are required, one designated parking space for people with disabilities is required per 100 (or part thereof) car spaces provided. Council has adopted the ‘enhanced’ requirements for land uses where there is a higher demand for disabled facilities. For example, for retail shopping complexes, community facilities and medical centres, parking provisions for people with disabilities should be increased to 2 to 3 % of the</td><td>Parking for those with a disability will be provided with 10 spaces in the at-grade parking lot and 4 space in the basement parking. Proposed design ensures compliance with Australian standards and additional spaces are provided considering the medical centre and retail centre.

The location of the spaces is in a prime location for entry into the village centre, with both above ground and underground options. Minimum requirements of space have been considered with minimum 5.4 metre length and 2.4 metre width.</td><td></td></tr>
</table>

Relevant Clause	Control	Proposal	Complies
	overall parking requirements. Council's enhanced car parking standards are as follows: ▪ medical services, including community health centres – 1 space per two to five surgeries (or equivalent), 2 spaces for six or more surgeries (or equivalent) ▪ entertainment facilities clubs and public halls, large retail complexes (ie>100 spaces) and railway stations – 3 spaces per 100 car parking spaces ▪ The location of spaces designated for persons with a disability should be close to an entrance to a building or facility with access from the car space by ramps and/or lifts. These spaces should be clearly signposted for the convenience of their users and to discourage other drivers from using such spaces. The spaces should be a minimum of 3.2 metres wide to assist movement into and out of parked vehicles – refer to Figure on Page 287.		
6. BICYCLE PARKING			
	7. MAJOR TRAFFIC GENERATING DEVELOPMENT Parking requirements for major new retail, commercial or tourist developments will be assessed on their merits, with particular reference to:	A Traffic and Parking report has been prepared at **Appendix E** to assess the traffic generating potential of the proposed development and it's intended uses. Bicycle parking is required to supply 78 bicycle spaces for both staff and visitors. The proposed works provide a bicycle rack at	

Relevant Clause	Control	Proposal	Complies
	▪ likely peak usage times; ▪ the mix of uses and their parking requirements; and, ▪ likely use of public transport. Where it is considered that a traffic generating development may have a major impact on the traffic movement within a given locality, Council may require the applicant to arrange for the preparation and submission of a Traffic and Parking Study, by a qualified professional. In this regard, the Roads and Traffic Authority's publication "Guide to Traffic Generating Developments" provides relevant information.	the entrance of the medical centre and proposed 4 bicycle spots in the basement parking. The conditions of consent will provide compliance and proposed works are capable of complying to these requirements.	
C.12 Crime Prevention Through Environmental Design	1. The security of buildings and public spaces is achieved through the application of Crime Prevention through Environmental Design principles. 2. Territorial reinforcement is achieved through good quality, well maintained buildings and spaces and the delineation of public and private areas. 3. Good natural surveillance is achieved by the position of buildings and the orientation of uses toward public areas. 4. Landscaping and lighting contribute to the safety of an area.	A Crime Prevention Through Environmental Design Report has been prepared by The Design Partnership and is found at **Appendix L**. The report recognises the importance of territorial reinforcement achieving a quality and well maintained building through a maintenance plan that will be curated at the Construction Certificate stage. Through the use of lighting, landscaping, variation in colour/material, entry point locations and signage high surveillance of the building will be achieved. As recommended in the CPTED Report the lighting and landscaping for the proposed development will be used to reinforce paths for safety. This will be designed and implemented	Yes

Relevant Clause	Control	Proposal	Complies
	5. Mechanical surveillance (e.g. CCTV) is only used where passive surveillance cannot be achieved or in isolated, high risk areas. 6. Way-finding, desire lines and formal/informal routes are reinforced by physical and symbolic barriers that channel and group pedestrians into areas. 7. Activity in public spaces is promoted by providing and maintaining high-quality public areas and promoting a diversity of uses that encourage activity throughout the day and night. 8. Perception of crime is minimised by maintenance of public areas and the rapid response to vandalism and graffiti.	by a qualified professional in each area (Landscaping is detailed in **Appendix D**). Surveillance will be provided throughout the centre at appropriate locations Barriers and signage will reinforce way finding The public and open spaces promote uses through the design and intended activity throughout the spaces. Ongoing maintenance will be managed by the centre proprietor to ensure it maintains public areas and deters potential vandals.	
Part 7 – Urban Release Area – Thornton North Urban Release Area **Chisolm Neighbourhood Centre**	**1.1 Staging** 1. The precinct should be staged generally in accordance with Figure 48: Chisholm Neighbourhood Centre Stage 1 Plan. 2. A full line supermarket and other core retail uses are to be provided in Stage 1 of the neighbourhood centre. 3. The proposed town square is to be developed within the stage 1 of the neighbourhood centre.	The proposed development is not proposed to be staged given the market demand outlined in the Economic Impact Assessment indicates the market has capacity to absorb the proposed commercial/retail floor space. The supermarket and other core retail uses will be provided in stage 1. The proposed development will deliver a full line supermarket and other core retail uses, as well as a town square.	Yes

Relevant Clause	Control	Proposal	Complies
	4. The surrounding street network and centre interface is to facilitate bus access with the proposed bus set down area on Tigerhawk Drive to be provided as part of Stage 1.	The surrounding street network and centre interface will allow for a bus set down area on Tigerhawk Drive.	
	1.2 Economic Impact Assessment 1. An Economic Impact Assessment (EIA) shall be submitted with the development application for each stage of the Chisholm Neighbourhood Centre. 2. The EIA shall consider the potential mix of retail and commercial offerings and the scale of any to ensure the continued viability of both the Thornton and Chisholm centres.	An Economic Impact Assessment has been prepared by Ethos Urban and included at **Appendix J.** The Economic Impact Assessment considers the potential economic and employments impacts associated with a new neighbourhood shopping centre.	Yes, refer to **Appendix J**.
	1.3 Transport and Movement 1. The link between the Investa and Waterford estates via Harvest Boulevard and Dragonfly Drive shall be completed prior to the issue of an occupation certificate for development in the neighbourhood centre. 2. The development application for stage 1 shall include a Traffic Impact Assessment and Access Strategy prepared by a suitably qualified consultant. 3. The Traffic Impact Assessment and Access Strategy shall consider the full development scenario of the centre. 4. This assessment is to include details relating to the overall traffic and pedestrian management,	Completed. A Traffic and Parking Assessment and Access Strategy have been prepared and submitted with this DA (**Appendix E** and **Appendix F** respectively). The respective reports consider the full development scenario of the centre.	Yes

Relevant Clause	Control	Proposal	Complies
	access to parking areas, pedestrian access provisions, assessment of the proposed car parking designs and traffic generation including an assessment on the surrounding road network and key intersections. 5. The intersection of Tigerhawk and Heritage Drives shall be upgraded to cater for pedestrian safety, bus and heavy vehicles and traffic movements. Traffic lights are envisaged for this intersection. 6. Pedestrian linkages shall be provided in every direction. 7. The assessment shall consider the safety and functionality of the pedestrian focal point and the public and school bus services that will congregate on Tigerhawk Drive. 8. Development applications are to include a shared path connectivity plan linking all external paths to the entry point of the development. 9. Regrade of the kerb return and verge on the Heritage Tigerhawk Drives intersection to provide adequate longitudinal and transverse cross falls. 10. Development applications are to include details of recommended regulatory signage for existing and proposed roads. i.e. parking controls, loading zones, bus and taxi zones, etc	Intersection and public domain upgrades are subject to further discussion with Council.	

Relevant Clause	Control	Proposal	Complies
	11. Street lighting shall be planned (lighting categories), designed and implemented to relevant Australian standards for vehicle and pedestrian networks (including pedestrian crossings). 12. Driveway entry points on Settlers Boulevarde and Tigerhawk Drive shall be left-in/left-out with concrete median separation on the centreline. 13. A pedestrian/Access assessment shall be submitted with development applications for connectivity into the site. 14. Pedestrian/cycle refuges, or greater, shall be provided on public roads including a central connection across Heritage Drive to the Riparian Corridor. 15. Internal taxi and mini bus pickup at front of shop entry. 16. Internal pedestrian network and bicycle racks /facilities shall be provided.		
	1.5 Passive and Active Recreation Areas 1. An urban design masterplan shall be submitted with the development at Stage 1 of centre. 2. The masterplan shall provide opportunities for; An informal meeting place that can be used by local residents and parents of children attending nearby local schools and child care centres.	The proposed development provides opportunities for: ▪ Informal meeting places ▪ Formal and informal outdoor seating areas. ▪ Outdoor dining. ▪ A space for activities which support the local community. ▪ Landscaping and design features.	Yes

Relevant Clause	Control	Proposal	Complies
	Formal and informal outdoor seating areas. Outdoor dining. A space for activities which support the local community such as charity fundraising stalls, donation tables etc. Landscaping and design features which encourages use and activity throughout the day and in to the evening, including safe areas for children to play whilst being supervised from adjacent outdoor seating areas.		
	1.10 Neighbourhood Commercial and Retail Uses Building Design 1. Where more than 2-storeys are proposed, the third and higher storeys are setback further by a minimum of 3.0m. 2. Variations in roof form including the use of skillions, gables and hips are to be provided in the development or between developments. 3. Flat roofs shall be avoided unless they are behind a parapet. 4. Lift over-runs and service plant shall be concealed within roof structures. 5. All roof plant is to be represented on plans and elevations.	No more than 2-storey is proposed. Nevertheless, variations in roof form have been provided in the development and security grills are not proposed.	Yes

Relevant Clause	Control	Proposal	Complies
	6. Outdoor recreation areas on flat roofs shall be landscaped and incorporate shade structures and wind screens to encourage use. 7. Security grills (for e.g. roll-up doors) shall be avoided. 8. If installed, security grilles shall be provided within the building, behind the glazing and be constructed of material that allows the interior to be visible.		
	Setbacks 1. Development along identified active streets must be built-to-boundary. 2. In all other cases, building shall be setback within 20% of the average of the adjoining buildings. 3. All pedestrian paved areas along an active street are to have a minimum paved width of 3.5m. 4. The 3.5m paved setback: ▪ is clear and accessible for pedestrians for its entire length and width; ▪ is clear of columns (other than awning posts where provided) and other obstructions; may include outdoor dining where a minimum footway clearance width of: ▪ 1.8m for high volume pedestrian areas; or	The food and beverage premises on Heritage Drive will be built to the boundary. Whilst elevated above street level the outdoor seating areas will provide activity and passive surveillance over the surrounding public domain. No established setback pattern, the site is an island site and as such the proposed development orientation and setbacks are considered appropriate. The existing 6m paved areas surrounding the site are clear and accessible for pedestrians. The footpaths areas widen around the main pedestrian entry along Tigerhawk Drive and the secondary entry points off Heritage Drive. Given the width of existing pavement surrounding site and the prevailing topography it is not considered necessary or appropriate to provide an additional 3.5m paved setback along the identified active frontage along Heritage Drive.	Yes

Relevant Clause	Control	Proposal	Complies
	▪ 1.5m in all other circumstances; is maintained. ▪ has a pavement matching the gradient of the adjoining footpath and connects to pedestrian areas on neighbouring sites; and ▪ connects without any lip or step to adjoining footpaths or abutting pedestrian areas on neighbouring sites. 5. Pavements, furniture and landscaping are to be designed in accordance the Council's requirements or in consultation with Council's Executive Manager Appearance and Infrastructure. 6. Steps, escalators, ramps or lifts are not located within the 3.5m paved, pedestrian area. 7. Any automatic teller machine: ▪ is inset 1.5m into the building line; ▪ is well illuminated at all times. 8. Ramps are constructed and finished with materials that are similar or complementary to those used on the building or in the street.	The pavements, furniture and landscaping will be of the highest quality and consistent with the surrounding residential subdivision and Council requirements. Steps, escalators, ramps or lifts will not be located within the 3.5m, pedestrian area. Noted, any proposed ATM can comply.	
	Active Frontages 1. Active frontages shall consist of one or more of the following: ▪ A shop front.	The size of the site and the length of its multiple street frontages makes it difficult to provide active street frontages to all streets. Nevertheless, food and beverage premises, gym, learn to swim and child care centre will be provided along the designated active frontage along Heritage Drive.	Yes

Relevant Clause	Control	Proposal	Complies
	▪ Commercial and residential lobbies. ▪ Café or restaurant. ▪ Public building if accompanied by an entry from the street. 2. A minimum of 80% of the ground floor level front facade shall be clear glazed. 3. The reflexivity index for glass shall not exceed 20%. 4. Restaurants and cafés shall provide openable shop fronts (for e.g. bi-fold doors) where practical to the public domain. 5. Colonnade structures (refer Figure 3) shall not be used unless it is demonstrated that the design: ▪ would not restrict visibility into the shop or commercial premises; and ▪ not limit natural daylight along footpaths; and ▪ does not create opportunities for concealment.	The food and drink premises will include glazed front facades consistent with their uses. The proposal is capable of complying with the reflectivity index. All food and drink premises are capable of compliance. A covered walkway is provided from the proposed medical centre to the main retail centre. Whilst this gives the impression of a Colonnade it does not restrict visibility, limit access to sunlight or create opportunities for concealment.	
	Arcades 1. Arcades are to: ▪ Be obvious and direct through-ways for pedestrians.	Arcades are not proposed.	N/A

Relevant Clause	Control	Proposal	Complies
	▪ Have a minimum width of 3m clear of all obstructions unless it includes arcade dining where a minimum footway clearance width of 1.8m for high volume pedestrian areas or 1.5m in all other circumstances; is maintained. ▪ Be accessible to the public for the duration of activity in the centre. ▪ Where practical, have access to natural light for part of their length and at openings at each end. ▪ Have clear glazed entry doors at least 50% of the entrance, where the arcade is air-conditioned. ▪ Have signage at the entry indicating public accessibility and to where the arcade leads. ▪ Have clear sight lines and no opportunities for concealment. ▪ Where arcades or internalised shopping malls are proposed, those shops at the entrance shall have direct pedestrian access to the street.		
	Awnings 1. Continuous shelter from the weather is to be provided for the full extent of the active street frontage. 2. Awnings shall be horizontal or near horizontal (maximum pitch of 10%).	An awning is proposed at the corner of Heritage Drive and Tigerhawk Drive. The awning is capability of complying the prescribed standards within the DCP. Due to the level changes, and proposed site arrangement an awning along the full frontage of Heritage Drive is not feasible or deemed necessary.	Yes.

Relevant Clause	Control	Proposal	Complies
	3. Awnings heights shall be no less than 2.7m high at any point measured above the existing ground level. 4. A minimum awning width of 2.5m-3.0m is required unless this cannot be achieved because of narrow pavements and street tree planting, traffic signals, traffic signage or utility poles. 5. New awnings shall be set back a minimum of 450mm from the kerb line. 6. Awnings along sloping streets shall step down in horizontal steps (a maximum of 700mm per step) to follow the slope of the street. 7. All contiguous awnings shall be of consistent height and depth and of complementary design and materials. 8. Awnings and/or canopies shall be provided elsewhere to define public entrances to buildings, including residential flat buildings. 9. Awnings shall wrap around street corners and contribute to the articulation and focal design of corner buildings. 10. New awning fascias have a vertical depth not greater than the average of the vertical depths of the immediately adjoining awning fascias or, if there are no adjoining awning fascias, 350mm.		

Relevant Clause	Control	Proposal	Complies
	11. Under awning lighting shall comply with AS/NZS1158 - Lighting for roads and public spaces. 12. Awnings are to be designed and certified by a professional engineer.		
	Gateway, corner and landmark sites 1. The design of buildings on corner sites or at the ends of business or commercial zones shall emphasise the importance of the corner as a focal point. 2. Corner sites or at the ends of business or commercial zones shall be constructed to boundary with no car parking or servicing between the street boundary and the building. 3. Corner buildings shall include design devices such as: ▪ Increased wall heights; ▪ Splayed corner details; ▪ Expression of junction of building planes; ▪ contrasting building materials; and ▪ other architectural features; ▪ to reinforce the prominence and distinctiveness of the building.	The corners are not proposed to be car parking or servicing, as the proposal includes a strong built form expression at the corner of Heritage Drive and Tigerhawk Drive. The tallest portion of the proposed buildings are located on a corner. The corner of Tigerhawk Drive and Settlers Boulevard will be development in a future stage.	Yes

Relevant Clause	Control	Proposal	Complies
	4. Shopfronts shall wrap around corners and entrances located centrally to the corner. 5. The tallest portion of the building shall be on the corner.		
	Pedestrian Entries and access 1. The development complies with AS1428 - Design for Access and Mobility. 2. Pedestrian and vehicle movement areas are separated and defined by changes in pavement material, levels, lining or tactile treatments. 3. Parking areas are illuminated (naturally and/or artificially) during the time period the centre is open. 4. Signage is provided at the entries to the development detailing the services available within the centre and where they are located. 5. Signage to key public spaces accessible from the centre such as car parks, food courts shall be provided within the centre. 6. Signage to key facilities such as rest rooms, centre management, baby change rooms shall be provided within the centre. 7. Secure and convenient parking/storing for bicycles is provided close to the entrance of the development and with good surveillance.	Proposed works are capable to comply, conditions recommended.	Yes, capable of compliance.

Relevant Clause	Control	Proposal	Complies
	Parking, loading and servicing 1. Car parking provision shall be in accordance with the provisions of C.11 of this development control plan. 2. Garage doors and loading docks shall be located at the rear of development, so that they are not a dominant element in the overall presentation of the development to key streets. 3. Signage shall be provided to direct visitors to the centre and to car parking areas. 5. All vehicles must be able to enter and leave any development in a forward direction. 6. Loading and manoeuvring areas for service vehicles shall be separated from car parks and pedestrian paths. Where shared access is provided, no loading or unloading shall be carried out over car parking spaces and access aisles. 7. Where natural or mechanical ventilation of a car park is achieved through the use of metal grills or large openings they shall contribute to the overall design or be screened by landscaping or other design elements. 8. External service areas (for e.g. areas for rubbish storage, cardboard compacting etc) shall not be visible from roadways or public open space areas.	Parking is in accordance with the provision set out in the DCP. The loading dock location is at the rear of the shopping centre, at the south of the site where it will be well integrated to hide visibility. It will be proposed on the new Link Road that will be proposed subject to a separate DA. Signage will be provided for visitors to visually locate the centre. The car park driveways allow for forward movement and no turning around will be necessary once a visitor has entered the carpark. The loading area is located at the rear of the shopping centre whilst the car parks are located at the entrance side of the centre and in the basement. The loading dock is also located away from pedestrian paths, entrance and exit to the centre. The mechanical ventilation from the underground car park is screened by the external materials concealing the ventilation. The loading dock area will be an area for storage, cardboards space and will not be visible from roadways or public open space. The loading dock area will provide space for storage and servicing areas and will be suitably screened by landscaping and a wall. Deep soil landscaped areas are provided around the entire site area. The basement car park is setback greater than 3 metres.	Yes

Relevant Clause	Control	Proposal	Complies
	9. External storage and service areas shall be suitably screened from view from both roads and parking areas and pedestrian areas. 10. Deep soil planted landscaped setback areas are provided. 11. Basement car parks shall be setback a minimum of 3.0 metres from the street boundary.		
	Vehicular Access 1. The number of vehicular crossovers shall be kept to a minimum. 2. Access and egress points are designed so that exiting vehicles have clear sight of pedestrians and cyclists. 3. Any car park ramps are located within the building footprint. 4. Access and egress to car parks is achieved in a forward direction. 5. Vehicular entrances to underground car parks are: ▪ located on minor streets; ▪ have a maximum crossover width of 6.0m; ▪ signed and lit appropriately;	Vehicle crossovers are provided only where necessary for driveways to ease access for vehicles entering and exiting. The entrance and exit locations are widened with minimal objects surrounding to ensure highest visibility and safety. The car park ramp is within the building footprint. All access allows forward movement that connects from the entrance to the exit. Access to the basement car park is located within the building footprint after access from Heritage Drive. The crossover width appropriate and will be signed and lit appropriately. For vehicles exiting vision will be clear but there will be a lane to pull out onto and no pedestrians will be able to cross at the exit from the basement. The entrance to the village centre and exit to the street are located centrally and will be very clear for visitors to the basement.	Yes

Relevant Clause	Control	Proposal	Complies
	▪ designed so that exiting vehicles have clear sight of pedestrians and cyclists. 6. All stairs and elevators in the parking structure are clearly visible. 7. The street level frontage of car parking structures (including multi-level car parks) where adjoining public places, including active streets, share ways and laneways, shall present an active frontage along the entire frontage less any car park entry. 8. Internal finishes of underground car parks shall be consistent with the external materials where they are visible from the public realm. 9. Underground car parks shall be designed for natural ventilation. 10. Ventilation ducts/grilles shall integrate with the streetscape and be unobtrusive and/or appropriately screened. 11. Garage doors to underground parking shall be designed to complement the materials used elsewhere on the development.	Heritage Drive is the primary frontage and is activated by the Tavern and Child Care centre where activity will occur within operating hours. The materials used on the exterior will also be used or complement the interior of the basement car park. The car park has been designed to allow for natural ventilation with well covered ventilation on the exterior and openings for vehicles and pedestrians. The ventilation ducts are integrated with the exterior by using screening with external materials concealing the ventilation. Garage doors will not be used for underground parking	
	Public art, landscaping and public domain works 1. A landscape plan shall be submitted with the development application that shows: ▪ Existing vegetation; ▪ Vegetation proposed to be removed;	A landscape plan has been prepared at **Appendix D**. The landscape plan outlines the existing conditions with a site analysis plan and outlines the key plans for landscaping in quadrants. It also includes the species that are proposed to be planted and	Yes

Relevant Clause	Control	Proposal	Complies
	▪ Proposed general planting landscape treatment; ▪ Design details of hard landscaping elements; ▪ Major earth cuts, fills and any mounding; ▪ Street trees; and ▪ Existing and proposed street furniture including proposed signage. 2. The landscape plan for the site achieves the following minimum standards: ▪ Large trees and spreading ground covers are provided in all landscape areas within the site. ▪ Where screening is required, large screening shrubs of an appropriate density and size to complement the scale and bulk of the subject building are provided. ▪ At grade car parking areas shall be provided with one tall, branching, mature shade tree for every 4 linear car spaces. ▪ All areas less than 1.0 metre in width shall be paved. ▪ Where car parking cannot be provided under or behind the building and Council has agreed to permit some or all of the parking in the front setback, a landscaped strip with a minimum width of 3.0m is provided along the entire frontage/s of the site.	resources that will be used for the facilities including furniture, surfaces, signage, edge treatments and play structures. The landscape plan achieves the minimum standards that include large trees and ground covers in all landscaped areas. Screening is provided at appropriate locations and will complement and provide an appropriate scale and bulk for the area. Trees are provided every four parking spaces. The parking area is paved for all areas less than 1 metre in width. No parking will be provided in the front setback. All areas on the site if undeveloped have landscaping provided in that area. The future PAD site is turfed. All planting is selected from Councils policy. No fencing will be erected between the building line and the boundary site. Landscaping will be provided around fences.	

Relevant Clause	Control	Proposal	Complies
	▪ Any area of the site that remains undeveloped shall be landscaped with turf and scattered planting at a minimum. ▪ All street plantings are to be selected from Council's landscaping policy or with the agreement of Council's Coordinator Recreation and Tree Services. ▪ Water sensitive urban design facilities (such as swales, bio-detention ponds and rain gardens) are used to treat stormwater for at-grade car parking areas. ▪ Water sensitive urban design facilities are designed in accordance with Council's Manual of Engineering Standards. ▪ Fencing for security or privacy shall not be erected between the building line and the front boundary of a site. ▪ Where fences are erected, landscaping of an appropriate height and scale shall be provided to screen the fence and achieve an attractive appearance to the development when viewed from the street or other public place. ▪ Street furniture (including seats, bollards, signage, grates, grills, screens and fences, bicycle racks, flag poles, banners, litter bins, telephone booths and drinking fountains) and streetscape treatments are provided in accordance with Council's Public Domain	Street furniture will be provided the furniture that will be incorporated is outlined in the landscape plans. Public art is not included for this DA.	

Relevant Clause	Control	Proposal	Complies
	Design Manual or with agreement of the Executive Manager Appearance and Infrastructure. ▪ Any public art is provided in accordance with Council's Public Art Strategy.		
	Waste Management 1. A waste management plan for the construction and/or occupation of the development is provided that: ▪ Recycles and reuses demolished materials where possible; ▪ Integrates waste management processes into all stages of the project; ▪ Specifies building materials that can be reused and recycled at the end of their life; and ▪ Uses standard components and sizes to reduce waste and facilitate update in the future. 2. Separate storage bins for collection of organic waste and recyclable waste are provided within the development. 3. Bulk waste facilities shall be stored in a designated area that is physically and visually integrated into the development at ground or sub-basement level that: ▪ is not visible from the street or public domain;	The Waste Management Plan has assessed the components of waste generated and appropriately nominated the potential volume and types of waste detailed in **Appendix H.** For the storage of waste for use, recycling and disposal two areas have been allocated, one within the child care centre and the other on the southern edge of the shopping centre. Waste Management Plans have been prepared for the Demolition, Construction and operational stages of the project. The plans have identified the reuse to regrade materials. Waste is proposed to be reduced where possible.	Yes

Relevant Clause	Control	Proposal	Complies
	▪ is easily accessible to businesses; ▪ may be serviced by collection vehicles; ▪ has water and drainage facilities for cleaning and maintenance; ▪ does not immediately adjoin onsite employee recreation area; and ▪ be maintained to be free of pests. 4. Cardboard compactors shall be provided for large retail and commercial developments. 5. Where waste facilities cannot be collected at the street, evidence that the site can be serviced by a waste collection service shall be provided.	Separate storage bins for recyclable and general waste are being provided at waste storage areas and organic waste will be removed at an off-site location. There are identified waste rooms that will be used for waste storage before collection. They will not be visible from the street or public domain, at an accessible location for the premises. Is accessible via vehicle as its located in the loading dock. Will be able to be cleaned and maintained. Does not adjoin any employee recreation area and will be maintained to deter pests. Cardboard will be flattened before placing in the recycling bin. Waste facilities will be have access to the street.	
	Development adjoining sensitive land uses 1. The development is designed so that all vehicle movement areas and servicing areas are located away from adjoining residential areas. 2. Where this cannot be achieved, visual and acoustic treatment of the interface is required. 3. The building elevation adjoining the residential area shall be: ▪ Articulated, with changes in setback at intervals no greater than 10m; ▪ Use a variety of materials and treatments;	The site is an island site and as such no building directly adjoining a residential area.	Yes

Relevant Clause	Control	Proposal	Complies
	▪ Be setback a minimum of half the height of the wall or a minimum of 3.0 metres whichever is greater.		

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an Elephants Foot Company

Chisholm Shopping Centre

Retail Development

OPERATIONAL WASTE MANAGEMENT PLAN

10/12/2021
Report No. 3663
Revision B

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REVISION REFERENCE

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B	10/12/2021	A Armstrong	E Saidi	Amendment

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GLOSSARY OF ABBREVIATIONS AND TERMS

TERM	DESCRIPTION
Baler	A device that compresses waste into a mould to form bales which may be self-supporting or retained in shape by strapping
Bin-carting Route	Travel route for transferring bins from the storage area to a nominated collection point
Collection Area/Point	The identified position or area where general waste or recyclables are loaded onto the collection vehicle
Compactor	A machine for compressing waste into disposable or reusable containers
Composter	A container/machine used for composting specific food scraps
Crate	A plastic box used for the collection of recyclable materials
DA	Development Application
DCP	Development Control Plan
EPA	Environmental Protection Authority
HRV	Heavy Rigid Vehicle described by AS 2890.2-2002 Parking facilities – Off-street commercial vehicle facilities
L	Litre(s)
LEP	Local Environmental Plans guide planning decisions for local government areas
Liquid Waste	Non-hazardous liquid waste generated by commercial premises that must be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste)
Mixed Use Development	A development comprised of two or more different uses
MUD	Multi-Unit Dwellings comprise of a development with more than one dwelling. This ranges from dual occupancies and attached dwellings to high-rise residential developments
Mobile Garbage Bin(s) (MGB)	A waste container generally constructed of plastic with wheels with a capacity in litres of 120, 240, 360, 660, 1000 or 1100
MRV	Medium Rigid Vehicle described by AS 2890.2-2002 Parking facilities – Off-street commercial vehicle facilities
Onsite Collection	When the collection vehicle enters the property and services the development within the property boundary from a designated loading area
Owners Corporation	An organisation or group of persons that is identified by a particular name and acts, or may act, as an entity
Service Bins	Bin set side to be placed under a chute while the remainder of the bins are being collected

SRV	Small Rigid Vehicle described by AS 2890.2-2002 Parking facilities – Off-street commercial vehicle facilities
WHS	Workplace Health and Safety
Wheel-in wheel-out service	A type of waste collection service offered by local councils where the council waste collection personnel enter the premises to collect the bins and returns them to the property

1 INTRODUCTION

Elephants Foot Recycling Solutions (EFRS) has been engaged to prepare the following waste management plan for the operational management of waste generated by the Chisholm Shopping Centre development located on Heritage Drive, Chisholm.

Waste management strategies and audits are required for new developments in order to support the design and sustainable performance of the building. It is EFRS's belief that a successful waste management strategy contains three key objectives:

i. ***Promote responsible source separation*** to reduce the amount of waste that goes to landfill by implementing convenient and efficient waste management systems.

ii. ***Ensure adequate waste provisions and robust procedures*** that will cater for potential changes during the operational phase of the development.

iii. ***Comply*** with all relevant council codes, policies, and guidelines.

To achieve these objectives, this operational waste management plan (OWMP) identifies the different waste streams likely to be generated during the operational phase of the development, as well as how the waste will be handled and disposed, details of bin sizes/quantities and waste rooms, descriptions of the proposed waste management equipment used, and information on waste collection points and frequencies.

It is essential that this OWMP is integrated into the overall management of the building and is clearly communicated to all relevant stakeholders.

1.1 SCOPE OF REPORT

This operational waste management plan (OWMP) only applies to the **operational** phase of the proposed development; therefore, the requirements outlined in this OWMP must be implemented during the operational phase of the site and may be subject to review upon further expansion of, and/or changes to the development.

The waste management of the **construction** and **demolition** phases of the development are not addressed in this report. A construction and demolition WMP will need to be provided separately.

1.2 REPORT CONDITIONS

The purpose of this report is to document an OWMP as part of a development application, which is supplied by EFRS with the following limitations:

- Drawings, estimates and information contained in this OWMP have been prepared by analysing the information, plans and documents supplied by the client and third parties including Council and other government agencies. The assumptions based on the information contained in the OWMP is outside the control of EFRS,
- The figures presented in the report are an estimate only – the actual amount of waste generated will be dependent on the occupancy rate of the building/s and waste generation intensity as well as the building management's approach to educating tenants regarding waste management operations and responsibilities,
- The building manager will adjust waste management operations as required based on actual waste volumes (e.g. if waste is greater than estimated) and increase the number of bins and collections accordingly,
- The report will not be used to determine or forecast operational costs or prepare any feasibility study or to document any safety or operational procedures,
- The report has been prepared with all due care; however no assurance is made that the OWMP reflects the actual outcome of the proposed waste facilities, services, and operations, and EFRS will not be liable for plans or results that are not suitable for purpose due to incorrect or unsuitable information or otherwise,
- EFRS offer no warranty or representation of accuracy or reliability of the OWMP unless specifically stated,
- Any manual handling equipment recommended in this OWMP should be provided at the recommendation of the appropriate equipment provider who will assess the correct equipment for supply,
- Design of waste management equipment and systems must be approved by the supplier,
- EFRS cannot be held accountable for late changes to the design after the OWMP has been submitted to Council,
- EFRS will provide specifications and recommendations on bin access and travel paths within the OWMP, however it is the architect's responsibility to ensure the architectural drawings meet these provisions,
- EFRS are not required to provide information on collection vehicle swept paths, head heights, internal manoeuvring or loading requirements. It is assumed this information will be provided by a traffic consultant,
- Council are subject to changing waste and recycling policies and requirements at their own discretion.

This OWMP is only finalised once the Draft Watermark has been removed. If the Draft Watermark is present, the information in the OWMP is not confirmed.

2 LEGISLATION & GUIDANCE

Waste management and resource recovery regulation in Australia is administered by the Australian Constitution, Commonwealth laws, and international agreements. State and territory governments maintain primary responsibility for controlling development and regulating waste. The following legislation has been enacted in New South Wales, and provides the lawful underpinnings of this OWMP.

- NSW Environmental Planning & Assessment Act 1979
- NSW Protection of the Environment Operations Act 1997
- NSW Waste Avoidance & Resource Recovery Act 2001

At the local level, councils or Local Government Areas (LGAs) require OWMPs to be included in new development applications. This OWMP is specifically required by:

- *Maitland Council Development Control Plan 2011*

The primary purpose of a development control plan (DCP) is to guide development according to the aims of the corresponding local environmental plan (LEP). The DCP must be read in conjunction with the provisions of the relevant LEP.

Information provided in this OWMP comes from a wide range of waste management guidance at the local, state, and federal levels. The primary sources of guidance include:

- Maitland Council's Development Control Plan: B6 – Waste Not – Site Waste Minimisation & Management
- NSW Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012
- NSW Better practice guide for resource recovery in residential developments 2019
- NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021
- NSW Waste Classification Guidelines 2014
- Australia's National Waste Policy 2018

1.1 COUNCIL OBJECTIVES

- Avoiding unnecessary resource consumption;
- Recovering resources for reuse ;
- Recovering resources for recycling or reprocessing; &
- Disposing of residual waste as a last resort.

3 DEVELOPMENT OVERVIEW

The proposed development falls under the LGA of Maitland Council, and consists of a shopping centre with the following tenancies:

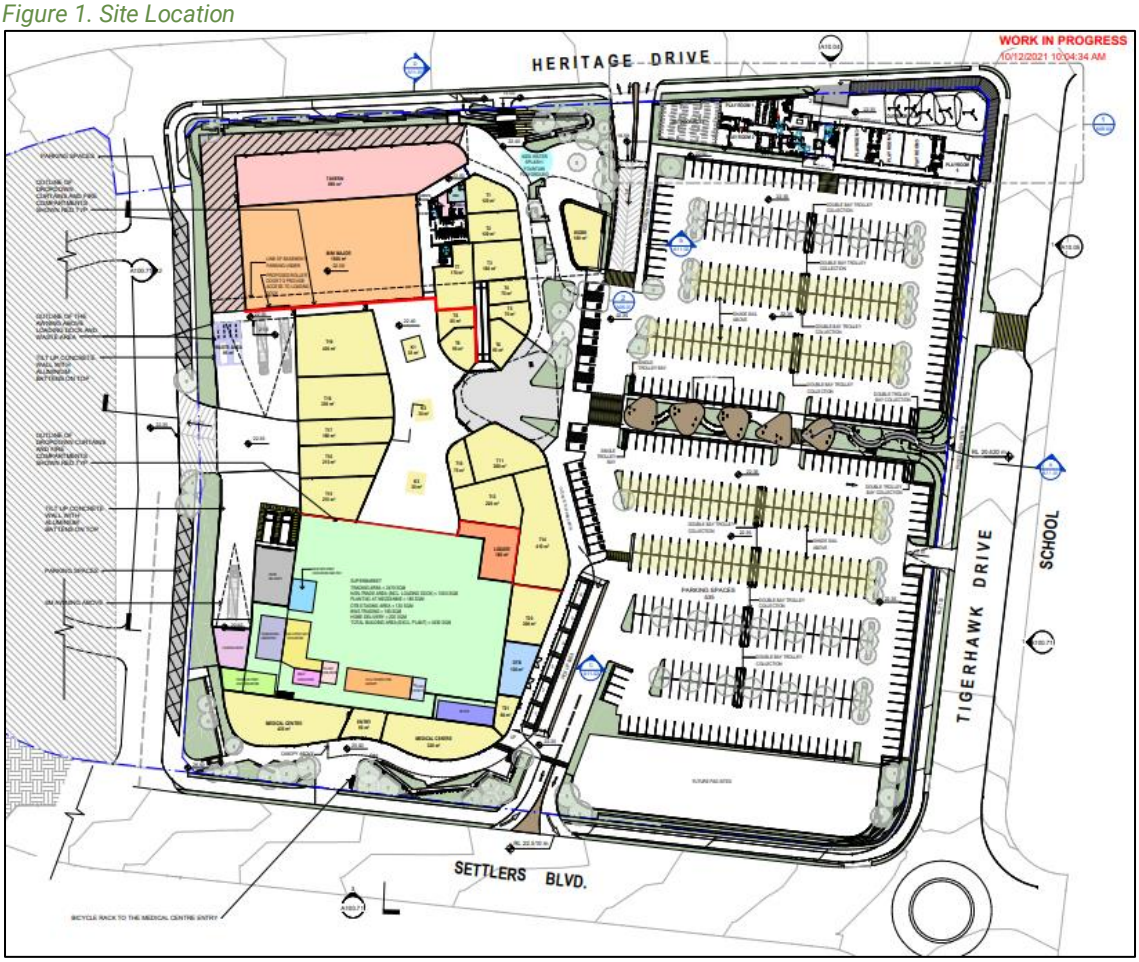
- Supermarket (including a liquor store) with a total GFA of 3,934m^2;
- Mini major store with a total GFA of 1,519m^2
- Retail tenancies with a total GFA of 5,209m^2
- Kiosk with a total GFA of 227m^2
- Gym with a total GFA of 1,009m^2
- Medical centre with a total GFA of 937m^2
- Tavern with a total GFA of 900m^2
- Childcare centre with a total GFA of 659m^2

All figures and calculations are based on area schedules as advised by our client and shown on architectural drawings.

3.1 SITE LOCATION

The site is located on Heritage Drive, Chisholm, as shown in Figure.1. The site has frontages to Heritage Drive, Settlers Boulavard and Tgerhawk Drive, with vehicle access for waste collections intended to be via Heritage Drive.

Figure 1. Site Location



Source: BN Group – Ground Level Plan

4 RETAIL AND COMMERCIAL WASTE MANAGEMENT

The following section outlines best practice waste management for the development, including waste generation estimates and waste disposal and collection procedures. Please note that the proposed supermarket has not been included in this section as it is intended that this will be addressed in a separate report provided by the operator.

4.1 WASTE GENERATION ESTIMATES

The NSW EPA's *Better Practice Guide for Resource Recovery in Residential Developments* (2019) has been referenced to calculate the total number of bins required for the anticipated tenants. Calculations are based on generic figures, and waste generation rates may differ according to the tenants' actual waste management practice.

The following table shows the estimated volume (L) of general waste and recyclables that will be generated by the retail/commercial tenants based on a seven-day operating week.

Table 1: Estimated Waste and Recycling Generation

Tenancy Type	Category	GFA (m^2)	General Waste Generation Rate (L/100m^2/day)	Generated General Waste (L/week)	Recycling Generation Rate (L/100m^2/day)	Generated Recycling (L/week)
Mini Major	Supermarket	1519	240	25519	300	31899
Retail	Food & Beverage	2604	150	27342	100	18228
Retail	Standard Chain Store Retail	2605	5	912	20	3646
Kiosk	Café	227	100	1589	120	1907
Gym	Gymnasium	1009	20	1413	15	1059
Medical Centre	Medical	937	20	1312	10	656
Food & Beverage	Tavern	900	400	25200	280	17640
Tenancy	**Type**	**No. of Children**	**General Waste Generation Rate** (L/child/day)	**Generated General Waste** (L/week)	**Recycling Generation Rate** (L/child/day)	**Generated Recycling** (L/week)
Childcare Centre	Childcare	100	5	3500	5	3500
TOTAL				**86786**		**78535**
Collections & Equipment		General Waste Bin Size (L)		4500	Recycling Bin Size (L)	4500
		General Waste Collections per Week		3	Recycling Collections per Week	3
		Total General Waste Bins Required		7	Total Recycling Bins Required	6

4.2 BIN SUMMARY

Based on the estimated waste generated by the retail tenancies, café, gymnasium, medical centre and tavern tenancies, the recommended compactor/bin quantities and collection frequencies are as follows:

General Waste: 1 x 23m^3 compactor (4:1 compaction ratio) collected 1 x weekly

Recycled Paper/Cardboard: 1 x 23m^3 compactor (4:1 compaction ratio) collected 1 x fortnightly

Comingled Recyclables: 12 x 660 bulk bins collected **3 x weekly**

The childcare facility will not utilise the compactors/bins listed above and will have its own separate waste room, bins and collection contract in place as per the below:

General Waste: 2 x 660L bins collected 3 x weekly

Recycled Paper/Cardboard: 2 x 660L bins collected 3 x weekly

Compactor/bin sizes, quantities, and/or collection frequencies may be modified by management once the proposed development is operational. Management will be required to negotiate any changes to bins or collections with the collection service provider. Seasonal peak periods such as public and school holidays should also be considered.

4.3 WASTE DISPOSAL PROCEDURES

Tenants will be responsible for storing their waste and recyclables back of house on a daily basis. General waste and recycling receptacles should be paired next to each other in convenient locations such as kitchens, reception areas, BOH storage rooms and tea rooms.

On completion of each trading day or as required, nominated staff or contracted cleaners will transport all general waste and recyclables to the compactors/bin located in the loading dock on the ground level (see APPENDIX A.1).

General waste will be deposited directly into the designated compactor, or else the tenant will wheel their own 240L MGBs to the compactor and use an adjoining bin lifter to decant waste into the compactor.

Similarly, paper/cardboard recyclables will either be deposited directly into the paper/cardboard compactor or tenants will wheel their own 240L paper/cardboard bins to the compactor to decant materials via an adjoining bin lifter.

Commingled recyclables will be deposited directly into the designated 660L MGBs.

To ensure the proper management and disposal of waste, tenants must be made aware of the following practices:

- all garbage should be bagged and garbage bins should be plastic lined,
- bagging of recyclables is not permitted,
- all interim waste storage is located BOH during operations, and
- individual recycling programs are recommended for tenants to ensure commingled recycling is correctly separated.

4.3.1 SEPARATE CHILDCARE WASTE DISPOSAL PROCEEDURES

Waste generated by childcare centres typically consists of soiled nappies, wipes, food scraps, other general waste, and recyclables. Dedicated bins should be allocated for general waste (including disposable nappies) and recycling.

Childcare staff will be responsible for storing the waste and recyclables back of house on a daily basis. General waste and recycling receptacles should be paired next to each other in convenient locations such as offices, kitchens, and playrooms. The receptables should be kept in locations that cannot be accessed by the children.

On completion of each trading day or as required, nominated staff or contracted cleaners will transport the waste and recyclables to the separate childcare waste room and place into the designated bins.

4.4 WASTE COLLECTION PROCEDURES

A private waste collection contractor will be engaged to collect the general waste, paper/cardboard, and commingled recyclables per an agreed schedule.

On the day of compactor servicing, a private waste collection vehicle (hook lift) will enter the site from the laneway (accessible via Heritage Drive and Settlers Boulevard) and reverse in front of the compactor for loading onto the vehicle. Once the compactor is loaded, the vehicle exits the site in a forward direction and unloads the material at a licenced resource recovery facility. The compactor is then returned to resume operational use.

On the day of servicing for commingled recyclables, a rear-load vehicle enters the site from the laneway and parks in the designated loading bay to service the bins. Once the bins are decanted are returned to the storage area, the driver will exit the site in a forward direction onto the laneway.

See 4.6.2 for *Medical Waste Collection Procedures*.

4.4.1 SEPARATE CHILDCARE WASTE COLLECTION PROCEDDURES

A private waste collection contractor will be engaged to service the childcare waste and recycling bins per an agreed schedule. This report assumed that waste and recycling will be collected 3 x weekly.

On the day of service, a private waste collection vehicle will pull up on Tigerhawk Drive adjacent to the childcare waste room. The bins will be collected directly from the childcare waste room via a collect and return arrangement.

It is recommended that collection occurs outside the childcare operating hours to minimise conflicts with other traffic movements.

4.5 OTHER WASTE MANAGEMENT CONSIDERATIONS

Based on the types of tenancies anticipated for this development, the following waste management practices are recommended.

4.5.1 FOOD RETAIL AREAS

Food and beverage tenancies will be provided with dedicated source separation bins back of house for general waste and recycling. It is recommended that the bins are stored in food preparation areas. Cleaners or nominated staff will be responsible for monitoring these bins and emptying them into collection bins in the bin holding area as required.

4.5.2 NON-FOOD RETAIL AREAS

Non-food retail tenancies will also have back of house bins for general waste and recycling. At the end of each trading day or as required, nominated staff or cleaners will transfer waste to the collection bins in the bin holding area.

4.5.3 GYM AREAS

Smaller bins for general waste and recycling will be situated at regular intervals throughout the gym. The frequency of these bins will depend upon the frequency of use. Each of these bins will be emptied by the contract cleaners during their cleaning routine after hours, before being transferred to the compactors and bins in the central loading dock.

4.5.4 BATHROOMS

Washroom facilities should be supplied with collection bins for paper towels (if used). Sanitary bins for female restroom facilities must also be arranged with an appropriate contractor.

4.5.5 LIQUID WASTE

Liquid wastes such cleaning products, chemicals, paints, and cooking oil, etc., will be stored in a secure space that is bunded and drained to a grease trap in accordance with State government authorities and legislation.

4.5.6 RE-USEABLE COMMERCIAL ITEMS

Space will be provided back of house for the storage of re-usable commercial items such as crates, pallets, kegs and strip out waste. The building manager will be responsible for ensuring that storage of these items in public places is completely avoided.

4.5.7 PROBLEM WASTE

The building manager is responsible for making arrangements for the disposal and recycling of problem waste streams with an appropriate contractor. Problem wastes cannot be placed in general waste as they can have adverse impacts to human health and the environment if disposed of in landfill. Retail and Commercial tenants will need to liaise with the building manager when disposing of problem waste streams.

Problem waste streams include:

- Chemical Waste
- Liquid wastes
- Toner cartridges
- Lightbulbs
- eWaste
- Batteries

4.6 MEDICAL CENTRE WASTE MANAGEMENT CONSIDERATIONS

The medical centre will generate medical waste in addition to general waste and recycling. Medical waste is any solid waste that is hazardous or contains potentially infectious material generated from biological and medical sources and activities. Medical waste can include, but is not limited to: Sharps and pharmaceutical waste, clinical waste, cytotoxic

waste, and radioactive waste. The management of the various medical waste streams are further outlined in APPENDIX: C.2.

It is the responsibility of the medical centre operator to determine the types of medical waste that will be generated by the development, and to arrange for the appropriate bins and collection services for the relevant medical waste types.

The medical centre operator is also responsible for appointing a medical waste collection contractor prior to the operation of the site to provide and service the appropriate medical waste bins.

Medical waste must be managed and disposed of in accordance with the *Protection of the Environment Operations Act* 1997 and the *Protection of the Environment Operations (Waste) Regulation* 2005.

Please refer to the following table for the storage and collection requirements of the medical waste streams when the site becomes operational.

Table 2: Storage and Collection Requirements for Medical Waste

Area	Location
Storage	According to best practice as detailed in Waste Management Association of Australia, Biohazardous Waste Industry Group, *Manual for the Management of Biohazardous Waste*, 6th edition 2010, storage can be in a dedicated and purpose-built room or dedicated storage area for mobile garbage bins back of house. The appropriate storage will depend on the type of medical waste, volumes and servicing processes. In accordance with NSW Health's *Clinical and Related Waste Management for Health Services* 2017, health services must provide an enclosed structure such as a shed, garage, cage or fenced area or separate loading bay to store medical waste. The storage area for anatomical and/or clinical waste may require refrigeration to prevent decomposition of the waste if this waste stream is not removed on a frequent basis. Any medical waste holding area must: • Be located away from food and clean storage areas, • Be inaccessible to the public, • Have a lockable door, • Have rigid impervious flooring, • Allow for regular cleaning, and • Prevent odour and vermin. An EPA licence may be required to store Hazardous Wastes.
Containers	All medical waste must be stored in the correct medical waste container with correct colour coding and labelling in accordance the *Australian Dangerous Goods Code Edition 7.3 (ADG Code).* All containers of medical waste to be stored in a secure location.
Spillages	Clean up facilities, spills kits, appropriate drainage and bunding should be provided within the Waste Storage Area. Ensure all necessary equipment required to clean and disinfect the area in case of accidental spillage is easily available and accessible. It is essential that personnel

	involved in spill management receive education and training in emergency procedures and handling requirements. Spill kits that have been used should be disposed of with the type of waste that has been cleaned up, e.g. used cytotoxic spill kits should be disposed of with cytotoxic waste.
Mixed waste	Any waste mixed with medical waste must be treated as medical waste
Sharps	Sharps containers should be placed within "arms reach" of where the sharps are generated. Full containers will be sealed and then transported utility rooms/ designated storage area to awaiting collection by contractors.
Collections	It is intended that as per normal practice for these types of facilities, that the appointed contractor will service the medical waste containers/bins from their operational location within the facility and replace them at the same time with empty containers/bins. Medical waste shall remain within the storage areas and only be moved during collections. Collections will be performed by a transporter licensed by the EPA to collect, transport and dispose of the medical waste stream accordingly.

4.6.1 MEDICAL WASTE ROOM REQUIREMENTS

Medical waste rooms provided within a development should strive to meet the following best practice guidelines as outlined in Waste Management Association of Australia, Biohazardous Waste Industry Group's *Manual for the Management of Biohazardous Waste*, 6th edition 2010:

- Storage area base is an impervious surface surround by a bund appropriate to contain any spill
- All loading/unloading takes place within the bunded area in such a manner to ensure any spills are appropriately managed
- The base and walls of bunded areas are free of gaps or cracks
- Where vehicular access to the bunded area is required, bunds are constructed to prevent them from being damage by vehicles
- Signage is posted with the biohazard symbol and other labelling appropriate to the types of waste stored in that area
- The bunded area drains to a sump or sewer to collect spills and wash water.
- If any refrigerator facilities are provided, they shall be contained within a secure area.

4.6.2 MEDICAL WASTE COLLECTION PROCEDURES

General waste and recycling generated by the medical centre will be disposed of into the compactors and bin located in the central loading dock alongside other retail waste.

Medical waste is to be collected by an appointed contractor directly from operational locations within the medical facility. Containers/bins will be replaced at the time of servicing with empty containers/bins.

Medical waste shall remain within the storage areas and only be moved during collections. Collections will be performed by a transporter licensed by the EPA to collect, transport and dispose of the medical waste stream accordingly.

5 STAKEHOLDER ROLES & RESPONSIBILITIES

The following table demonstrates the primary roles and responsibilities of the respective stakeholders:

Table 3: Stakeholder Roles and Responsibilities

Roles	Responsibilities
Management	• Ensuring that all waste service providers submit monthly reports on all equipment movements and waste quantities/weights; • Organising internal waste audits/visual assessments on a regular basis • Purchasing any on-going waste management equipment or maintenance of equipment once building is operational; and • Managing any non-compliances/complaints reported through waste audits.
Building Manager or Waste Caretaker	• Coordinating general waste and recycling collections; • Cleaning and transporting bins as required; • Organising replacement or maintenance requirements for bins; • Organising, maintaining and cleaning the waste holding area; • Organising bulky goods collection when required • Investigating and ensuring prompt clean-up of illegally dumped waste materials. • Preventing storm water pollution by taking necessary precautions (securing bin rooms, preventing overfilling of bins) • Abiding by all relevant WH&S legislation, regulations, and guidelines; • Providing staff/contractors with equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management; • Assessing any manual handling risks and preparing a manual handling control plan for waste and bin transfers; • Ensuring site safety for residents, children, visitors, staff and contractors; and • Ensuring effective signage, communication and education is provided to occupants, tenants, maintenance staff, and cleaning contractors.
Retail/Commercial Tenants	• Managing the back of house storage of generated waste and recycling during daily operation. • Correctly separating waste and recycling streams. Including bagging general waste and ensuring recyclables are not bagged. • Flattening cardboard within the recycling bin. • If required, making arrangements for storing used and unused cooking oil in a bunded storage area, • Organizing grease interceptor trap servicing, • Ensure dry basket arrestors are provided to the floor wastes in the food preparation, and • Ensuring the suitable storage for chemicals, pesticides and cleaning products waste back of house.
Waste Collection Contractor	• Provide a reliable and appropriate waste collection service; • Provide feedback to management/tenants regarding contamination of recyclables; and • Work with building managers to customise waste systems where possible.
Gardening/ Landscaping Contractor	• Removal of all garden organic waste generated during gardening maintenance activities for recycling at an offsite location.
Developer	• Purchasing all equipment required to implement this OWMP prior to the occupation of the building to be provided to the strata.

6 SOURCE SEPARATION

Better practice waste management includes the avoidance, reuse, and recovery of unwanted items, which can be achieved through source separation. The table below outlines what is typically included in various waste streams and how they can be managed. Refer to your local council for a list of accepted materials. Planet Ark can be accessed online to find other facilities that recover unwanted items.

Table 4: Operational Waste Streams

Waste Stream	Description	Typical Destination	Waste Stream Management
General Waste	The remaining portion of the waste stream that is not recovered for re-use, processing, or recycling. May include soft plastics, food scraps, polystyrene, etc.	Landfill	Waste should be bagged before placing in the designated waste bins.
Recycling	A mixture of items that are commonly recycled usually segregated through a MRF. Typically include food and beverage containers (e.g. aluminium, glass, steel, hard plastics, cartons). Also included cardboard and paper products.	Resource Recovery Centre	Recycling must not be bagged, and instead should be placed loosely in the designated recycling bins. Cardboard should be flattened before placing in the recycling bins.
Secure Documents	Secure documents are printed paper materials that contain sensitive information.	Recycling Facility	Secure documents are placed in allocated secure document bins. Private contractor removes bins from site.
Green Waste	Green waste consists of unwanted organic materials that are easily biodegradable and/or compostable (e.g. lawn clippings, branches)	Resource Recovery Centre	Landscape Maintenance Contractors will remove the green waste from site during scheduled maintenance.
Food Waste	Food waste consists of unwanted or uneaten kitchen scraps that are easily compostable/biodegradable (e.g. vegetable peels, fruit rinds, coffee grounds).	Composting facility or Landfill	Food waste can be composted on-site, off-site, or else included in the general waste stream.
Electronic Waste	Discarded e-waste, electronic components and materials such as computers, mobile phones, keyboards, etc.	Resource Recovery Centre	Commercial tenants arrange for recycling of their own e-waste.
Bulky Items	Items that are to too large to place into general rubbish collection. This includes disused and/or broken furniture, mattresses, white goods, etc.	Resource Recovery Centre or Landfill	Commercial tenants are responsible for removal of their bulky items.
Sanitary Waste	Feminine hygiene waste generated from female bathrooms.	Incineration or Landfill	Sanitary bins are serviced by sanitary waste contractor.
Other	Other recyclable items that require special recovery may include ink cartridges, batteries, chemical waste, fluorescent tubes, etc.	Resource Recovery Facility	Management arranges collection by appropriate recycling services when required.

7 EDUCATION

Educational materials encouraging correct separation of general waste and recyclables must be provided to each commercial/retail tenant. This should include the correct disposal process for bulky waste such as old furniture, large discarded items, and other materials including electronic and chemical wastes. It is recommended that the building caretaker provides information in multiple languages to support correct behaviours, and to minimise the possibility of contamination in communal waste bins.

7.1 SIGNAGE

Signage and education are essential components to support best practice waste management including resource recovery, source separation, and diversion of waste from landfill.

Signage should include:

- Clear and correctly labelled waste and recycling bins,
- Instructions for separating and disposing of waste items. Different languages should be considered,
- Locations of, and directions to, the waste storage areas with directional signs, arrows, or lines,
- The identification of all hazards or potential dangers associated with the waste facilities, and
- Emergency contact information should there be issues with the waste systems or services in the building.

The building manager is responsible for waste room signage including safety signage. Appropriate signage must be prominently displayed on doors, walls and above all bins, clearly stating what type of waste or recyclables is to be placed in each bin.

All signage should conform to the relevant Australian Standards.

7.2 POLLUTION PREVENTION

Building management shall be responsible for the following to minimise dispersion of site litter and prevent stormwater pollution to avoid impact to the environment and local amenity:

- Promoting adequate waste disposal into the bins
- Securing all bin rooms (whilst affording access to staff/contractors)
- Prevent overfilling of bins, keep all bin lids closed and bungs leak-free
- Taking action to prevent dumping or unauthorised use of waste areas
- Require collection contractor/s to clean up any spillage when clearing bins.

8 WASTE STORAGE AREA

The areas allocated for waste storage and collections are detailed in the table below, and are estimates only. Final areas will depend on room and bin layouts.

Table 5: Waste Room Areas

Location	Waste Room Type	Equipment	Estimated Area Required (m^2)
Loading Dock	Retail, Gym, Tavern & Medical Centre Communal Compactors & Bins	**General Waste** 1 x 23m^3 compactor **Paper/Cardboard Recycling:** 1 x 23m^3 compactor **Comingled Recycling:** 12 x 660 bulk bins	80
Childcare	Childcare Waste Room	**General Waste** 2 x 660L bins **Recycling:** 2 x 660L bins	8

EFRS recommends compactor/bin sizes, collection frequencies and/or equipment for best practice waste management at this site, however EFRS also acknowledges there are a range of other suitable options that may alter waste room requirements (e.g. floor area, accessibility, head height, etc.)

The waste areas have been calculated based on equipment requirements and/or compactor/bin dimensions with an additional 70% of bin GFA factored in for manoeuvrability.

9 CONSTRUCTION REQUIREMENTS

Waste room construction must comply with the minimum standards as outlined in the *Maitland Council Development Control Plan 2011* in order to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area.

The *NSW Better Practice Guide for Resource Recovery in Residential Developments* (2019) also states that better practice bin storage areas should achieve more than the minimum compliance requirements, which are as follows:

- Ensuring BCA compliance, including ventilation. Where required, ventilation system must comply with AS1668.4-2012 The use of ventilation and air conditioning in buildings.
- Ensuring storage areas are well lit (sensor lighting preferred) and have lighting available 24 hours a day.
- Provision of bin washing facilities, including taps for hot and cold water provided through a centralised mixing valve. The taps must be protected from bins and be located where they can be easily accessed even when the area is at bin capacity.
- Floor constructed of concrete at least 75mm thick.
- Floor graded so that any water is directed to a sewer authority approved drainage connection to ensure washing bins and/or waste storage areas do not discharge flow into the stormwater drain.
- Provision of smooth, cleanable and durable floor and wall surfaces that extend up the wall to a height equivalent to any bins held in the area.
- Ensuring ceilings are finished with a smooth-faced non-absorbent material capable of being cleaned.
- All surfaces (walls, ceiling and floors) finished in a light colour.

9.1 ADDITIONAL CONSIDERATIONS

- Waste room floor to be sealed with a two-pack epoxy;
- All corners coved and sealed 100mm up, this is to eliminate build-up of dirt;
- Tap height and light switch height of 1.6m;
- Storm water access preventatives (grate);
- All walls painted with light colour and washable paint;
- Equipment electric outlets to be installed 1700mm above finished floor level;
- Optional automatic odour and pest control system installed
- If 660L or 1100L bins are utilised, 2 x 820mm (minimum) double-doors must be used;
- All personnel doors are hinged, lockable and self-closing;
- Conform to the Building Code of Australia, Australian standards and local laws; and
- Childproofing and public/operator safety shall be assessed and ensured
- Waste and recycling rooms must have their own exhaust ventilation system either;
    - Mechanically - exhausting at a rate of 5L/m² floor area, with a minimum rate of 100L/s minimum; Mechanical exhaust systems shall comply with AS1668.4.2012 and not cause any inconvenience, noise or odour problem or
    - Naturally - permanent, unobstructed, and opening direct to the external air, not less than one-twentieth (1/20) of the floor area.

10 USEFUL CONTACTS

EFRS does not warrant or make representation for goods or services provided by suppliers.

LOCAL COUNCIL

Maitland Council Customer Service	Ph: 4934 9700	E: info@maitland.nsw.gov.au

PRIVATE WASTE COLLECTION PROVIDER

Capital City Waste Services	Ph: 02 9599 9999	E: service@ccws.net.au
Remondis	Ph: 02 9032 7100	
Suez Environmental	Ph: 13 13 35	
Wastewise NSW	Ph: 1300 550 408	E: admin@wastewise.com.au

BIN MOVING DEVICE SUPPLIERS

Electrodrive	Ph: 1800 333 002	E: sales@electrodrive.com.au
Sitecraft	Ph: 1300 363 152	E: sales@sitecraft.com.au
Spacepac	Ph: 1300 763 444	

ORGANIC DIGESTERS AND DEHYDRATORS

Closed Loop	Ph: 1300 762 166	
Orca		E: contact.australia@feedtheorca.com
Soil Food	Ph: 1300 556 628	
Waste Master	Ph: 1800 614 272	E: hello@wastemasterpacific.com.au

COOKING OIL CONTAINERS AND DISPOSAL

Auscol	Ph: 1800 629 476	E: sales@auscol.com

ODOUR CONTROL

Purifying Solutions	Ph: 1300 636 877	E: sales@purifyingsolutions.com.au

SOURCE SPERATION BINS

Source Separation Systems	Ph: 1300 739 913	E: info@sourceseparationsystems.com.au

MOBILE GARBAGE BINS, BULK BINS AND BIN EQUIPMENT

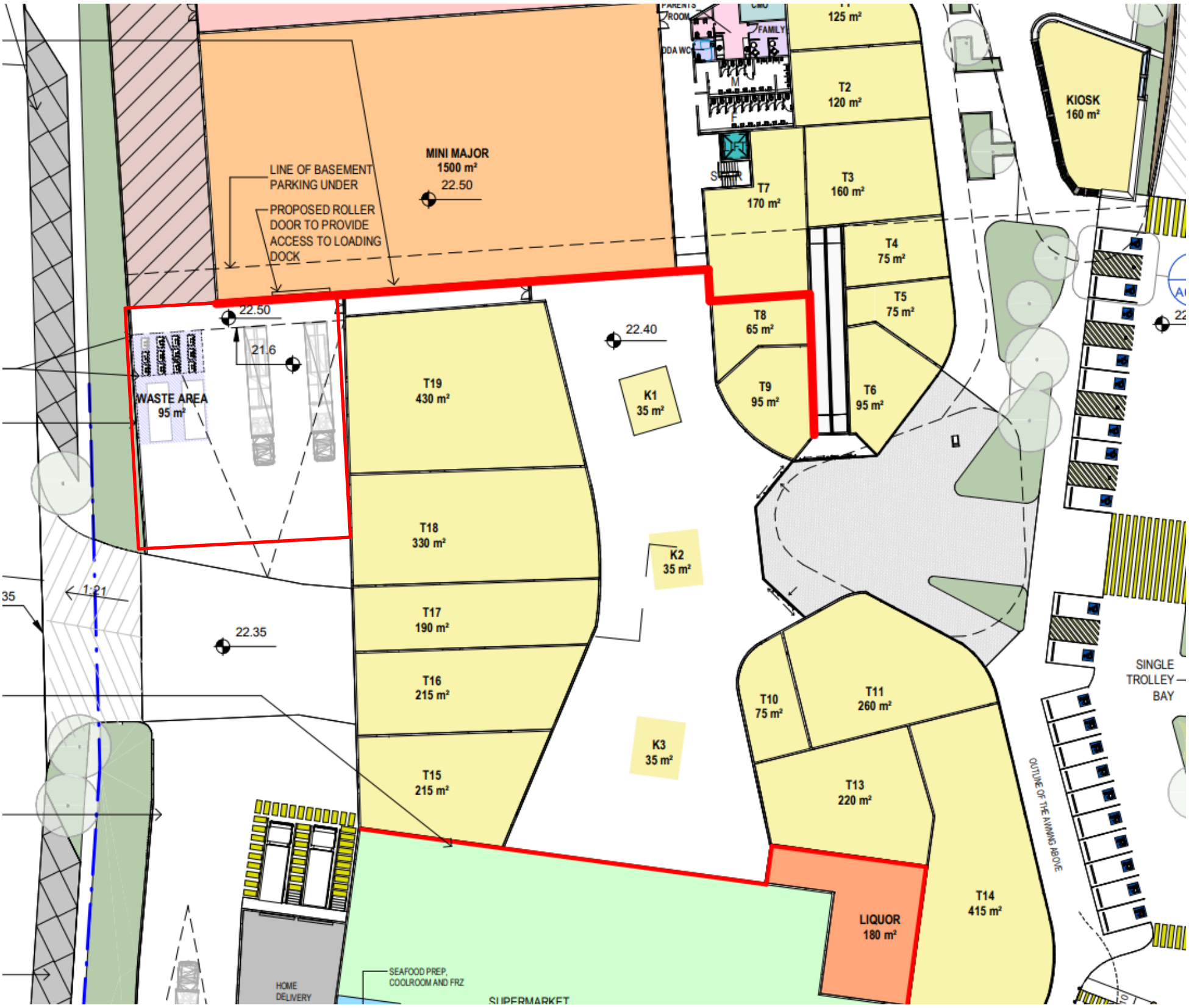
SULO	Ph: 1300 364 388	E: sales@sulo.com.au
OTTO Australia	Ph: 02 9153 6999	

CHUTES, COMPACTORS AND EDIVERTER SYSTEMS

Elephants Foot Recycling Solutions	Ph: 1800 025 073	E: info@elephantsfoot.com.au

APPENDIX A: ARCHITECTURAL PLANS

APPENDIX: A.1 RETAIL, GYM, TAVERN & MEDICAL CENTRE COMPACTORS & BINS



Excerpt – BN Architecture Urban Design Masterplanning Graphics Interiors, A06.02, Rev H, dated 08/12/2021

APPENDIX B: PRIMARY WASTE MANAGEMENT PROVISIONS

APPENDIX: B.1 TYPICAL BIN SPECIFICATIONS

Table G1.3: Average dimension ranges for bulk bins over 1700L in capacity

Bulk bins greater than 1700L

Bin capacity)	1m³	1.5m³	2m³	3m³	4.5m³	6m³
Height (mm)	1000	910–1250	865–1000	1020–1580	1440–2014	1650
Depth (mm)	1000	905–1000	1300–1400	1470–1700	1605–1900	1900
Width (mm)	1400	1805–2010	1830–2000	1400–2010	1800–2010	2000
Approximate footprint (m²)	1.4	1.63–2.01	2.4–2.8	2.1–3.4	2.9–3.8	3.8

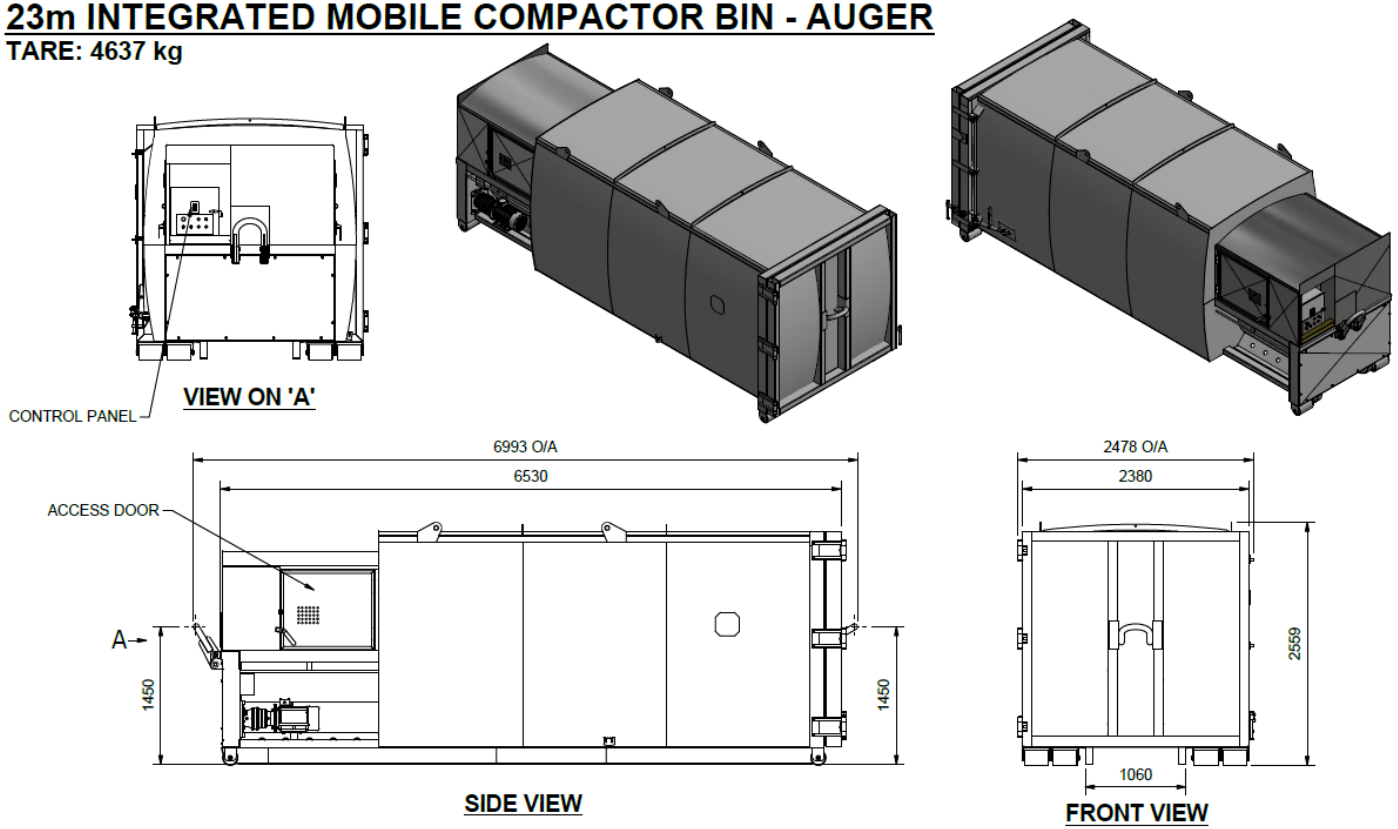
Sources include TORO Waste Equipment, SUEZ, Signal Waste, Perth Waste and ACT Industrial

Source: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

APPENDIX: B2 TYPICAL COMPACTOR SPECIFICATIONS

23m INTEGRATED MOBILE COMPACTOR BIN - AUGER

TARE: 4637 kg



DO NOT SCALE. IF IN DOUBT ASK - DIMENSIONS IN MILLIMETRES U.N.O.

TORO WASTE EQUIPMENT

TORO Waste Equipment (Aust) Pty Ltd
299 Parramatta Rd, Auburn NSW, 2144
Phone: 1300 55 65 70 Fax: (02) 9475 0257
www.toroeq.com.au

THESE SPECIFICATIONS ARE INTENDED SOLELY FOR THE USE OF THE RECIPIENTS & CONTAIN INFORMATION WHICH IS CONFIDENTIAL AND MAY NOT BE REPRODUCED OR DISSEMINATED TO ANY OTHER PERSON WITHOUT WRITTEN CONSENT FROM TORO WASTE EQUIPMENT (AUST) PTY LTD.

DRAWN TO AS1100	
DRAWN	DY
DATE	12/09/2017
CHECKED	
APPROVED	
DESIGN ENG.	

CLIENT / PROJECT: INTEGRATED MOBILE COMPACTOR BIN

TITLE: GA DRAWING

DRAWING No.	REVISION
GA	0

SCALE	SHEET No.	
NTS	1 of 1	A3

FILENAME: CP23-IA_GA.idw

APPENDIX: B.2 SIGNAGE FOR WASTE AND RECYCLING BINS

Waste signs

Signs and educational materials perform several functions including:

- informing residents why it is important to recover resources and protect the environment
- providing clear instructions on how to use the bins and services provided
- alerting people to any dangers or hazards within the bin storage areas.

All waste, recycling and organic bins should be Australian Standard colours and clearly and correctly labelled, such as by a sticker on the lid and/or the body of the bin.

Communal bin storage areas should be clearly signposted with signs outlining how to correctly separate waste into the bins provided. The local council responsible for waste services may be a good source of signs and posters and can advise on what signs are suitable.

Information on who to contact to find out more about the recycling and/or other resource recovery services in the building should also be displayed in communal areas, such as on a noticeboard.

The Planet Ark website also has resources available free of charge for use by businesses and councils. These signs can be found at businessrecycling.com.au/research/signage.cfm

Figure I1.1: Examples of waste wall posters (EPA supplied)

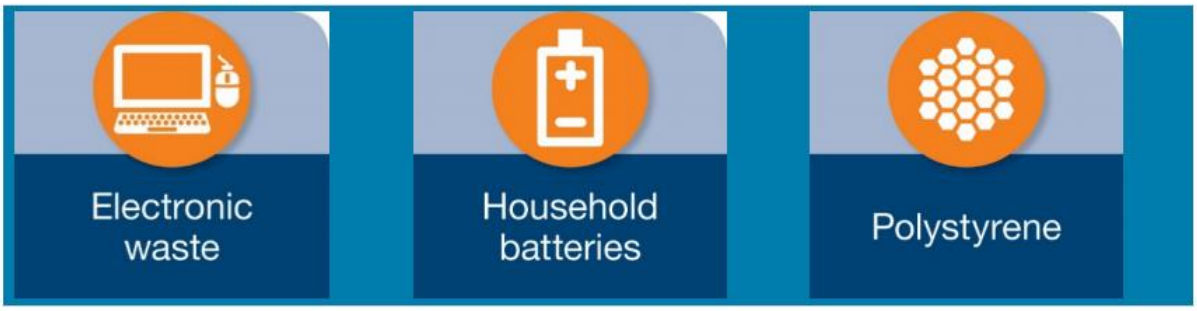
Figure I1.2: Examples of bin lid stickers (EPA supplied)

Source: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

Problem waste signs

The EPA has also produced a range of images and signs that can be used for problem wastes, such as fluoro globes and tubes, household and car batteries, e-waste and smoke detectors. To access these resources, contact the NSW EPA. Some examples are shown below.

Figure I2.1: Problem waste signs



Safety signs

The use of safety signs for waste resource recovery rooms must comply with *AS1319 Safety signs for occupational environments*. Safety signs must be used to regulate and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information. Suitable signs should be decided for each development as required.

Figure I3.1: Example safety signs

Source: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

APPENDIX: B.3 TYPICAL COLLECTION VEHICLE INFORMATION

General

Appropriate heavy rigid vehicle standards should be incorporated into the road and street designs in new developments where onsite collections are proposed. Road and street designs must comply with relevant Acts, regulations, guidelines, and codes administered by Austroads, Standards Australia, NSW Roads and Maritime Services, WorkSafe NSW and any local council traffic requirements.

Applicants and building designers should consult with councils and other relevant authorities before designing new roads or streets and access points for waste collection vehicles to establish specific design requirements.

Table H4.1: Australian Standards for turning circles for medium and heavy rigid class vehicles

Vehicle class	Overall length (m)	Design width (m)	Design turning radius (m)	Swept circle (m)	Clearance (travel) height (m)
Medium rigid vehicle	8.80	2.5	10.0	21.6	4.5
Heavy rigid vehicle	12.5	2.5	12.5	27.8	4.5

Source: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

Large collection vehicles

Waste collection vehicles may be side-loading, rear-loading, front-lift-loading, hook or crane lift trucks. Vehicle dimensions vary by collection service, manufacturer, make and model. It is not possible to provide definitive dimensions, so architects and developers should consult with the local council and/or contractors.

The following characteristics represent typical collection vehicles and are provided for guidance only. Reference to *AS2890.2 Parking facilities: off-street commercial vehicle facilities* for detailed requirements, including vehicle dimensions, is recommended.

Table B2.1: Collection vehicle dimensions

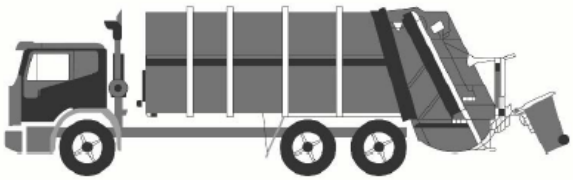
Vehicle type	Rear-loading	Side-loading*	Front-lift-loading	Hook truck	Crane truck
Length overall (m)	10.5	9.6	11.8	10.0	10.0
Width overall (m)	2.5	2.5	2.5	3.0	2.5
Travel height (m)	3.9	3.6	4.8	4.7	3.8
Operational height for loading (m)	3.9	4.2	6.5	3.0	8.75
Vehicle tare weight (t)	13.1	11.8	16.7	13.0	13.0
Maximum payload (t)	10.0	10.8	11.0	14.5	9.5
Turning circle (m)	25.0	21.4	25.0	25.0	18

* The maximum reach of a side arm is 3 m.

Sources: JJ Richards, SUEZ, MacDonald Johnson, Cleanaway, Garwood, Ros Roca, Bingo and Edbro. Figures shown represent the maximum dimensions for each vehicle type.

Rear-loading collection vehicles

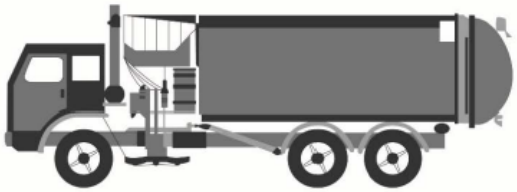
These vehicles are commonly used for domestic waste collections from MUDs and RFBs and sometimes for recycling. They can be used to collect waste stored in mobile bins or bulk bins, particularly where bins are not presented at the kerbside. They are also used for collecting bulky waste.



Rear-loading waste collection vehicle

Side-loading collection vehicles

This is the most commonly used vehicle for domestic waste, recycling and organics collections. It is only suitable for collecting mobile bins up to 360L in capacity.



Side-loading waste collection vehicle

Front-lift-loading collection vehicles

These vehicles are commonly used for collecting commercial and industrial waste. They can only collect specially designed front-lift bulk bins and not mobile bins.

Front-lift-loading waste collection vehicle

Small collection vehicles

Typically, councils and their contractors operate with large collection vehicles (heavy rigid class vehicles) because they carry greater payloads and allow for more cost-effective collection services. Some councils, or their contractors, may have smaller collection vehicles in their fleet. Early discussion with the council is important to confirm this, but it should not be assumed that the council will have access to small collection vehicles.

The waste management systems and the location of the collection point should always be designed so that the council can provide the standard domestic waste service.

Source: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

APPENDIX C: SECONDARY WASTE MANAGEMENT PROVISIONS

APPENDIX: C.1 TYPICAL COOKING OIL CONTAINERS

Drums 205L

Pour in Bulk Tank

View Brochure

Oil Kaddy System

View Brochure

Eco Systems

Direct-Connect to Fryer

Source: http://www.auscol.com/services/collection-systems/

APPENDIX: C.2 MEDICAL WASTE STREAMS AND MANAGEMENT

The following are the various medical waste streams and their storage guidelines as detailed in NSW Health's *Clinical and Related Waste Management for Health Services* 2017.

Medical Waste Stream	Medical Waste Stream Description and Management	Container Example
Sharps Waste	Sharps waste is any clinical object capable of inflicting a penetrating injury which may or may not be contaminated with blood and or body substance. This includes needles, ampoules and any other sharp objects or instruments designed to perform penetrating procedures Sharps container should be located adjacent to the work area where sharps are used. When the sharps residue container is filled to the black line, the container should be sealed and labelled.	
Pharmaceutical Waste	Pharmaceutical waste refers to any waste pharmaceuticals or other chemical substances specified as regulated goods in the Poisons and Therapeutic Goods Act 2008. This includes any substance specified in a Schedule of the Poisons List under the Act, as well as any therapeutic good which is unscheduled. Pharmaceutical waste also includes expired or discarded pharmaceuticals, filters or other material contaminated by pharmaceutical products. Pharmaceutical waste bins must be lockable	
Clinical Waste	Clinical waste with the potential to cause injury, infection, or offence: • Unrecognisable human tissue (excluding hair, teeth, nails, and anatomical waste) • Bulk blood or other body fluids (or body substances) • Material and equipment visibly stained by blood or body fluids (includes incontinence pads and disposable nappies that come from an infectious patient) [3] • Lab specimens, cultures, or other waste from lab investigations • Waste from medical or veterinary research • Genetically Modified Organisms (GMOs) For incineration or autoclaving and shredding, autoclave tape and bag indicators must be used to show autoclaving has been completed. Fluid may be discharged into sewer depending on Liquid Trade Agreement between the health service and water utility. All clinical waste once treated by a process acceptable to NSW Health may be reclassified in accordance with the Waste Classification.	

Cytotoxic Waste	Cytotoxic waste is any material contaminated with residues or preparations containing materials toxic or otherwise harmful to cells. This includes any residual cytotoxic drug or laboratory chemical and any discarded material or clinical waste associated with the preparation or administration or excretion of cytotoxic drugs. This may include Genetically Modified Organisms (GMOs) or tissues containing GMOs If Cytotoxic waste is generated it must be placed within an approved purple cytotoxic bag or container. When this container is full, it should be placed in a locked purple cytotoxic waste wheelie bin. Once the larger wheelie bin is full, its collection should be organized.	
Radioactive	Radioactive waste is material that includes sharps and clinical waste contaminated with a radioisotope from the medical or research use of radionuclides, e.g. during nuclear medicine, radioimmunoassay, and bacteriological procedures, and may be in solid, liquid, or gaseous form, and which emits a level of radiation above the level set by regulatory authorities. Radioactive material must be stored on site in an appropriate storage area until it decays to below the thresholds of a "radioactive substance" as defined under the Radiation Control Act and Regulation. Handling and storage must comply with a Radiation Management Plan in accordance with the Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (ARPANSA 2008).	
Anatomical Waste	Anatomical waste is identifiable human body parts such as limbs, organs, placenta and recognisable or large pathological specimens resulting from investigation or treatment of a patient. It does not include deceased bodies.	

Please note: Containers shown above are examples only, please refer to supplier information

APPENDIX: C.3 TYPICAL SOURCE SEPARATION BINS

Source: https://www.sourceseparationsystems.com.au/

ABN 48 612 666 172

Sydney | Brisbane | Melbourne

Level 23, 101 Miller St
North Sydney NSW 2060

PO Box 3
North Sydney NSW 2059
Ph (02) 94371000

8 December 2021

Revelop

Suite 506, Level 5 55 Philip Street

Parramatta NSW 2150

Attention: E.Han

Dear Emily,

RE: National Construction Code (NCC) 2019 Volume One Amendment 1 Section J Part J1 Statement of Compliance

JOB NO.: 210410

REV. NO.: FINAL V1

SUBJECT PREMISE: Chisholm Shopping Centre

This NCC Section J Part J1 statement has been prepared to demonstrate design compliance for the proposed Chisholm Shopping Centre development located at Heritage Drive Chisholm, NSW 2322.

The proposed development is located in climate Zone 5 as defined by the NCC.

The table below shows the areas assessed, NCC building classification and the method of compliance.

Building Area Description	NCC Classification	Method of Compliance
Main building	6 & 9a	DTS
Detached retail	6	DTS
Gym and Childcare	6 & 9b	DTS

The assessment is based on the architectural drawings listed below.

Architectural Drawings BN Group
Project no. N/A
Issued 05/11/2021

Building	Title	Drawing No	Revision
Chisholm Shopping Centre	GLAR & CARPARKING ANALYSIS	A00.20	F
	PROPOSED SITE PLAN	A02.01	F
	PROPOSED BASEMENT FLOOR PLAN CHISHOLM SHOPPING CENTRE AND MEZZANINE FLOOR PLAN	A06.01	G
	PROPOSED GROUND FLOOR PLAN	A06.02	G
	PROPOSED ROOF PLAN	A06.03	E
	PROPOSED CHILDCARE PLAN	A06.04	E
	NORTH ELEVATION	A10.01	F

	SOUTH ELEVATION	A10.02	F
	EAST ELEVATION	A10.03	F
	WEST ELEVATION	A10.04	G
	TIGERHAWK DRIVE STREET VIEW	A10.05	F
	ELEVATION CHILDCARE	A10.09	E
	SECTION 1	A11.01	E
	SECTION 2	A11.02	F
	SECTION 3	A11.03	E
	SECTIONS CHILDCARE	A11.04	E
	3D VISUALIZATION	A80.01	F
	PERSPECTIVES SHEET 1	A80.02	E
	PERSPECTIVES SHEET 2	A80.03	F
	PROPOSED MATERIAL BOARD	A100.01	A

As per the Deemed-to-Satisfy Provisions of **NCC 2019 Volume One Amendment 1**, design compliance with Part J1 can be met subject to the following specifications:

Part J1 Building Fabric

Required **total R-value** including allowance for **thermal bridging**:

Elements	Total Construction R-value	Notes
All Roof	R3.7 (Downward, SA < 0.45)	• It is a total system performance value and **NOT** the insulation. • The impact of **Thermal Bridging** must be included in the building envelope total system R-value calculations. • Main building Slab on ground expected to achieve R3.67 as per Specification J1.6 Sub-floor thermal performance, hence no additional insulation required. • Gym and Childcare Slab on ground expected to achieve R3.67 as per Specification J1.6 Sub-floor thermal performance, hence no additional insulation required.
Envelope Walls	R1.4	
Envelope Floors (including slab on Ground)	R2.0 (Downward)	

Required total system **U-value** and **SHGC**:

Location	Azimuth	Window Assembly (Glass & Frame)		Description
		U-value	SHGC	
Main building	All	3.0	0.38	Double Low-e Tinted Glazing or the like
Main building (Escalator lobby)	All	4.6	0.59	Single Clear Glazing or the like
Detached retail	All	3.5	0.54	Double Tinted Glazing or the like
Gym and Childcare	All	5.8	0.53	Single Clear Glazing or the like

Please refer to Attachment A for the facade calculator demonstrating compliance, and Attachment B for the mark-ups of the building fabrics thermal construction requirements.

Additional Section J Compliance Notes

Note project needs to adhere to the following NCC2019 Section J construction requirements as applicable:

- J1.2 (a-d) Thermal Construction – general installation requirements for insulations
- J1.2 (e) – The required total R-value and total system U-value, including thermal bridging calculation.

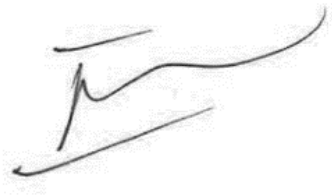
JHA recommend the following general construction requirements from Section J of the NCC 2019 be included in the architectural specification and drawings to ensure compliance.

Part J3 – Building Sealing

- J3.2 Chimneys and flues
- J3.3 Roof lights
- J3.4 Windows and doors
- J3.5 Exhaust fans
- J3.6 Construction of ceilings, walls and floors
- J3.7 Evaporative coolers

Full Name of Designer:	Ivan Miao
Qualifications:	B. Mechanical Eng (Honours)
Address of Designer:	JHA Level 23, 101 Miller Street, NORTH SYDNEY NSW 2060
Business Telephone No:	(02) 9437 1000
Name of Employer:	JHA

Yours sincerely,



Ivan Miao

Sustainability Engineer

Disclaimer

This statement is prepared for the nominated recipient only and relates to the specific scope of work and agreement between JHA and the client (the recipient). It is not to be used or relied upon by any third party for any purpose.

Revision History

REV	DATE	Amendment
Draft V1	25/11/2021	
Final V1	08/12/2021	

Attachment A – Facade Calculator:

The total representative air-conditioning energy value (E_R) value of the proposed building is 681.36 (less than 681.71) and total System U-value is 1.99 (less than 2.00). Therefore, the proposed building façade complies with Part J1 via *Method 2*.

Project Chisolm Shopping Centre - Main Building

Climate Zone	CZ 5
Class	Other
Azimuth	18

Exposure	Total Wall-Glazing Area					Walls		Windows			
	Reference Wall Type	External Envelope	Internal Envelope	Excluded Area	Sum	R-Value	A*U-Value	Exposure	U-Value	SHGC	A*U-Value
North	1	885.4	0.0		885.4	1.40	44.5	N1	3.0	0.38	2469.3
	2	112.0			112.0	1.40	80.0	N2	4.6	0.59	0.0
	1				0.0		0.0	N3			0.0
	1				0.0		0.0	N4			0.0
East	1	459.5	0.0	28.8	430.7	1.40	142.3	E1	3.0	0.38	694.2
	2	88.2			88.2	1.40	35.6	E2	4.6	0.59	176.5
	1				0.0		0.0	E3			0.0
	1				0.0		0.0	E4			0.0
South	1	929.6	0.0	4.0	925.7	1.40	499.0	S1	3.0	0.38	681.3
	2	112.0			112.0	1.40	80.0	S2	4.6	0.59	0.0
	1				0.0		0.0	S3			0.0
	1				0.0		0.0	S4			0.0
West	1	554.5	0.0		554.5	1.40	148.1	W1	3.0	0.38	1041.3
	2	39.6			39.6	1.40	0.0	W2	4.6	0.59	182.1
	1				0.0		0.0	W3			0.0
	1				0.0		0.0	W4			0.0

					Method 1		Method 2		U-value		R-value	
Exposure	Façade Area				Solar Admittance				Total System		Total System	
	Total [m²]	Wall [m²]	Window [m²]	Wall Glazing Ratio	Max SA	Achieved SA	Max Er	Achieved Er	Max. U-Value	Achieved U-Value	Min. R-Value	Achieved R-Value
N	997.4	174.3	823.1	17%	0.13	0.19	295.63	423.93	2.0	2.60	1.0	1.40
E	518.9	249.2	269.8	48%	0.13	0.09	116.03	82.72	2.0	2.02	1.0	1.40
S	1037.7	810.5	227.1	78%	0.13	0.07	134.89	72.29	2.0	1.21	1.0	1.40
W	594.1	207.4	386.7	35%	0.13	0.10	135.15	102.42	2.0	2.31	1.0	1.40
						SUM	681.71	681.36	2.0	1.99		

Description	Level	Window Exposure	Reference Wall Type	Window			P	H	P/H	G/H	Shading Multiplier	A*S*SHGC
				Height [m]	Width [m]	Area [m²]	[m]	[m]				
1		N1	1	4.00		180.4	6.44	4.00	1.61	0.00	0.35	23.99
2		N1	1	4.00	8.53	34.1	3.20	4.00	0.80	0.00	0.41	5.32
3		N1	1	4.00	25.26	101.0	2.77	4.00	0.69	0.00	0.51	19.58
4		N1	1	4.00	7.10	28.4	2.75	4.00	0.69	0.00	0.51	5.50
5		W1	1	4.00	12.16	48.6	2.75	4.00	0.69	0.00	0.51	9.42
6		W1	1	5.28		33.3	12.40	5.28	2.35	0.00	0.35	4.42
7		N1	1	5.28	8.00	42.2	17.90	5.28	3.39	0.00	0.35	5.62
8		E1	1	5.28		34.8	9.40	5.28	1.78	0.00	0.35	4.63
9		E2	2	5.28		38.4	4.60	5.28	0.87	0.00	0.41	9.28
10		E1	1	4.00	11.10	44.4	2.80	4.00	0.70	0.00	0.46	7.76
11		N1	1	4.00	7.63	30.5	2.80	4.00	0.70	0.00	0.46	5.33
12		N1	1	4.00	31.50	126.0	2.80	4.00	0.70	0.00	0.46	22.02
13		N1	1	4.00	7.40	29.6	2.80	4.00	0.70	0.00	0.46	5.17
14		W1	1	4.00	7.40	29.6	2.80	4.00	0.70	0.00	0.46	5.17
15		N1	1	4.00	3.50	14.0	1.74	3.90	0.45	0.00	0.64	3.40
16		W1	1	4.00	58.90	235.6	5.00	1.34	3.73	0.00	0.35	31.33
17		S1	1	3.90	14.50	56.6	9.62	6.45	1.49	0.40	0.74	15.90
18		S1	1	2.45	69.70	170.6	0.73	2.45	0.30	0.00	0.87	56.39
19		E1	1	3.65	6.86	25.0			-	-	1.00	9.51
20		E1	1	3.60		39.3	4.85	3.65	1.33	0.01	0.35	5.23
21		E1	1	3.60	17.14	61.7	4.85	3.65	1.33	0.01	0.35	8.21
22		E1	1	3.65	3.10	17.6	4.66	3.65	1.28	0.00	0.35	2.33
23		E1	1	1.83	4.68	8.5	4.66	1.83	2.55	0.00	0.35	1.14
24		N1	1	1.50	33.82	50.6			-	-	1.00	19.22
25		N1	1	2.13	71.18	151.6			-	-	1.00	57.61
26		N1	1	1.50	23.13	34.6			-	-	1.00	13.15
38		W2	2	3.26	12.14	39.6	29.50	3.26	9.05	0.00	0.35	8.17

The total representative air-conditioning energy value (E_R) value of the proposed building is 83.70 (less than 84.74) and total System U-value is 1.96 (less than 2.00). Therefore, the proposed building façade complies with Part J1 via *Method 2*.

Project Chisolm Shopping Centre - Building detached retail

Climate Zone	CZ 5
Class	Other
Azimuth	18

Exposure	Total Wall-Glazing Area					Walls		Windows			
	Reference Wall Type	External Envelope	Internal Envelope	Excluded Area	Sum	R-Value	A*U-Value	Exposure	U-Value	SHGC	A*U-Value
North	1	91.4	0.0	0.0	91.4	1.40	45.1	N1	3.5	0.54	99.2
	1				0.0		0.0	N2			0.0
	1				0.0		0.0	N3			0.0
	1				0.0		0.0	N4			0.0
East	1	41.8	0.0	0.0	41.8	1.40	16.9	E1	3.5	0.54	63.5
	1				0.0		0.0	E2			0.0
	1				0.0		0.0	E3			0.0
	1				0.0		0.0	E4			0.0
South	1	263.5	0.0	0.0	263.5	1.40	113.0	S1	3.5	0.54	368.6
	1				0.0		0.0	S2			0.0
	1				0.0		0.0	S3			0.0
	1				0.0		0.0	S4			0.0
West	1	61.8	0.0	0.0	61.8	1.40	6.5	W1	3.5	0.54	184.4
	1				0.0		0.0	W2			0.0
	1				0.0		0.0	W3			0.0
	1				0.0		0.0	W4			0.0

Exposure	Façade Area				Method 1 Solar Admittance		Method 2 Solar Admittance		U-value Total System		R-value Total System	
	Total [m^2]	Wall [m^2]	Window [m^2]	Wall Glazing Ratio	Max SA	Achieved SA	Max Er	Achieved Er	Max. U-Value	Achieved U-Value	Min. R-Value	Achieved R-Value
N	91.4	63.1	28.3	69%	0.13	0.12	27.10	25.11	2.0	1.58	1.0	1.40
E	41.8	23.7	18.1	57%	0.13	0.08	9.34	5.90	2.0	1.92	1.0	1.40
S	263.5	158.1	105.3	60%	0.13	0.13	34.25	35.26	2.0	1.83	1.0	1.40
W	61.8	9.1	52.7	15%	0.13	0.16	14.05	17.43	2.0	3.09	1.0	1.40
						SUM	84.74	83.70	2.0	1.96		

Description	Level	Window Exposure	Reference Wall Type	Window Height [m]	Window Width [m]	Window Area [m^2]	P [m]	H [m]	P/H	G/H	Shading Multiplier	A*S*SHGC
38		N1	1	4.96		28.3	1.52	4.96	0.31	0.00	0.72	11.02
39		W1	1	4.96		52.7	5.04	4.96	1.02	0.00	0.35	9.96
40		S1	1	5.65		105.3	4.70	5.65	0.83	0.00	0.62	35.26
41		E1	1	6.80		18.1	6.90	6.80	1.01	0.00	0.35	3.43

The total representative air-conditioning energy value (E_R) value of the proposed building is 211.54 (less than 214.17) and total System U-value is 1.77 (less than 2.00). Therefore, the proposed building façade complies with Part J1 via *Method 2*.

Project Chisolm Shopping Centre - Gym and Childcare

Climate Zone	CZ 5
Class	Other
Azimuth	18

Exposure	Total Wall-Glazing Area					Walls		Windows			
	Reference Wall Type	External Envelope	Internal Envelope	Excluded Area	Sum	R-Value	A*U-Value	Exposure	U-Value	SHGC	A*U-Value
North	1	273.0	0.0	0.0	273.0	1.40	179.7	N1	5.8	0.53	124.4
	1				0.0		0.0	N2			0.0
	1				0.0		0.0	N3			0.0
	1				0.0		0.0	N4			0.0
East	1	517.9	0.0	7.4	510.5	1.40	304.3	E1	5.8	0.53	489.9
	1				0.0		0.0	E2			0.0
	1				0.0		0.0	E3			0.0
	1				0.0		0.0	E4			0.0
South	1	133.7	0.0	7.1	126.6	1.40	90.4	S1	5.8	0.53	0.0
	1				0.0		0.0	S2			0.0
	1				0.0		0.0	S3			0.0
	1				0.0		0.0	S4			0.0
West	1	971.4	0.0	29.9	941.4	1.40	474.0	W1	5.8	0.53	1611.4
	1				0.0		0.0	W2			0.0
	1				0.0		0.0	W3			0.0
	1				0.0		0.0	W4			0.0

Exposure	Façade Area				Method 1 Solar Admittance		Method 2 Solar Admittance		U-value Total System		R-value Total System	
	Total (m^2)	Wall (m^2)	Window (m^2)	Wall Glazing Ratio	Max SA	Achieved SA	Max Er	Achieved Er	Max. U-Value	Achieved U-Value	Min. R-Value	Achieved R-Value
N	273.0	251.5	21.5	92%	0.13	0.02	0.00	0.00	2.0	1.11	1.4	1.40
E	510.5	426.0	84.5	83%	0.13	0.07	0.00	0.00	2.0	1.56	1.4	1.40
S	126.6	126.6	0.0	100%	0.13	0.00	0.00	0.00	2.0	0.71	1.4	1.40
W	941.4	663.6	277.8	70%	0.13	0.13	214.17	211.54	2.0	2.22	1.0	1.40
						SUM	214.17	211.54	2.0	1.77		

Description	Level	Window Exposure	Reference Wall Type	Window Height [m]	Window Width [m]	Window Area [m^2]	P [m]	H [m]	P/H	G/H	Shading Multiplier	A*S*SHGC
27		E1	1	2.20	8.70	19.1	0.40	3.55	0.11	0.38	1.00	10.14
28		E1	1	4.90		39.1	3.80	4.90	0.78	0.00	0.46	9.54
29		E1	1			26.2			-	-	1.00	13.90
30		W1	1	3.60		27.5	2.40	3.60	0.67	0.00	0.51	7.44
31		W1	1	3.60		53.0			-	-	1.00	28.08
32		W1	1	3.60		51.1	0.54	4.52	0.12	0.20	0.98	26.57
33		W1	1	1.70	15.70	26.7			-	-	1.00	14.15
34		N1	1	3.30	6.50	21.5	3.00	3.30	0.91	0.00	0.38	4.32
35		W1	1	1.60	24.83	39.7	3.63	2.20	1.65	0.27	0.47	9.90
36		W1	1	3.60		17.6	5.70	7.70	0.74	0.53	0.90	8.41
37		W1	1	2.82	22.06	62.1	0.60	2.82	0.21	0.00	0.80	26.35

Attachment B – Building Fabric Requirements

DEVELOPMENT APPLICATION

All dimensions to be checked on site, written dimensions only to be used. Do not scale from drawings. Copyright of the design shown herein is retained by the Architect. Written authority is required for any reproduction.

WORK IN PROGRESS

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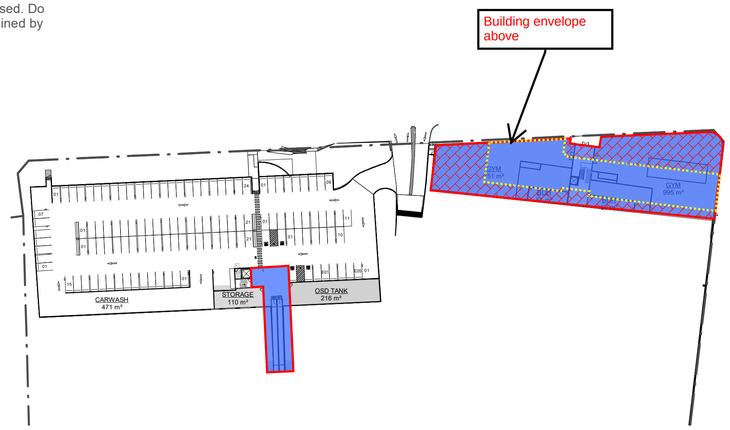

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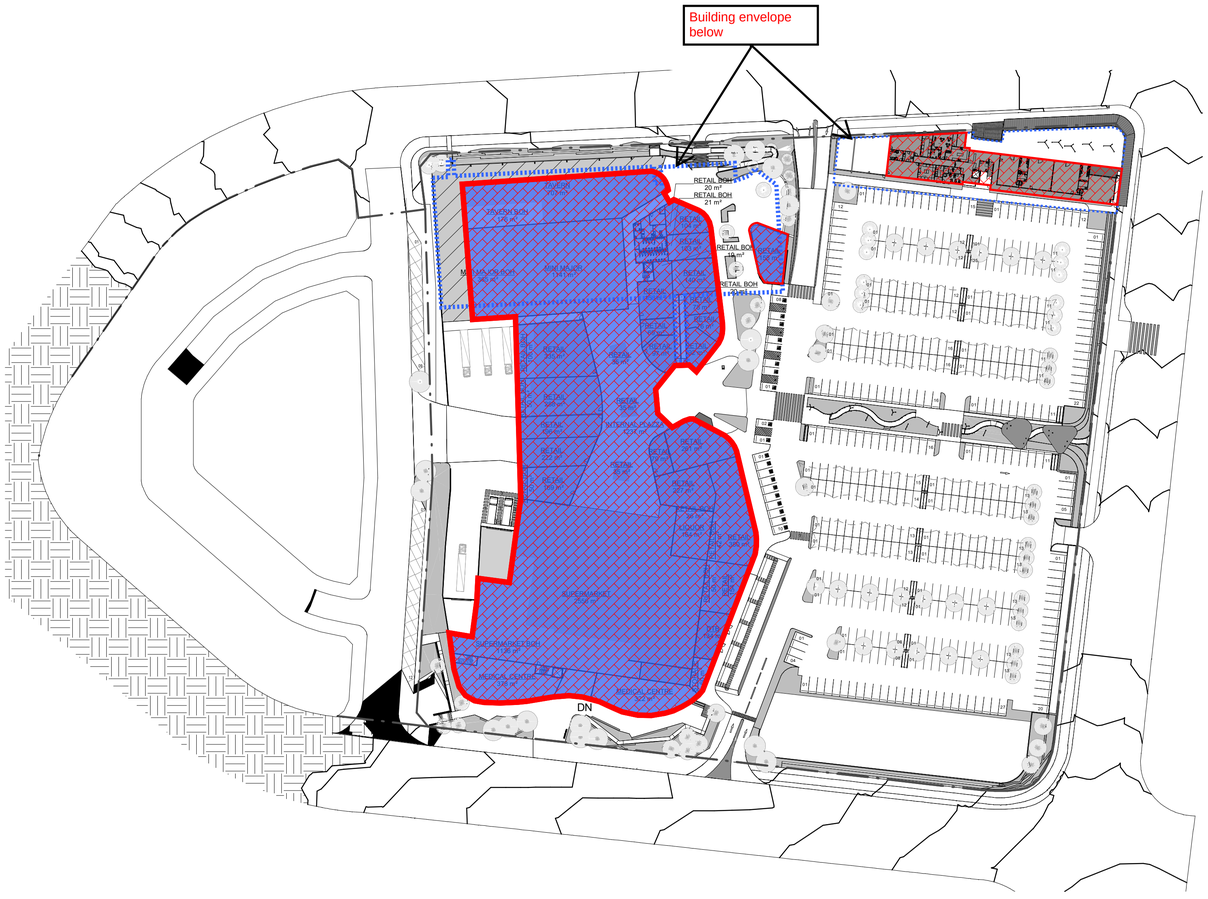

2 GROUND FLOOR(1)
1 : 1000

- AMENITIES
- BOH
- CARWASH
- CHILDCARE
- DTB
- GYM
- INTERNAL PLAZZA
- LIQUOR
- MEDICAL CENTRE
- MINI MAJOR
- MINI MAJOR BOH
- OSD TANK
- RETAIL
- RETAIL BOH
- SERVICE
- STORAGE
- SUPERMARKET
- SUPERMARKET BOH
- TAVERN
- TAVERN BOH

CAR PARKING SCHEDULE

PROPOSED BASEMENT LEVEL

CARPARKING 5400X 2600	116
DISABLED 5400X 2600	4
EV PARKING 5400X 2600	5
BIKE PARKING 5400X 2600	4
GRAND TOTAL	129

PROPOSED GROUND LEVEL

CARPARKING 5400X 2600	537
DISABLED 5400X 2600	10
PARENTS 5400X 2700	10
GRAND TOTAL	557

NCC 2019 Section J1 Preliminary
Building Fabric Required total system R-Values

- Roof & Ceiling - Rt 3.7 (Downward)
- Envelope Floors - Rt 2.0 (Downward)
- Envelope Walls - Rt 1.4

Note:
1) All R-values must account for the impact of Thermal Bridging.
1) The above construction R-values including allowance for Thermal Bridging.
2) The R-value is a total system performance value and NOT insulation.
3) The above construction are only to be applied to non-glazed portions of the envelope and spandrel panels; glazing must be installed as per the architectural layouts with its thermal performances pursuant to the respective glazing specifications stated in the Section J report.

Glazing (Glass + Frame) requirements.
1) Main building performance glazing with U-value 3.0 SHGC 0.38
2) Main building (Escalator lobby) performance glazing with U-value 4.6 SHGC 0.59
3) Detached retail performance glazing with U-value 3.5 SHGC 0.54
4) Gym and Childcare performance glazing with U-value 5.8 SHGC 0.53

JHA
MARKUP / SKETCH

DOCUMENT No.: 210410
DOCUMENT TITLE: Chisholm Shopping Centre - Section J DTS
DOCUMENT REV: Draft V1
DOCUMENT BY: I.M. DATE: 24/11/2021

Area Schedule		
Name	Area	
1		BOH AREA
LIQUOR	164 m²	
MINI MAJOR	1141 m²	365 m²
RETAIL	3491 m²	398 m²
SUPERMARKET	2556 m²	1136 m²
TAVERN	707 m²	176 m²
1: 28	8060 m²	2074 m²
2		
CHILDCARE	875 m²	
GYM	1747 m²	
MEDICAL CENTRE	700 m²	
2: 5	3322 m²	
3		
AMENITIES	198 m²	
INTERNAL PLAZZA	1328 m²	
3: 5	1526 m²	
Grand total: 38	12908 m²	

SITE AREA	43,940m²
PROPOSED FSR	1:0.29
REQUIRED FSR	1:0.30

TROLLEY CORRAL SCHEDULE			
DESCRIPTION	No. OF TROLLY BAY	TROLLEYS PER BAY	No.OF TROLLEYS
1000 x 3000	33		
PROPOSED BASEMENT LEVEL			
SINGLE TROLLEY BAY	4	15	30
PROPOSED GROUND LEVEL			
SINGLE TROLLEY BAY	2	15	540
DOUBLE TROLLEY BAY	16	30	480
Grand total			

REVELOP

CHISHOLM SHOPPING CENTRE

HERITAGE DRIVE
CHISHOLM, NSW 2322 , AUSTRALIA

ISSUE	DATE	DESCRIPTION
C	21-09-2021	DA ISSUE
D	05-10-2021	DA ISSUE
E	21-10-21	FOR REVIEW
F	08-11-21	FOR REVIEW

GLAR & CARPARKING ANALYSIS

A00.20 DA F
1:1000 @ A1
1:2000 @ A3

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Douglas Partners
Geotechnics · Environment · Groundwater

REPORT
on
PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED RESIDENTIAL SUBDIVISION
AREA C
THORNTON NORTH

Prepared for
URBIS PTY LTD
on behalf of
BEACHWOOD HOMES

Project 31729A
NOVEMBER 2003

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ACEA The Association of Consulting Engineers Australia

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ATTACHMENTS

General Notes
Test Pit Report Sheets, Pits 1 to 19
Dynamic Penetrometer Result Sheet
Drawing 1 – Test Location Plan

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7 November 2003

REPORT ON
PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL SUBDIVISION
AREA C
THORNTON NORTH

1. INTRODUCTION

This report presents the results of a preliminary geotechnical investigation to provide comment on the feasibility of a proposed residential subdivision Thornton North Investigation Area C. The work was carried out for Urbis Pty Ltd on behalf of Beechwood Homes.

Douglas Partners Pty Ltd (DP) have undertaken a previous investigation on the subject site, Report 31729, dated 13 May 2003. It is understood that an additional 11.7 hectares of land to the north of the previously investigated area will be incorporated into the development.

Assessment was required for the additional area together with preparation of this report presenting assessment of the issues relevant to the proposed development and possible constraints to the development for the entire site (103 hectares).

The investigation comprised a desk top study of available information in the vicinity of the site, a walk over survey of the site, together with the excavation of test pits.

For the purpose of the investigation, the client supplied a detailed survey plan of the site.

It should be noted that a contamination or hazardous material assessment was not required as part of this work.

2. SITE DESCRIPTION AND REGIONAL GEOLOGY

The site is located within Lot 12 (DP 603613) to the north of Raymond Terrace Road, Thornton. It is part of a larger area identified as "Thornton North Investigation Area C" on the client supplied drawing number 4876all.dwg, prepared by Palmer Bruyn & Parker Pty Ltd.

The site is of irregular shape covering an area of approximately 103 hectares. The site is bounded to the north, east and west by farmland containing some poultry sheds and a rural residential development to the south (Timber Lane Estate).

Currently the site consists of open farmland divided into paddocks separated by post and wire fences. There are four operational poultry farms on the site, three within the southern portion of the site and one within the northern portion of the site. The poultry sheds are contained within fenced areas and positioned on constructed filling platforms. Several single storey residential dwellings are situated on the site, each associated with the poultry farms.

The majority of the northern portion of the site is open paddocks.

Vegetation on the site generally comprises low grass cover with scattered mature trees and tree stumps.

The topography of the site is generally dominated by a central shallow and broad gully sloping down towards the north-west, and two surrounding broad spurs. There were some smaller gullies leading to the main central gully located approximately in the middle of the site.

Several small farm dams are located across the site generally in the main gully area. The dams were observed to be full at the time of investigation. There was a small excavated area located in the north western section of the site that appeared to be being used as a rubbish disposal area. Generally the site slopes from east down to the west. Slopes on the site were generally around 5%. There were minimal signs of erosion on the site.

Reference to the 1:100,000 Newcastle Regional Coalfields Geological Sheet indicates the site lies near the border between the Tomago Coal Measures and the Mulbring Siltstone formation.

3. FIELD WORK

3.1 Methods

Walk Over Survey

A detailed walkover survey was undertaken by the project manager and the field geotechnical engineer on 1 May 2003. Subsequent to the initial walk over survey, further assessment was undertaken on 4 November 2003 by the project manager to assess the additional area to the north. Dominant geomorphologies were noted, together with site slopes, areas of site features such as gullies and existing dams.

Test Pits

The field work was undertaken on 1 May 2003, and comprised the backhoe excavation of 19 test pits (Pits 1 to 19). The position of the pits was recorded using a hand help GPS unit and are indicated on attached Drawing 1. Surface levels for each test pit were interpolated from the client supplied drawing, which shows site contours.

The pits were located across the site in areas which were anticipated to consist of a range of soil types and subsurface conditions, i.e. within the gullies and also on the hill slopes.

The pits were set out by a geotechnical engineer from Douglas Partners Pty Ltd (DP), who also logged the subsurface profile in each pit and took regular samples for laboratory testing and identification purposes. Pocket penetrometer and dynamic cone penetrometer tests were performed at selected depths and locations to determine the strength of cohesive soils encountered.

3.2 Results

The subsurface conditions encountered are presented in detail in the attached test pit report sheets. These should be read in conjunction with the general notes preceding them, which explain the descriptive terms and classification methods used in the reports. The following is a summary of these subsurface conditions.

FILLING/TOPSOIL	Sandy silt or silty sand topsoil was encountered in Pits 11 to 19 to depths ranging from 0.08 m to 0.15 m. Clayey sand filling was encountered in Pit 3 to a depth of 0.55 m
SILTY SAND OR SANDY SILT	Medium dense silty sand or sandy silt was encountered in Pits 1, 4 to 7, 10, 12, 18 and 19 generally at the surface or underlying the topsoil and extended to depths ranging from 0.2 m to 0.6 m.
SANDY CLAY/CLAYEY SAND	Hard sandy clay or clayey sand was encountered in Pits 1, 2, 5, 7, 10 and 17 at depths ranging from the surface to 0.5 m and extended to the sandstone bedrock at depths of between 0.45 m to 1.4 m. Firm clayey sand was encountered in Pits 8 and 9 at the surface and extended to depths of 0.2 m and 0.15 m respectively.

SILTY CLAY	Very stiff to hard silty clay was encountered in all pits except Pits 1, 2, 5, 7, 10 and 12 at depths ranging from 0.08 m to 0.55 m and continued to termination depth or bedrock at depths ranging from 0.7 m to 2.6 m.
SANDSTONE/SILTSTONE	Extremely low to low strength sandstone or siltstone bedrock was encountered in all pits except Pits 4 and 8 at depths ranging from 0.45 m to 1.9 m and extended to depths of between 0.75 m and 2.9 m. Backhoe refusal was encountered in Pits 1, 2, 5, 7, 12 and 17 to 19 at depths of between 0.75 m and 1.45 m. Further data on the bedrock conditions is given in Table 1 in Section 4.2.2.

Groundwater was not encountered during the time that the excavations were open. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

4. COMMENTS

4.1 Subsurface Conditions

Based on the observations made during the site survey and the results of the test pits, subsurface conditions encountered within in the pits are relatively uniform. The following pertinent features are considered relevant to the proposed subdivision:

- the site generally falls to the west with a general slope of around 6%, and local slopes within the gullies and hill slopes of 5% to 7%. The steeper slopes were generally located within the gully located within the central portion of the site.

- the silty clay, encountered within all the pits, is considered the dominant soil type on the site;
- relatively shallow sandstone or siltstone bedrock; at depths ranging from 0.45 m to 1.9 m;
- backhoe refusal, on siltstone or sandstone bedrock, was encountered in Pits 1, 2, 5, 7, 12 and 17 to 19 at depths of between 0.75 m and 1.45 m;
- several features which may be filled-in trenches, were observed across the site, as indicated on Drawing 1. It is unknown if these trenches were former burial trenches for the poultry. From a geotechnical viewpoint, additional earthworks may be required to remove and recompact these trenches in the event that proposed allotments or pavements be located in these positions;
- a depressed area was observed in the vicinity of Pits 2 and 3, which is possibly a former dam. Several mounds of filling were observed in this area, containing pieces of steel, concrete pieces, soil and plastic.

Based on these observations, the geomorphology of the site is dominated by the north-west trending gully and the two broad spurs on either side. There area a number of small, shallow broad gullies within the two spurs.

The soil types are generally consistent throughout the site, with residual soils overlying relatively shallow bedrock.

A number of geotechnical issues and potential constraints to development have been identified. These are discussed individually as follows.

4.2 Proposed Allotments

Owing to the relatively flat ground slopes over the majority of the site, it is anticipated that only limited earthworks would be necessary to prepare the allotments for construction of house. Should significant site regrading be required within the proposed allotments, fill should be placed under geotechnical inspection and control testing. Excavation conditions are discussed below.

There is only limited additional geotechnical data available in the immediate vicinity of the site, however, DP has undertaken numerous investigations in the Thornton area. Results of these investigations indicate that typical site classifications for this area vary from Class S to Class H, but are predominantly Class H.

Future lots within the proposed subdivision would need to be investigated at a later stage to determine appropriate site classifications to AS 2870-1996 (Ref 2).

4.3 Bedrock/Excavation Conditions

Bedrock was encountered in a number of pits across the site. Refusal was also encountered in a number of these pits. The depth to bedrock and backhoe refusal is shown in Table 1, below:

Table 1 – Summary of Bedrock

Pit	Depth to Bedrock (m)	Depth to Backhoe Refusal (m)	Termination Depth of Pit (m)
1	0.45	0.75	0.75
2	1.4	1.45	1.45
3	1.7	NE	2.4
4	NE	NE	2.2
5	0.95	1.1	1.1
6	1.9	NE	2.4
7	0.8	0.95	0.95
8	NE	NE	2.6
9	0.9	NE	2.5
10	NE	NE	2.8
11	1.5	NE	2.8
12	0.6	1.9	1.9
13	1.7	NE	2.5
14	1.4	NE	2.7
15	0.75	0.8	0.8
16	0.8	NE	2.7
17	0.7	0.85	0.85
18	0.7	1.05	1.05
19	1.0	NE	1.25

Excavation of the soil throughout the site is anticipated to be readily achievable using conventional earthmoving equipment. Similarly, excavation within the upper layers of the bedrock (approximately 0.5 m), should be achievable with machinery fitted with rock breaking teeth.

4.4 Slope Stability Issues

Slopes at the site a generally about 6° with some localised greater slopes on dam embankments and within the gullies.

The factors which influence slope instability and the assessment of the risk of instability are discussed in Ref 1 and summarised in Table 2 (see attached), reproduced from Ref 1. No evidence of deep seated or active instability were observed and the site is considered to have a low risk of instability. Sites classified as low risk of instability are normally considered suitable for development subject to good hillside engineering practice. This risk category would require reassessment should any cuts or fills be proposed greater than 2 m vertical height.

4.5 Erosion Observations

No laboratory testing was undertaken on the dispersivity of the soil, however, few obvious signs of surface erosion were observed throughout the site.

Minor signs of erosion, however, were observed in the vicinity of Pits 10, 13 and 18, generally within the existing shallow gullies and was characterised by localised scours of the topsoil material to depths less than 0.5 m. Erosion was also observed on the downstream embankments of a number of the existing dams on the site.

Due consideration should be given to drainage design to prevent erosion once the proposed allotments and pavements have been constructed.

4.6 Road Pavements

At this stage of the project, final layout of the proposed allotments and road pavements has not been prepared.

Based on the conditions encountered within the pits, it is anticipated that, dependant on the vertical alignment of the future roads, the subgrade material will consist predominantly of clay or sandstone bedrock.

A few pits encountered firm clayey sand within the initial 0.3 m from the surface. This material may require removal prior to construction of any future pavements for constructability considerations.

4.7 Mine Subsidence Issues

Discussion was undertaken with the Mine Subsidence Board, who advised that there are no recorded mine workings beneath the site.

4.8 Acid Sulphate Soils

Reference to the 1:250 000 Beresfield Acid Sulphate Soil Risk Map, Edition Two, indicates that there is no known occurrence of acid sulphate soils within the area of the site.

4.9 Clay Resource Quality

It is understood that the site lies near the extent of the clay conservation zone identified by the Council. Furthermore, there are a number of currently operational clay quarries in the vicinity of the site.

The following comments are made in relation to the quality of the on-site subsurface material for brick making activities:

- reference to the 1:100,000 Newcastle Regional Coalfields Geological Sheet indicates the site lies near the border between the Tomago Coal Measures and the Mulbring Siltstone formation. Material from both these formations are utilised in brick making operations;
- material is extracted to depths of up to 30 m for brick making activities in the area, and includes both clays and weathered bedrock. Coal is not used for the brick making activities;
- there are no specific geotechnical criteria for assessing the suitability of brick making materials. Generally speaking, the controlling issues for the suitability of the material are grain size, ease of extrusion and plasticity. However, the suitability is normally assessed by simulated firing trials by specialist consultants.

Overall, the material on-site may be suitable for use in brick making operations. Assessment would require further investigation at a later stage.

4.10 Conclusion

Based on the results of the field work it is considered that there are no major geotechnical constraints to the proposed development of the site as a residential subdivision.

The site is suitable for the proposed development from a geotechnical perspective, provided that the geotechnical guidelines are incorporated into the design of the development.

It is understood that the proposed subdivision will be connected to the waste water sewerage system.

The additional investigation work required for this project to proceed to detailed design will be dependent on the final layout of the subdivision, and is expected to include the following:

- site classification investigation once allotment layout has been established;
- pavement subgrade investigation when road alignments and long-sections have been finalised;
- pavement thickness design;
- geotechnical inspection and control during earthworks; and possibly
- assessment of on-site materials suitability for brick making operations.

DOUGLAS PARTNERS PTY LTD

Reviewed by:

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Principal

REFERENCES

1. Walker B, et al "Geotechnical Risks Associated with Hillside Development", Australian Geomechanics News, No 10, December 1985.

2. AS 2870-1996 "Residential Slabs and Footings – Construction".

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NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, Geotechnical Site Investigations Code. In general, descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (eg. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Undrained Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

Relative Density	SPT "N" Value (blows/300 mm)	CPT Cone Value (q_c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descent into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (eg. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in

clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from 'feel' and rate of penetration.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond-tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" — Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7

  as 4, 6, 7
  N = 13

- In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm

  as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test 6.4.1.

In the tests, a 35 mm diameter rod with a cone-tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20 mm per second) the information is plotted on a computer screen and at the end of the test is stored on the computer for later plotting of the results.

The information provided on the plotted results comprises: —

- Cone resistance — the actual end bearing force divided by the cross sectional area of the cone — expressed in MPa.
- Sleeve friction — the frictional force on the sleeve divided by the surface area — expressed in kPa.
- Friction ratio — the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main scale (0—50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve friction to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:—

q_c (MPa) = (0.4 to 0.6) N (blows per 300 mm)

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

q_c = (12 to 18) c_u

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on soil classification is required, direct drilling and sampling may be preferable.

Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two relatively similar tests are used.

- Perth sand penetrometer — a 16 mm diameter flat-ended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms.

Bore Logs

The bore logs presented herein are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable, or possible to justify on economic grounds. In any case, the boreholes represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

- In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Engineering Reports

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- unexpected variations in ground conditions — the potential for this will depend partly on bore spacing and sampling frequency
- changes in policy or interpretation of policy by statutory authorities
- the actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes

Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section

is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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AN ENGINEERING CLASSIFICATION OF SEDIMENTARY ROCKS IN THE SYDNEY AREA

This classification system provides a standardized terminology for the engineering description of the sandstone and shales in the Sydney area, but the terms and definitions may be used elsewhere when applicable.

Under this system rocks are classified by Rock Type, Degree of Weathering, Strength, Stratification Spacing, and Degree of Fracturing. These terms do not cover the full range of engineering properties. Descriptions of rock may also need to refer to other properties (e.g. durability, abrasiveness, etc.) where these are relevant.

ROCK TYPE DEFINITIONS

Rock Type	Definition
Conglomerate:	More than 50% of the rock consists of gravel sized (greater than 2 mm) fragments.
Sandstone :	More than 50% of the rock consists of sand sized (.06 to 2 mm) grains.
Siltstone:	More than 50% of the rock consists of silt-sized (less than .06 mm) granular particles and the rock is not laminated
Claystone:	More than 50% of the rock consists of clay or sericitic material and the rock is not laminated.
Shale:	More than 50% of the rock consists of silt or clay sized particles and the rock is laminated.

Rocks possessing characteristics of two groups are described by their predominant particle size with reference also to the minor constituents, e.g., clayey sandstone, sandy shale.

DEGREE OF WEATHERING

Term	Symbol	Definition
Extremely Weathered	EW	Rock substance affected by weathering to the extent that the rock exhibits soil properties — i.e. it can be remoulded and can be classified according to the Unified Classification System, but the texture of the original rock is still evident.
Highly Weathered	HW	Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock usually as a result of iron leaching or deposition. The colour and strength of the original fresh rock substance is no longer recognisable.
Moderately Weathered	MW	Rock substance affected by weathering to the extent that staining extends throughout the whole of the rock substance and the original colour of the fresh rock is no longer recognisable.
Slightly Weathered	SW	Rock substance affected by weathering to the extent that partial staining or discolouration of the rock substance usually by limonite has taken place. The colour and texture of the fresh rock is recognisable.
Fresh	Fr	Rock substance unaffected by weathering.

STRATIFICATION SPACING

Term	Separation of Stratification Planes
Thinly laminated	<6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	>2m

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Society of Rock Mechanics (Reference).

Strength Term	Is(50) MPa	Field Guide	Approx. qu MPa*
Extremely Low:	0.03	Easily remoulded by hand to a material with soil properties.	0.7
Very Low:	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.	2.4
Low:	0.3	A piece of core 150 mm long x 50 mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.	7
Medium:	1	A piece of core 150 mm long x 50 mm dia. can be broken by hand with considerable difficulty. Readily scored with knife.	24
High:	3	A piece of core 150 mm long x 50 mm dia. core cannot be broken by unaided hands, can be slightly scratched or scored with knife.	70
Very High:	10	A piece of core 150 mm long x 50 mm dia. may be broken readily with hand held hammer. Cannot be scratched with pen knife.	240
Extremely High:		A piece of core 150 mm long x 50 mm dia. is difficult to break with hand held hammer. Rings when struck with a hammer.	

*The approximate unconfined compressive strength (qu) shown in the table is based on an assumed ratio to the point load index of 24:1. This ratio may vary widely.

DEGREE OF FRACTURING

This classification applies to diamond drill cores and refers to the spacing of all types of natural fractures along which the core is discontinuous. These include bedding plane partings, joints and other rock defects, but exclude known artificial fractures such as drilling breaks.

Term	Description
Fragmented:	The core is comprised primarily of fragments of length less than 20 mm, and mostly of width less than the core diameter.
Highly Fractured:	Core lengths are generally less than 20 mm — 40 mm with occasional fragments.
Fractured:	Core lengths are mainly 30 mm — 100 mm with occasional shorter and longer section.
Slightly Fractured:	Core lengths are generally 300 mm —1000 mm with occasional longer sections and occasional sections of 100 mm — 300 mm.
Unbroken:	The core does not contain any fracture.

REFERENCE

— International Society of Rock Mechanics, Commission on Standardisation of Laboratory and Field Tests, Suggested Methods for Determining the Uniaxial Compressive Strength of Rock Materials and the Point Load Strength Index, Committee on Laboratory Tests Document No. 1. Final Draft October 1972.

Prepared by the Sydney Group of the Australian Geomechanics Society, January, 1975.

GRAPHIC SYMBOLS FOR SOIL & ROCK

SOIL

BITUMINOUS CONCRETE

CONCRETE

TOPSOIL

FILLING

PEAT

CLAY

SILTY CLAY

SANDY CLAY

GRAVELLY CLAY

SHALY CLAY

SILT

CLAYEY SILT

SANDY SILT

SAND

CLAYEY SAND

SILTY SAND

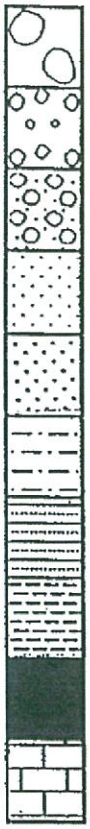
GRAVEL

SANDY GRAVEL

COBBLES/BOULDERS

TALUS

SEDIMENTARY ROCK



BOULDER CONGLOMERATE

CONGLOMERATE

CONGLOMERATIC SANDSTONE

SANDSTONE FINE GRAINED

SANDSTONE COARSE GRAINED

SILTSTONE

LAMINITE

MUDSTONE, CLAYSTONE, SHALE

COAL

LIMESTONE

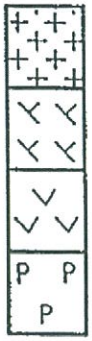
METAMORPHIC ROCK

SLATE, PHYLLITE, SCHIST

GNEISS

QUARTZITE

IGNEOUS ROCK



GRANITE

DOLERITE, BASALT

TUFF

PORPHYRY

SEAMS

SEAM
> 10 mm

SEAM
< 10 mm

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 6.5m AHD*

PIT No: 1
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
	SILTY SAND: Loose to medium dense, dark brown sand with trace clay and some rootlets, damp		D,pp	0.15	100kPa	
0.25	SANDY CLAY: Hard, light grey mottled orange sandy clay, M<<Wp		D,pp	0.3	>600kPa	
0.45	SANDSTONE: Very low strength, highly weathered, light grey mottled orange sandstone		D	0.6		
0.75	Test Pit 1 discontinued at 0.75m depth, refusal					

RIG: John Deere 310D Backhoe
LOGGED: Taylor
GROUND WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	U_x	Tube sample (x mm dia.)
D	Disturbed sample	Wp	Plastic limit (%)
M	Moisture content	HV	Hand Vane

CHECKED
Initials:
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 12.75m AHD*

PIT No: 2
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
	SANDY CLAY: Hard, light grey sandy clay with trace rootlets and ironstaining in fissures		pp	0.3	>600kPa	
			D,pp	0.5	>600kPa	
			pp	1.2	>600kPa	
1.4						
1.45	SANDSTONE: Low strength, highly weathered, light grey mottled orange sandstone					
	Test Pit 2 discontinued at 1.45m depth, refusal.					

RIG: John Deere 310D Backhoe

LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	U_x	Tube sample (x mm dia.)
D	Disturbed sample	Wp	Plastic limit (%)
M	Moisture content	HV	Hand Vane

CHECKED
Initials:
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 15.5m AHD*

PIT No: 3
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.1	FILLING: Generally comprising brown silty sand with some rootlets		D	0.05		
	FILLING: Generally comprising orange brown gravelly clayey sand, damp		D	0.3		
0.55	SILTY CLAY: Hard, light grey mottled orange silty clay, M<<Wp		D,pp	0.9	>600kPa	
	Grading to siltstone		pp	1.5	>600kPa	
1.7	SILTSTONE: Extremely low strength, highly weathered, light grey mottled orange siltstone		D	2.0		
2.4	Test Pit 3 discontinued at 2.4m depth					

RIG: John Deere 3100 Backhoe
LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 13m AHD*

PIT No: 4
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.4	SILTY SAND: Medium dense, dark brown silty sand with trace rootlets, dry		D	0.2		
	SILTY CLAY: Hard, light grey mottled orange silty clay with trace sand, M>Wp		D,pp	0.6	450–550kPa	
1	From 1.0m depth, light grey mottled yellow		D,pp	1.3	510kPa	1
2	From 1.7m depth, very stiff		pp	2.0	390kPa	2
2.2	Test Pit 4 discontinued at 2.2m depth					

RIG: John Deere 310D Backhoe
LOGGED: Taylor
GROUND WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 15m AHD*

PIT No: 5
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing			Water
			Type	Depth (m)	Results	
	SILTY SAND: Medium dense, dark brown silty sand with trace rootlets, dry					
0.3	SANDY CLAY: Hard, grey mottled orange sandy clay, M<<Wp		D,pp	0.6	>600kPa	
			pp	0.8	>600kPa	
0.95	SANDSTONE: Low strength, highly weathered, light grey mottled orange sandstone		D	1.0		
1.1	Test Pit 5 discontinued at 1.1m depth, refusal.					

RIG: John Deere 310D Backhoe
LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 23m AHD*

PIT No: 6
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.2	SILTY SAND: Medium dense, dark brown silty sand with trace rootlets, dry		D	0.1		
	SILTY CLAY: Hard, light grey silty clay, M>Wp		D,pp	0.5	>600kPa	
	From 0.8m depth, light grey mottled orange		D,pp	1.3	>600kPa	
1.9			pp	1.7	500–550kPa	
	SILTSTONE: Extremely low strength, extremely weathered, light grey mottled orange siltstone		D	2.2		
2.4	Test Pit 6 discontinued at 2.4m depth					

RIG: John Deere 310D Backhoe
LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: AG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 11m AHD*

PIT No: 7
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.25	SILTY SAND: Medium dense, dark brown silty sand with trace rootlets, dry					
0.8	SANDY CLAY: Hard, grey mottled orange sandy clay, M<<Wp		D,pp	0.5	>600kPa	
0.95	SANDSTONE: Very low strength, highly weathered, light grey mottled orange sandstone		D	0.9		
	Test Pit 7 discontinued at 0.95m depth, refusal					

RIG: John Deere 310D Backhoe
LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 19m AHD*

PIT No: 8
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.2	CLAYEY SAND: Firm, dark brown clayey sand with trace gravel and rootlets, moist					
	SILTY CLAY: Very stiff, grey silty clay with trace gravel, M>Wp		D,pp	0.7	270–300kPa	
	From 1.2m depth, light grey mottled yellow with trace gravel, M>Wp Grading to extremely weathered siltstone		D,pp	1.9	300–340kPa	
	From 2.4m depth, with trace extrmely low strength, extremely weathered siltstone cobbles					
2.6	Test Pit 8 discontinued at 2.6m depth					

RIG: John Deere 310D Backhoe
LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 20.25m AHD*

PIT No: 9
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.15	CLAYEY SAND: Firm, dark brown clayey sand with trace gravel and rootlets, moist					
	SILTY CLAY: Hard, grey mottled orange silty clay, M<Wp		D,pp	0.7	>600kPa	
0.9	SILTSTONE: Extremely low to very low strength, extremely to highly weathred, light grey mottled orange siltstone		D	1.5		
	Strength increasing with depth					
2.5	Test Pit 9 discontinued at 2.5m depth					

RIG: John Deere 310D Backhoe
LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	U_x	Tube sample (x mm dia.)
D	Disturbed sample	Wp	Plastic limit (%)
M	Moisture content	HV	Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 8.75m AHD*

PIT No: 10
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
	SILTY SAND: Medium dense, dark brown silty sand with trace rootlets, dry					
	From 0.25m depth, hard, light grey		D,pp	0.2	150kPa	
			pp	0.35	>600kPa	
0.5	SANDY CLAY: Hard, grey mottled orange sandy clay, M<Wp		D,pp	0.75	490kPa	
1.0	CLAYEY SAND/SANDY CLAY: Very stiff, grey mottled orange clayey sand/sandy clay, moist		D,pp	1.3	300kPa	
			pp	1.7	350kPa	
	From 2.3m depth, with some iron cemented areas		D	2.6		
2.8	Test Pit 10 discontinued at 2.8m depth					

RIG: John Deere 310D Backhoe
LOGGED: Taylor

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	U_x	Tube sample (x mm dia.)
D	Disturbed sample	Wp	Plastic limit (%)
M	Moisture content	HV	Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 28.5m AHD*

PIT No: 11
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.00	TOPSOIL: Dark grey/brown sandy silt, with abundant rootlets, moist		D,pp	0.05	<100kPa	
	SILTY CLAY: Very stiff to hard, dark grey silty clay, trace fine gravel, M<Wp Moisture content increasing with depth					
	From 0.5m depth, M>Wp		D,pp	0.5	>600kPa	
	From 0.9m depth, M>>Wp, light grey					
1.1	SILTY CLAY: Very stiff to hard, light grey mottled orange silty clay with trace fine grained sand, M<Wp Grading to extremely weathered siltstone		D,pp	1.2	450–>600kPa	
	From 1.3m depth trace siltstone gravel					
1.5	CLAYSTONE/SILTSTONE: Extremely low strength, extremely weathered, light grey mottled light brown claystone/siltstone		D,pp	2.3	350–450kPa	
2.8	Test Pit 11 discontinued at 2.8m depth					

RIG: John Deere 310D Backhoe
LOGGED: Blackert
GROUND WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	U_x	Tube sample (x mm dia.)
D	Disturbed sample	Wp	Plastic limit (%)
M	Moisture content	HV	Hand Vane

CHECKED
Initials:
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 23m AHD*

PIT No: 12
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.1	TOPSOIL: Grey/brown sandy silt with abundant rootlets					
	SILTY SAND: Dark grey silty sand with trace rootlets		D	0.3		
	Slightly cemented from 0.4m depth, light grey, silt content decreases					
0.6	SANDSTONE: Extremely low to very low strength, highly weathered, light grey mottled orange, fine to medium grained sandstone with occasional low strength seams		D	1.0		
	Becoming weaker from 1.1m depth					
	Strength increasing from 1.7m depth					
1.9	Test Pit 12 discontinued at 1.9m depth, near refusal					

RIG: John Deere 310D Backhoe
LOGGED: Blackert

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 16.75m AHD*

PIT No: 13
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.15	TOPSOIL: Dark grey, fine grained sandy silt with abundant rootlets, moist		D	0.1		
	SILTY CLAY: Hard, light grey/grey mottled orange silty clay, M<Wp		D,pp	0.5	>600kPa	
				0.65		
	From 0.8m depth, M>Wp		U_{50}			
1.0	SILTY CLAY: Hard, grey mottled orange/red silty clay with trace orange/red ironstained gravel		pp	1.05	>600kPa	
			D,pp	1.2	>600kPa	
1.7	SILTSTONE: (Hard clay), extremely low strength, extremely weathered, light grey mottled yellow siltstone		D	2.3		
2.5	Test Pit 13 discontinued at 2.5m depth					

RIG: John Deere 310D Backhoe
LOGGED: Blackert

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 15m AHD*

PIT No: 14
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.1	TOPSOIL: Dark grey brown sandy silt with abundant rootlets, moist		D	0.05		
	SILTY CLAY: Hard, dark grey silty clay, trace fine grained sand, M<Wp		D,pp	0.2	>600kPa	
	From 0.3m depth, light grey mottled orange yellow, M>Wp					
			D,pp	0.8	>600kPa	
1	From 1.0m depth, M<Wp grading to extremely low strength siltstone					1
1.4	SILTSTONE: (Hard clay), extremely low strength, extremely weathered, light grey mottled yellow siltstone					
	From 1.8m depth, with some ironcemented gravel					
2						2
			D,pp	2.1	400–>600kPa	
			D	2.3		
2.7	Test Pit 14 discontinued at 2.7m depth					

RIG: John Deere 310D Backhoe
LOGGED: Blackert

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

Douglas Partners
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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 22.25m AHD*

PIT No: 15
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.1	TOPSOIL: Dark grey/brown sandy silt with abundant rootlets		D	0.05		
	SILTY CLAY: Hard, grey silty clay with some fine grained sand, M<Wp		D,pp	0.5	>600kPa	
0.75						
0.8	SANDSTONE: Very low to low strength, extremely weathered, light grey mottled yellow sandstone		D	0.77		
	Test Pit 15 discontinued at 0.8m depth, refusal					
1						1
2						2

RIG: John Deere 310D Backhoe
LOGGED: Blackert

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 14.5m AHD*

PIT No: 16
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.1	TOPSOIL: Dark grey/brown sandy silt, with abundant rootlets, moist		D	0.05		
	SILTY CLAY: Hard, grey silty clay, trace fine grained sand, M<Wp		D,pp	0.5	>600kPa	
				0.7		
0.8	SILTSTONE: Extremely low strength, extremely weathered, light grey yellow siltstone (hard clay)		U_{50}			
				1.1		
	Strength increasing with depth					
				1.5		
	With some ironcemented gravel from 1.8m depth					
2.7	Test Pit 16 discontinued at 2.7m depth					

RIG: John Deere 310D Backhoe
LOGGED: Blackert
GROUND WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: HG
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 15.5m AHD*

PIT No: 17
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
	TOPSOIL: Dark grey/brown silty sand, moist		D	0.1		
0.15	SANDY CLAY: Hard, light grey sandy clay with trace fine gravel and silt, M<Wp		D,pp	0.5	>600kPa	
0.7	SILTSTONE: Very low strength, light grey/grey siltstone, grading to fine to coarse grained sandstone with depth		D	0.8		
0.85	Test Pit 17 discontinued at 0.85m depth, refusal					

RIG: John Deere 310D Backhoe
LOGGED: Blackert

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials:
Date: 13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 12.75m AHD*

PIT No: 18
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Depth (m)	Results	Water
0.15	TOPSOIL: Dark brown sandy silt with some to abundant rootlets, moist					
	SANDY SILT: Hard, grey/light grey sandy silt, damp		D	0.3		
0.4	SILTY CLAY: Hard, grey silty clay, M<Wp		D,pp	0.55 0.6	>600kPa	
0.7	SANDSTONE: Extremely low to low strength, light grey/grey mottled yellow sandstone		U_{50}			
	Mottled orange from 0.95m depth		1.0	0.95 1.0		
1.05	Test Pit 18 discontinued at 1.05m depth, refusal					

RIG: John Deere 310D Backhoe
LOGGED: Blackert

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
B	Bulk sample	U_x	Tube sample (x mm dia.)
D	Disturbed sample	Wp	Plastic limit (%)
M	Moisture content	HV	Hand Vane

CHECKED	
Initials:	HC
Date:	13/5/03

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TEST PIT REPORT

CLIENT: Beechwood Homes
PROJECT: Proposed Rezoning
LOCATION: Area C – Thornton North

DATE: 1 May 2003
PROJECT No.: 31729
SURFACE LEVEL: 11.5m AHD*

PIT No: 19
SHEET 1 of 1

Depth (m)	Description of Strata	Graphic Log	Sampling & Testing: Type	Sampling & Testing: Depth (m)	Sampling & Testing: Results	Water
0.15	TOPSOIL: Dark grey/brown sandy silt with some to abundant rootlets, moist					
0.35	SILTY SAND: Dark grey/brown silty sand, moist		D	0.2		
1.0	SILTY CLAY: Hard, dark grey/brown, mottled orange silty clay with trace siltstone/sandstone cobbles/gravel, M<Wp		D,pp	0.6	>600kPa	
1.25	SILTSTONE: Extremely low to low strength, grey mottled orange/yellow siltstone		D	1.1		
	Test Pit 19 discontinued at 1.25m depth					

RIG: John Deere 310D Backhoe
LOGGED: Blackert

GROUND WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Levels interpolated from contour plan

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	pp Pocket penetrometer (kPa)
B Bulk sample	U_x Tube sample (x mm dia.)
D Disturbed sample	Wp Plastic limit (%)
M Moisture content	HV Hand Vane

CHECKED
Initials: MG
Date: 13/5/03

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RESULTS OF DYNAMIC PENETROMETER TESTS

CLIENT	Beechwood Homes	DATE	1.5.03
PROJECT	Proposed Rezoning	PROJECT NO	31729
LOCATION	Area C - Thornton North	PAGE NO	1 of 1

TEST LOCATIONS	1	2	3	4	5	6	7	8	9	10
RL OF TEST										
DEPTH m	PENETRATION RESISTANCE BLOWS/150mm									
0.00 - 0.15	3	-	2	2	4	2	3	2	2	2
0.15 - 0.30	5	4	5	6	4	7	7	4	9	4
0.30 - 0.45	10	5	6	5	5	6	9	4	10	5
0.45 - 0.60	20 ref	5	9	7	7	7	20	2	10	6
0.60 - 0.75		12	9	3	14/100	4	25/100	2	7	6
0.75 - 0.90		7	7	2	bounce	7	refusal	3	6	10
0.90 - 1.05		5	7	4		7		5	6	15
1.05 - 1.20			7	5		9		4	6	10
1.20 - 1.35										
1.35 - 1.50										
1.50 - 1.65										
1.65 - 1.80										
1.80 - 1.95										
1.95 - 2.10										
2.10 - 2.25										
2.25 - 2.40										
2.40 - 2.55										
2.55 - 2.70										
2.70 - 2.85										
2.85 - 3.00										

TEST METHOD AS 1289.6.3.2, CONE PENETROMETER ☑
AS 1289.6.3.3, FLAT END PENETROMETER ☐

TESTED BY: GT
CHECKED BY:

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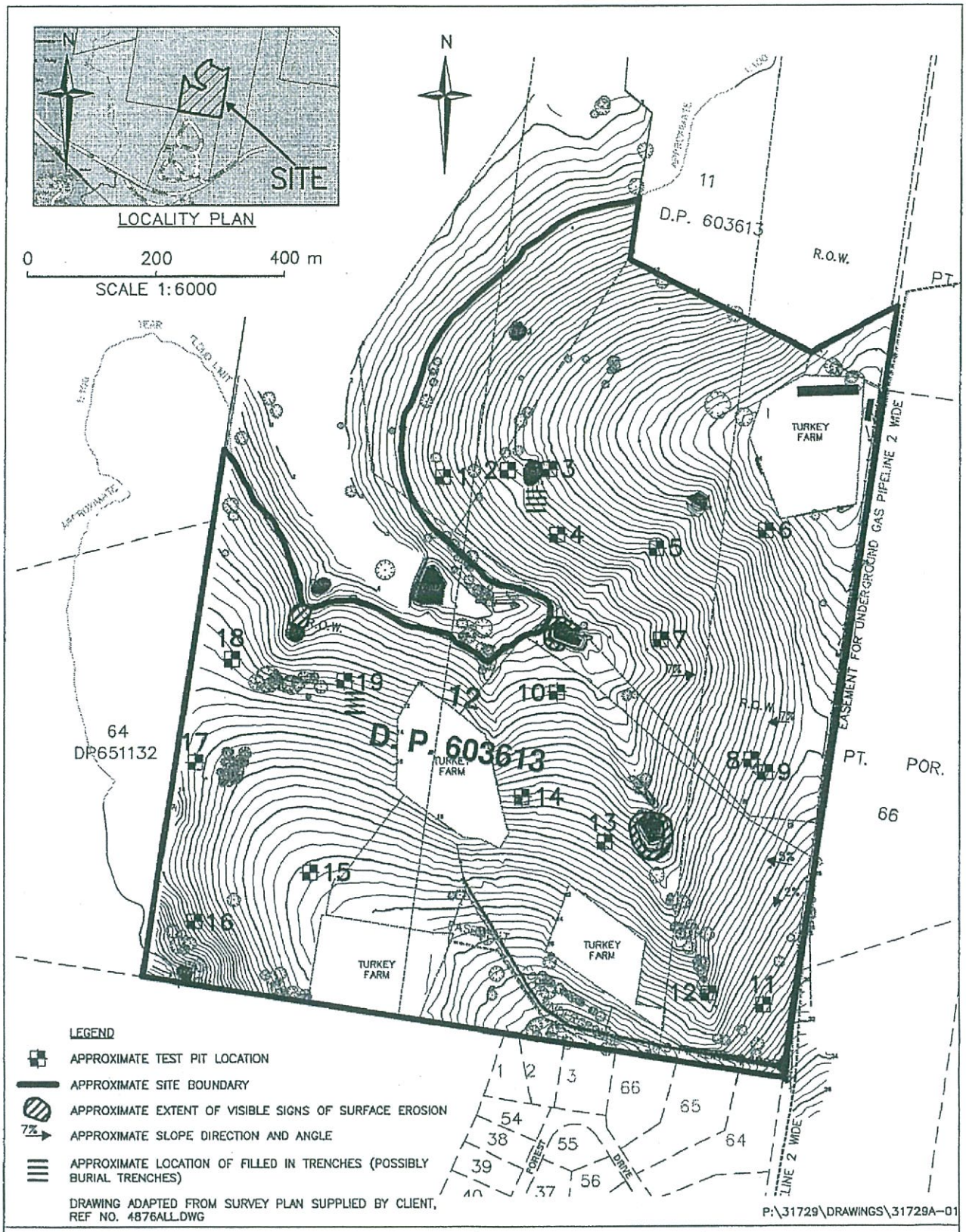

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Sydney, Newcastle, Brisbane, Melbourne, Perth, Wyong,

Wollongong, Campbelltown, Townsville, Cairns

TITLE: TEST LOCATION PLAN
PRELIMINARY GEOTECHNICAL ASSESSMENT – PROPOSED REZONING
AREA C – THORNTON NORTH

CLIENT: BEECHWOOD HOMES			OFFICE: NEWCASTLE
DRAWN BY: PH	SCALE: 1:6000	PROJECT No. 31729A	
APPROVED BY:		DATE: 7-11-03	DRAWING No: 1.

Outline of Proposal

Site Address _____

_____

Applicant Name Chisholm SC Pty Ltd atf Chisolm SC investment Trust

Applicant Address 506 / 55 Phillip Street Parramatta NSW 2150

_____

Building and other structures currently on the site

No, This is a Vacant Site.

Brief description of the proposal

Excavation and Construction of a retail shopping village and ground floor car park

Construction Phase

Waste materials on site	Vol (m^3)	Wt (t)	DESTINATION		
			ON SITE	OFF SITE	DISPOSAL
			Specify proposed reuse or on-site recycling methods	*Specify contractor and recycling outlet*	*Specify Contractor and Landfill Site*
Excavation Material	16530		Reuse to regrade portion		Benedict
Garden Waste	N/A	N/A			
Bricks				Bingo Industries - Tomago	
Tiles		2		Bingo Industries - Tomago	
Concrete	15			Bingo Industries - Tomago	
Timber – pine, particle board	10			Bingo Industries - Tomago	
Plasterboard	5			Bingo Industries - Tomago	
Metal – copper, aluminium	5			Bingo Industries - Tomago	
Asbestos – cement, roof and wall	N/A	N/A			
Other – including glass, doors, etc					

Ongoing Operations Phase

Ongoing Operations - Option 1
(applies to the following types of development)

- Single dwellings
- Dual Occupancy and Medium Density Housing – Individual Storage Areas
- Construction of outbuildings, such as garages, carports and sheds
- Dwelling alterations and additions
- Fences and retaining walls
- Swimming Pools
- Water Tanks
- Proposals involving minor construction
- Change of use applications involving minimal construction

Who is going to collect the waste and recycling generated by this development? *(tick applicable)*

- ☐ Council General Waste Collection (Green bin)
- ☐ Council Recycling Collection (Yellow bin)
- ☒ Private Contractor Council

Ongoing Operations - Option 2
(applies to all development excluding those categories nominated under Option 1 above)

Describe how you intend to ensure ongoing management of waste on site

1. A licensed private waste collection contractor will provide all waste and recycling services to the building, using a collection vehicle, suitable for
2. All commercial waste and recycling collections will take place from the Bin Area where the bins will be removed from the WSA by a representative of the contractors' collection team to a waiting vehicle stationed at the roadside in the
3. 6. The proprietor of the centre will be responsible for ensuring that all waste and recyclable matter and materials are placed and stored within the appropriate containers provided
4. All waste management facilities will be maintained in a clean and hygienic condition that will promote the principles of health, safety and
5. It will be the responsibility of the Owners Corporation to ensure that all green waste generated from the on-going use of the development is disposed of appropriately.
6. No formal green waste service will be provided to the development.