Technical Advisory Note

Project	SCW Precinct 5 Stage 2	**Project Number**	SCT_00629
Client	Always Consultancy Pty Ltd		
Document Name	Model Scoping Note		
Version	2.0	**Date**	27 August 2024
Author	Rohan Shetkar	Senior Consultant	
Reviewer	Jonathan Busch	Associate Director	
Authoriser	Andy Yung	Director	

1.0 Introduction

1.1 Background

SCT Consulting was engaged by Always Consultancy Pty Ltd to undertake Stage 2 (post-gateway) detailed traffic assessment to support the planning proposal of Cobbitty Sub-Precinct 5, also known as Precinct 5. Precinct 5 totals approximately 303 hectares and is characterised by rural residential and agricultural land uses and activities.

Precinct 5 is located within the southwest portion of the South Creek West Land Release area within the suburb of Cobbitty in the Camden LGA. The Precinct adjoins the Lowes Creek Maryland (LCM) Precinct, which has recently been rezoned to the north, the Pondicherry precinct to the east, which is in the process of being rezoned and the growing town centre and suburbs of Oran Park to the south. **Figure 1** illustrates the site boundaries of Precinct 5 (highlighted in red) and the South Creek West Land Release area. Figure 2 show the indicative layout plan for Precinct 5 and the surrounding land.

The stage 1 analysis of the pre-gateway determination was conducted. In stage 1, SCT Consulting undertook a preliminary capacity/performance analysis and provided the traffic assessment based on a high-level assessment of strategic network impacts. TfNSW provided Strategic Traffic Forecasting Model (STFM) outputs which were used to quantify impacts on the external road network (i.e. The Northern Road).

This model scoping note explains the scope and methodology of the detailed assessment in Stage 2 (post-gateway determination). The overall methodology is a detailed Aimsun mesoscopic and SIDRA intersection modelling to support the planning proposal.

Figure 1 Precinct 5 (red outline) in a regional context

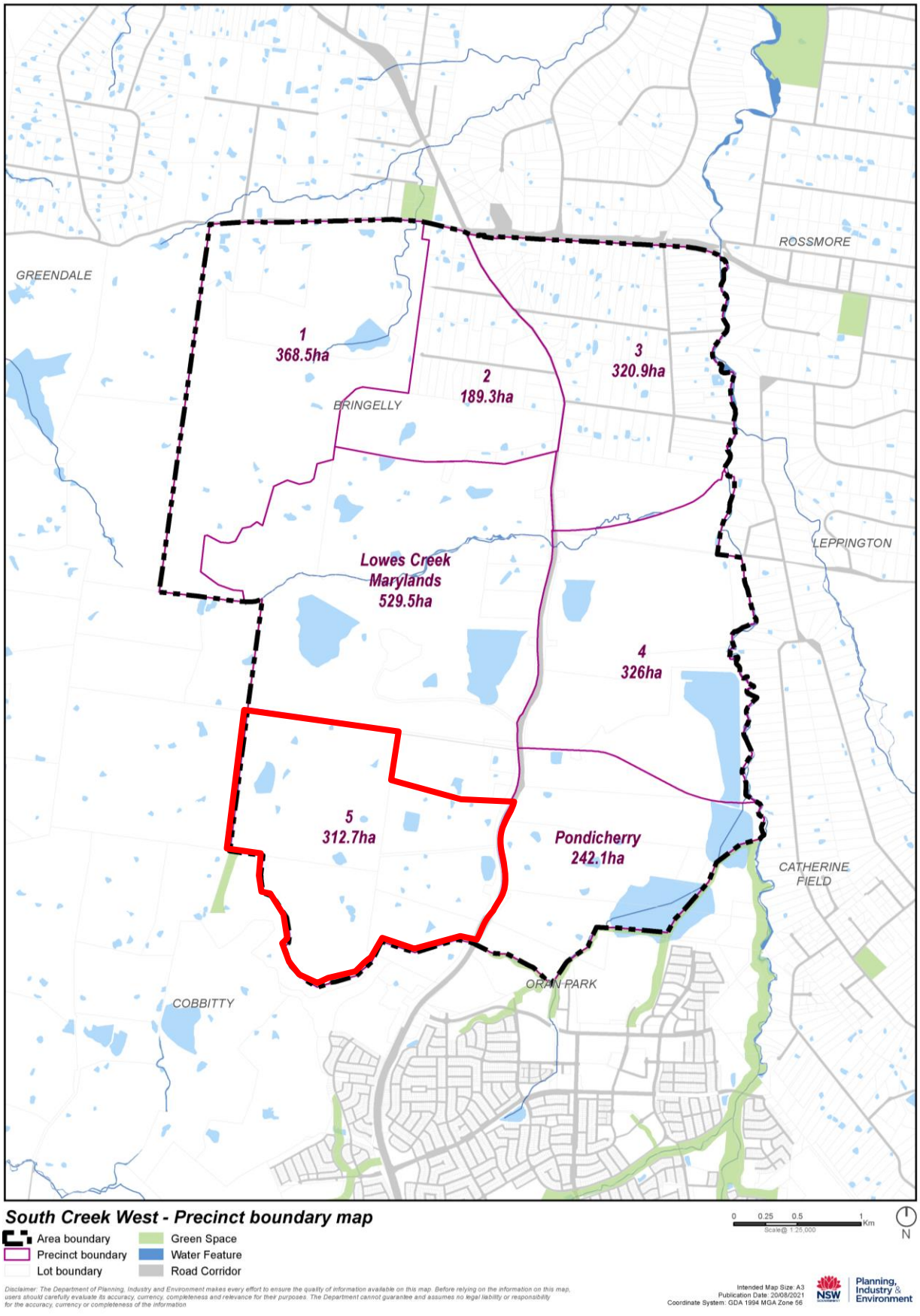
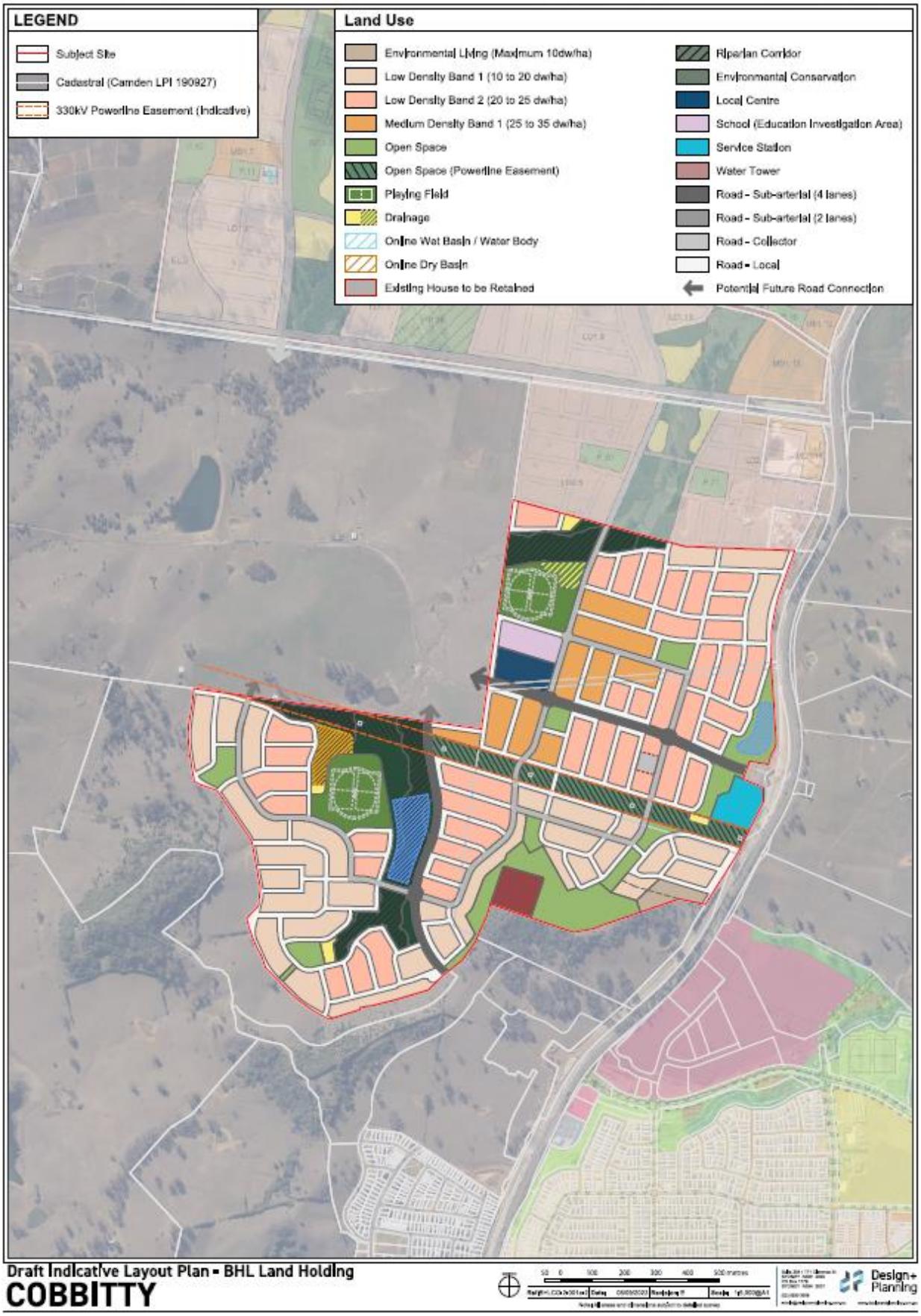


Figure 2 Precinct 5 Indicative Layout Plan



Source: Design+Planning, 2022

1.2 Project objective

The project aims to:

- Amend the current State Environmental Planning Policy (Precincts—Western Parkland City) 2021 to facilitate the urban development of Precinct 5 as part of the South West Growth Centre and envisaged in the Greater Sydney Commission's Regional Plan and District Plan.
- Quantify the impact of the proposed development in the Precinct 5 land on the surrounding transport network.
- Propose mitigation measures for road network, public transport, and active transport.

1.3 Scope of work

The scope of services is provided in **Table 1**.

Table 1 Scope of services

Deliverable	Tasks
Data collection	– Intersection turning count and queue length collection at 10 (all traffic signals) intersections and turning counts at two intersections (the priority intersections) for three hours in the morning and three hours in the evening peak of a typical weekday. Classification by light, heavy, bus, and cyclist. – A floating car travel time survey for three hours in the morning and four hours in the evening peak for The Northern Road from Bringelly Road to Peter Brock Drive with segments at each set of signals of a typical weekday. – Request for TfNSW traffic signal data for 10 intersections.
Finalise *Traffic, Transport and Access Assessment*	Update the SCT Consulting *Traffic, Transport and Access Assessment*: – To attach the base year calibration and validation report – Document future year model assumptions, infrastructure and network/intersection performance statistics. – Document updates to the precinct layout (such as road hierarchy, yield, active transport network, etc.)
Update *Traffic, Transport and Access Assessment* based on authority feedback	– One iteration of updates to the model based on TfNSW and Council feedback. This does not allow for changes to principles agreed in the rezoning lodgement or any positions agreed in writing.
Meetings, coordination and ad hoc advice	– An upper limit fee to support meetings, stakeholder engagement, coordination, and finalisation of the master plan. This item will be charged at hourly rates. This was estimated at 40 hours of Associate Director time based on the project's expected duration.
Base year model	Prepare a mesoscopic model: – Two hours will be used for calibration in the morning peak and three in the afternoon peak. The additional data will be used for warm up. – Calibrated and validated Aimsun mesoscopic model for the dashed area/intersections shown in **Figure 3** in line with the Traffic Modelling Guidelines (RMS, 2013) based on the 'Highway Assignment Modelling' chapter: • Meet Table 10.3 for turn volumes and R^2 criteria. Screen line, cordon and link criteria not used. • Table 10.4 travel time calibration criteria met – Calibrated and validated SIDRA models for all traffic signals (x10) in line with Traffic Modelling Guidelines (RMS, 2013) based on the 'Single intersection modelling' chapter: • Intersection models will be built for the busiest hour at each intersection • Intersection settings will be set to reflect conditions • Calibrate model throughput so full intersection turning count data can travel through each intersection • Modelled queue lengths are similar to surveys.

Deliverable	Tasks
Base year model calibration reporting	– Prepare a base year calibration and validation report per TTD 2017/001 Operational modelling reporting structure. – Allowance for one draft and final before submitting to TfNSW.
Base year model updates after authority feedback	– One iteration of updates to the model and reporting based on authority feedback. This does not allow for changes to model design, which will be agreed in the model scoping note.
Strategic modelling	– Request STFM forecasts for: • 2036 with background growth only • 2036 with development • 2041 with background growth only • 2041 with development
Future year modelling	– Conduct the following scenarios in the Aimsun mesoscopic model: • 2036 with background growth only • 2036 with development • 2041 with background growth only • 2041 with development – The Aimsun mesoscopic model will be expanded to cover the road network of South Creek West Precinct 5, Lowes Creek Maryland and South Creek West Precinct 2. This network coding will only include the Sub Arterial and collector level roads. Local streets would not be useful for forecasting. – The Aimsun mesoscopic model scenario will be developed to the point where congestion levels are appropriate. Then, demands will be transferred into SIDRA, where they are used to determine intersection layouts. – Level of Service benchmarks will be agreed with TfNSW before work commences.
Future year model updates after authority feedback	– One iteration of updates to the model based on TfNSW and Council feedback. This does not allow for changes to model design or growth assumptions, which will be agreed in the model scoping note. This does not include new scenarios being conducted (e.g. different future years), only edits to agreed scenarios.

We aren't allowing major staging work to occur in preparing the planning proposal. We have allowed one interim stage (2036) and one final stage (2041). Further detailed staging would need to be planned for subdivision applications, which may require additional modelling.

1.4 Stakeholders

The key stakeholders are:

– Department of Planning, Housing and Infrastructure

– Transport for NSW

– Camden Council

– Always Consultancy Pty Ltd.

1.5 Report outline

This report has been structured into the following sections:

– **Section 1** introduces this report, its context, and its purpose

– **Section 2** describes the project in more detail

– **Section 3** explains the traffic surveys and other input data to the models

– **Section 4** describes the modelling methodology

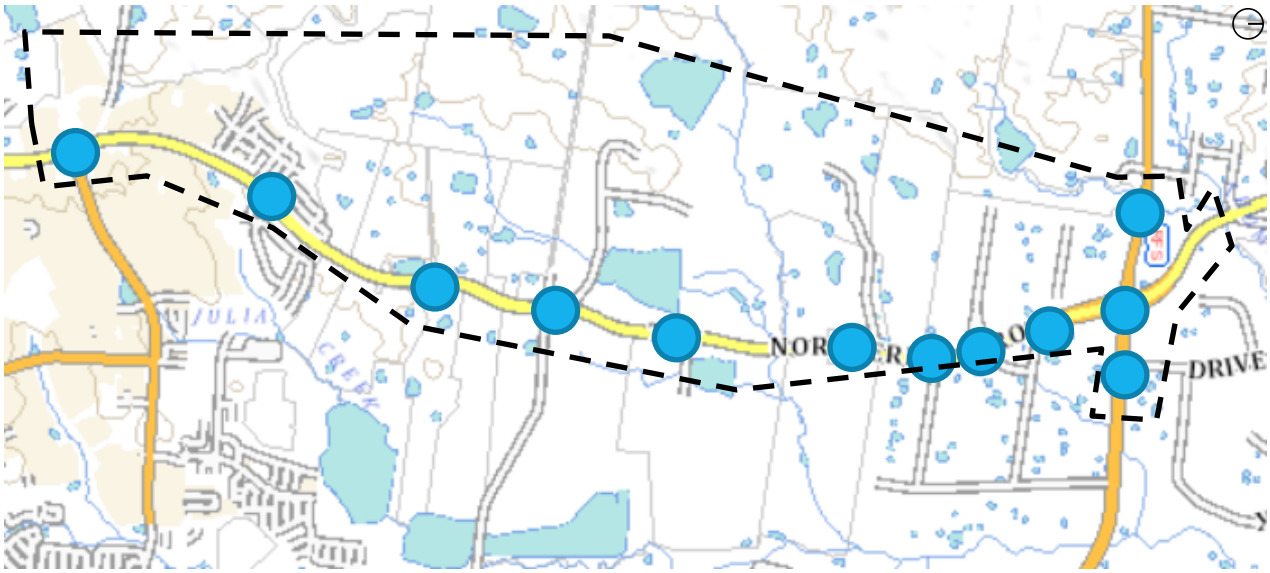
– **Section 5** captures the minutes of the inception meeting.

2.0 Project description

2.1 Study area

The assumed study area is provided in **Figure 3**.

Figure 3 Traffic modelling study area



Source: Six Maps, annotations by SCT Consulting, 2024

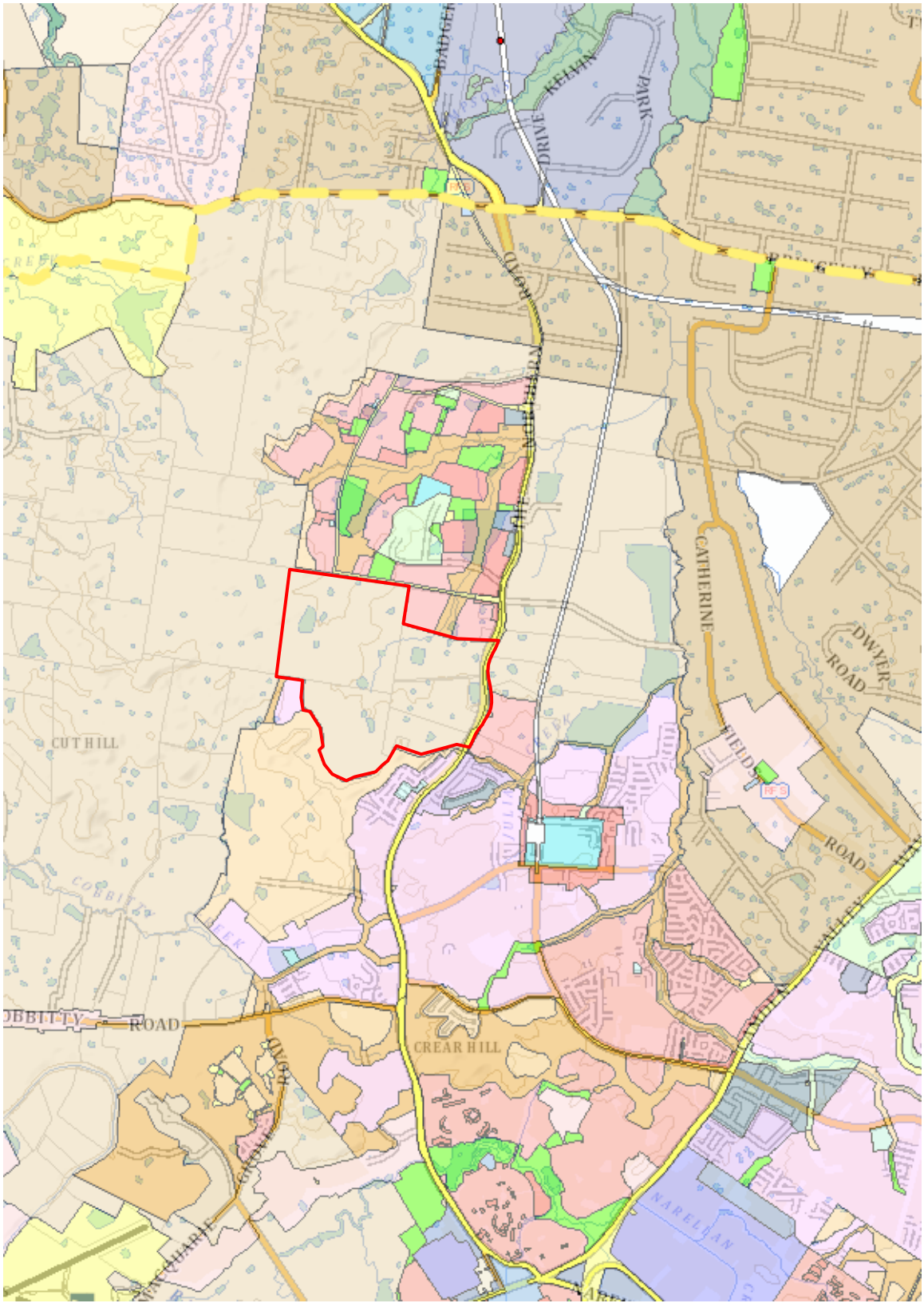
The intersections covered by this study area are:

- The Northern Road / Bringelly Road (signals)
- Bringelly Road / Kelvin Park Drive (signals)
- Bringelly Road / Wentworth Road (signals)
- The Northern Road / Belmore Road (signals)
- The Northern Road / Carrington Road (left in left out)
- The Northern Road / Lowes Creek Link Road (signals)
- The Northern Road / Marylands Link Road 3 (signals)
- The Northern Road / Marylands Link Road 2 (signals)
- The Northern Road / Marylands Link Road 1 (signals)
- The Northern Road / Dunk Pl offramp (priority)
- The Northern Road / Dick Johnson Drive (signals)
- The Northern Road / Peter Brock Drive (signals)

2.2 Land-use

The area in Precinct 5 is currently zoned as rural agricultural land use (**Figure 4**). Most of the area surrounding Precinct 5 is zoned as rural agricultural land use or is transitioning to be zoned to residential and mixed uses or has recently been transitioned from to residential/mixed-use.

Figure 4 Land Zoning Map for the area adjacent to Precinct 5 (red outline)

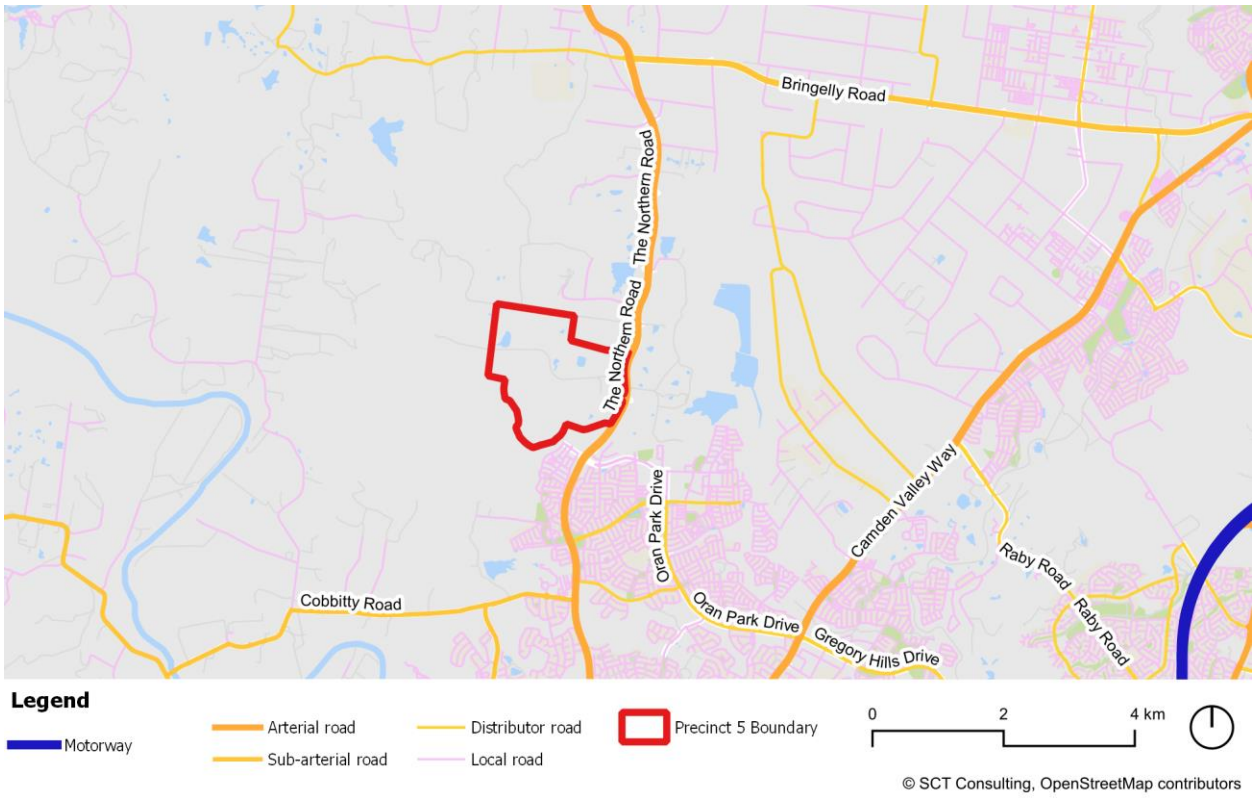


Source: NSW Planning Portal Spatial Viewer, accessed on 16th August 2024

2.3 Transport infrastructure

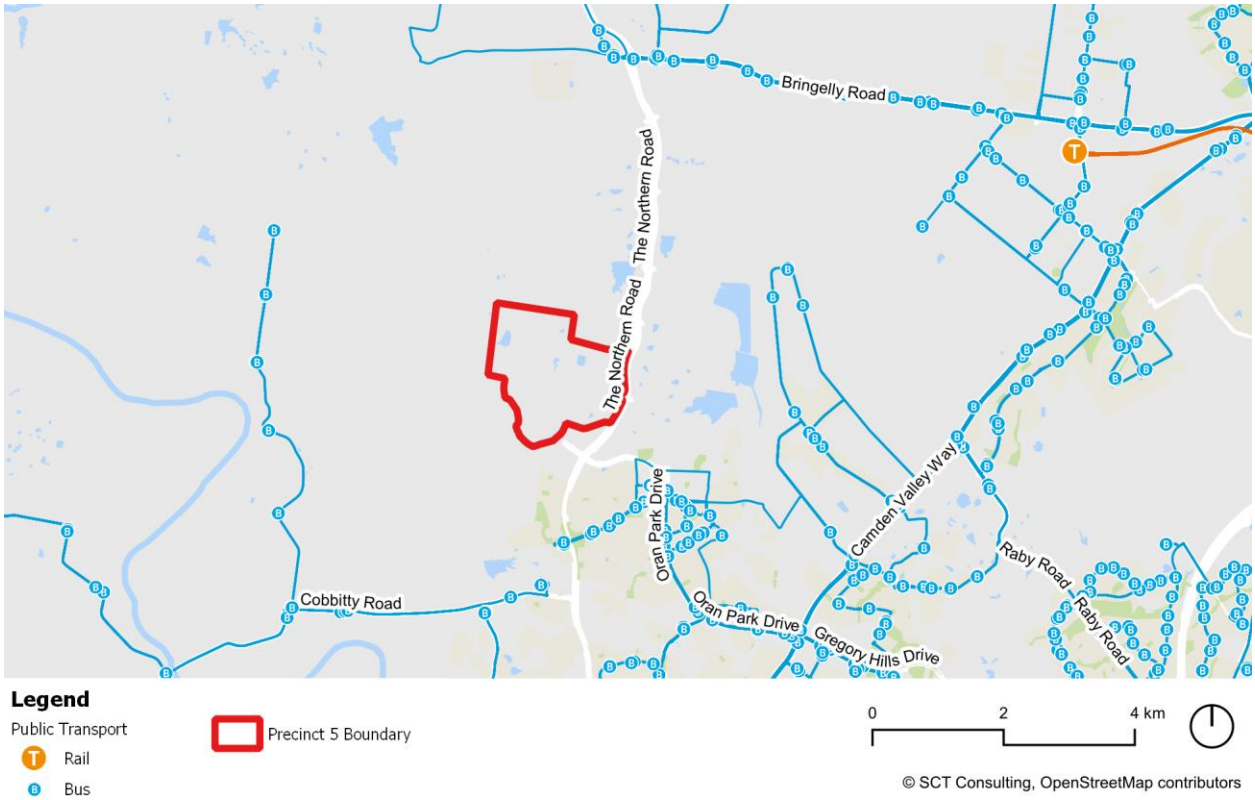
The Precinct 5 site is mainly connected by The Northern Road (**Figure 5**). The Northern Road is a four-lane divided arterial road with additional turn bays at the intersections, connecting the northern and southern parts of the city. The road has been subject to significant upgrades and improvements to enhance traffic flow and safety.

Figure 5 Road network surrounding study area



Public transport network in the vicinity of Precinct 5 is limited, with Leppington as the closest train station and sparce bus connectivity (**Figure 6**).

Figure 6 Public transport network surrounding Precinct 5



Active transport facilities are limited in this area due to low density.

2.4 Assessment years and time periods

All previous traffic modelling and assessments relating to LCM and SCW Precinct 5 were undertaken for 2021, 2026, 2031, 2036 and 2041.

For ongoing traffic modelling and assessments for the SCW Precinct 5 planning proposal, modelling would be undertaken for 2036 and 2041 (two-hour weekday AM and PM peaks with half an hour warmup and cooldown) to provide an understanding of the proposed development's interim and full development implications on the surrounding road network.

3.0 Input data

3.1 Traffic surveys

The traffic surveys proposed are identified in **Table 2**.

Table 2 Traffic surveys proposed

Element	Details
Intersection turning count	Data collection is proposed at 12 intersections (including ten, i.e. all traffic signals) for three hours in the morning and three hours in the evening peak of a typical weekday. Vehicle classification by light, heavy, and bus.
Queue length surveys	Queue length collection at 10 (all traffic signals) intersections for three hours in the morning and three hours in the evening peak of a typical weekday coinciding with intersection turning count.
Traffic signal settings	Request TfNSW traffic signal data for ten intersections.
Travel times	A floating car travel time survey for three hours in the morning and four hours in the evening peak for The Northern Road from Bringelly Road to Peter Brock Drive with segments at each set of signals of a typical weekday.

The proposed surveys will be conducted during the middle of the week (Tuesday to Thursday) in a typical school week.

3.2 Assumptions

Assumptions related to the demand estimation will be carried forward from Stage 1 pre-gateway analysis. The Aimsun mesoscopic models and SIDRA models will be calibrated as per the TfNSW Traffic Modelling Guidelines, 2013.

3.3 Strategic model

The following modelling scenarios (**Table 3**) are proposed to be included in the study.

Table 3 Modelling scenarios for Precinct 5 Stage 2 traffic modelling and study

Modelling scenario	TfNSW base case network assumptions	Land Use Assumptions			
		TfNSW base case land use assumptions	LCM Precinct (Rezoned)	Precinct 2 (subject to separate Planning Proposal)	Precinct 5 (subject precinct)
#1 - 2036 with background growth only	✓	✓	✓	✓	
#2 - 2036 with development	✓	✓	✓	✓	✓
#3 - 2041 with background growth only	✓	✓	✓	✓	
#4 - 2041 with development	✓	✓	✓	✓	✓

The purpose of each of the scenarios is as follows:

– Scenarios #1 and #3 provide a land use and transport baseline to assess the net impacts of the proposed land use changes of Precinct 5. Hence, the land use of SCW Precinct should include the approved residential and employment targets in the DPE forecasts minus those in Precinct 5.

– Scenarios #2 and #4, when compared with Scenarios #1 and #3, respectively, would specifically evaluate the impacts of the proposed land use change of Precinct 5.

The specific land use assumptions as presented above will be reviewed (in consultation with TfNSW) upon commencement of the modelling exercise, to confirm the scenarios are set up properly to assess the impacts of Precinct 5 only (for the purpose of the planning proposal).

The zone structure of the STFM modelling in the study area will also be reviewed (in consultation with TfNSW) upon commencement of the modelling exercise to reflect realistic trip distribution between the development and the surrounding road network.

3.4 Traffic signals

Signals will be vehicle actuated, covering at a minimum the following aspects of SCATS:

– Reference phase extension

– Phase skipping/early termination based on demand

– Communication between controllers (only if found to be necessary based on preliminary model runs and calibration)

– Diamond operations.

4.0 Methodology

4.1 Base model

4.1.1 Modelling Platform

The modelling method used in the assessments of precincts near Precinct 5 was studied, and a similar methodology has been proposed. A mesoscopic corridor model using Aimsun software will be developed for path assignment and to identify and mitigate congestion along the corridor. The key intersections along The Northern Road will further be analysed using SIDRA software.

4.1.2 Traffic demand

Traffic demand will be determined based on surveyed traffic volumes. We will compare the demand used in the modelling against the STFM 2024 model volume to evaluate how closely the surveyed volumes align with the STFM models.

Subsequently, the flows will be adjusted to match local traffic volumes. A comparison of trip length will be conducted to review the change in trip length.

4.1.3 Traffic zones/input

Zones will be generated for each of the entries and exits of the study area.

4.1.4 Traffic profile

Matrices will be developed during the calibration process for each fifteen minutes of model simulation. The warm-up period will be based on actual counts rather than a warm-up factor. Separate matrices will be developed for light and heavy vehicles.

4.1.5 Road type

Default TfNSW road types will be adopted. As the model does not have any route choice, road type (in terms of attractiveness parameters) will not be significant.

4.1.6 Driving behaviour and speed profile

The default driving behaviour and speed profiles will be used. Gap acceptance parameters will be adopted based on the Traffic Modelling Guidelines Appendix E Recommended Gap Acceptance Parameters.

4.1.7 Public transport

Include the process and source that will be used to develop the public transport data.

4.1.8 Traffic signals

Data will be requested from SCATS.Traffic.Signal.Data@transport.nsw.gov.au and is to be charged at standard cost rates to SCT Consulting. Signal settings will be reviewed as the model is calibrated and validated (namely typical phase length, and waste settings) to attempt to reflect the local conditions.

4.1.9 Pedestrians and cyclists

The intersections in the study area have limited pedestrian demands and, in some cases, do not have pedestrian crossings. As future modelling is expected to require modelling of pedestrian demand increases, pedestrian calls will be included in signal logic.

Cyclists will not be modelled.

4.1.10 Assignment type

The assignment type will be dynamic user equilibrium. The proposed model network will be a corridor, and hence, it does not have any route choice, but lane choice is important and will require iteration.

4.2 Future model

4.2.1 Scenario testing

Strategic model runs using the STFM will be requested from TfNSW and all the necessary information needed for these runs to be provided to TfNSW. The forecasts for the following scenarios will be assessed:

– 2036 with background growth only

– 2036 with development

– 2041 with background growth only

– 2041 with development

The above-mentioned scenarios will be assessed using a mesoscopic simulation model, using forecasts from strategic models. The Aimsun mesoscopic simulation model will be expanded to cover the road network of South Creek West Precinct 5, Lowes Creek Maryland, and South Creek West Precinct 2. This network coding will only include the Sub-arterial and collector-level roads. Local streets would not be useful for forecasting.

Level of Service benchmarks will be agreed with TfNSW before work commences.

4.2.2 Future base case assumptions

The proposed network upgrades to the Northern Road and surrounding area, which are part of the STFM, will also be included in the Aimsun model. The proposed network upgrades that are within the study area will be discussed with TfNSW before future year modelling commences.

4.2.3 Traffic demand/growth

4.2.3.1 Trip generation rates

The assumptions regarding trip generation rates, trip containment, and trip distribution used in Stage 1 of the assessment will be applied consistently in Stage 2. For additional details on the trip generation assumptions from Stage 1, please refer to Attachment 1.

4.2.3.2 Strategic demand models

Traffic growth will be obtained from STFM. As STFM is not capacity-constrained, an initial run will be used to determine the extent of traffic that is unable to enter the network to inform manual adjustments to the demand, which could include:

– Switching from car to bus/train where a reliable bus/train service exists

– Peak spreading (see discussion in traffic profile)

– Re-routing outside of the study area.

The future year's traffic generation will represent the net increase above existing traffic generation within each site. Any changes to demand for the future year will be discussed with TfNSW before implementation.

4.2.4 Traffic profile

The traffic profile identified from the base year data collection will be retained in the initial iteration of the model.

Based on the preliminary results, the need for peak spreading will be identified and discussed with TfNSW. Any adjustments will be evidence-based and based on a comparable area.

4.2.5 Public transport

Public transport improvements, including bus priority lanes and new services, will be included into the study based on the committed upgrades. The team will explore opportunities to enhance public transport access to the site.

4.2.6 Traffic signals

Traffic signals will need adjustments based on the changed demand profile. The intersection signal timings setting will be iteratively updated to get a reasonable outcome.

Table 4 Cycle time updates

Situation	Explanation
Minor reduction in demands, no change to demands and/or no change phasing	Cycle times will remain at the same level as the base year. Phase times will be optimised. Coordination (offsets) will remain the same as base year data.
Increases in demands, new intersection approaches, new traffic signals	Phasing will be set to optimised with a maximum of 140 seconds cycle time.

4.2.7 Assignment type

The assignment type will be retained from the base calibration model. The internal streets of the Precinct 5 will not be included in the future models.

5.0 Inception meeting outcome

The model scoping note prepared for the Stage 1 pre-gateway analysis is attached to this document, along with the TfNSW's confirmation about the Stage 1 Preliminary Traffic and Transport Analysis.

Attachment 1: Stage 1 Model Scoping Note

Technical Advisory Note

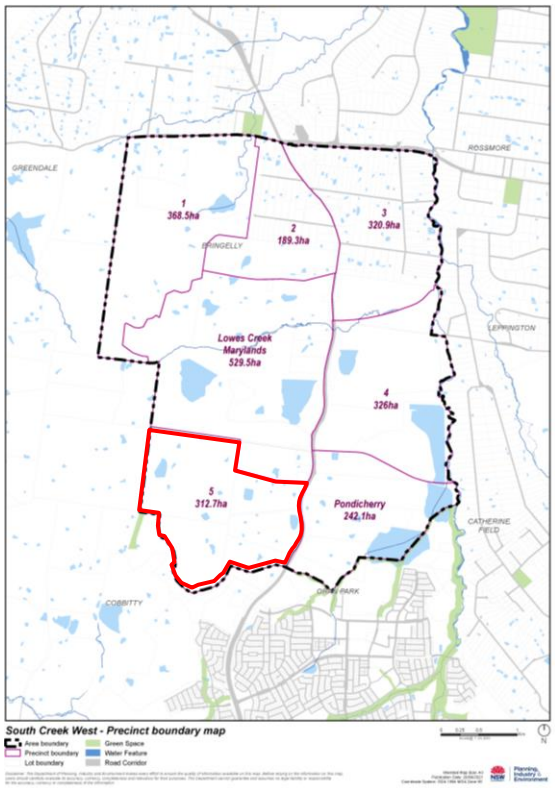
Quality Information			
Project:	South Creek West Precinct 5		
Project Number:	SCT_00264		
Document Name:	Pre-Gateway Transport Assessment - TfNSW strategic model inputs memo		
Version:	6.0	**Date:**	20/12/2022
Author:	Andy Yung	Director	
Reviewer:	Jonathan Busch	Associate Director	JDB
Authoriser:	Andy Yung	Director	

1.0 Background

SCT Consulting was engaged by BHL Group to undertake a traffic, transport and access assessment to support the planning proposal of Cobbitty Sub-Precinct 5, also known as Precinct 5. Precinct 5 totals approximately 303 hectares and has been characterised by rural residential and agricultural land uses and activities.

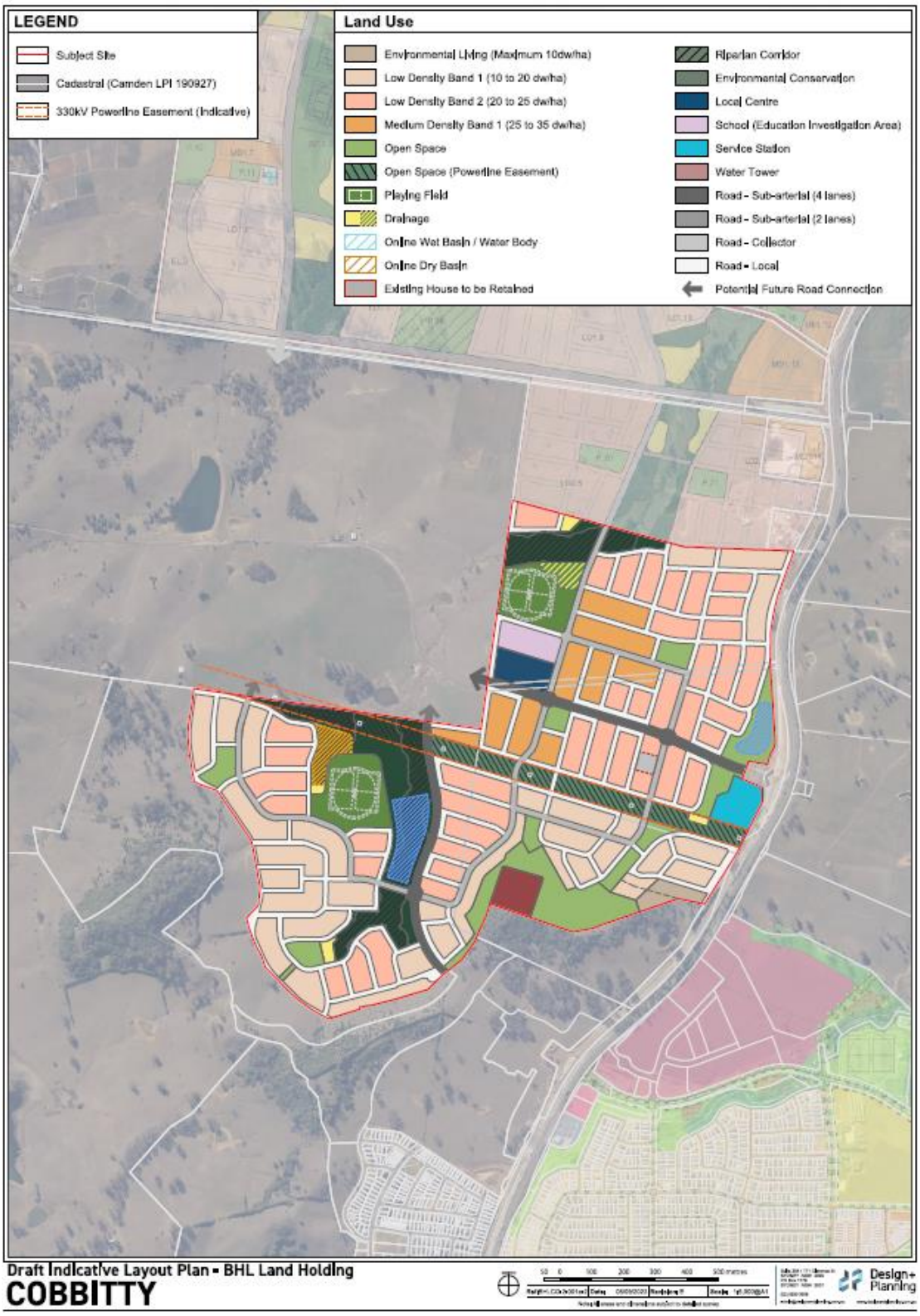
Precinct 5 is located within the southwest portion of the South Creek West Land Release area within the suburb of Cobbitty in the Camden LGA. The Precinct adjoins the Lowes Creek Maryland (LCM) Precinct, which has recently been rezoned to the north, the Pondicherry precinct to the east which is in the process of being rezoned and the growing town centre and suburbs of Oran Park to the south. **Figure 1-1** illustrates the site boundaries of Precinct 5 (highlighted in red) and South Creek West Land Release area.

Figure 1-1 Precinct 5 (red outline) in a regional context



BHL, as the major landholder of Precinct 5, seeks to initiate the preparation of a planning proposal for the rezoning of Precinct 5. However, through on-going discussions with Council and neighbouring landowners within Precinct 5, the planning proposal would only be relevant for land under BHL ownership within Precinct 5, as highlighted in the Draft Indicative Layout Plan (ILP), as shown in **Figure 1-2**. For the purpose of this pre-gateway Stage 1 preliminary traffic assessment, the whole of Precinct 5 will be assessed.

Figure 1-2 Precinct 5 (part – BHL ownership) Indicative Layout Plan



Source: Design+Planning, 2022

The intended outcome of this Planning Proposal is to amend the current State Environmental Planning Policy (Precincts—Western Parkland City) 2021 to facilitate the urban development of Precinct 5 as part of the South West Growth Centre and envisaged in the Greater Sydney Commission's Regional Plan and District Plan.

Traffic modelling was undertaken and transport assumptions for this site were discussed and confirmed with relevant stakeholders. A traffic and transport assessment was undertaken based on work completed by the Department of Planning and Environment (DPE) during the planning of Lowes Creek Maryland (LCM) precinct.

Since the submission of the traffic and transport assessment in support of the planning proposal for Precinct 5, Camden Council wrote to Transport for NSW (TfNSW) to request advice about the assessment of the planning proposal. TfNSW identified the need for further modelling before gateway determination.

A meeting with a Land Use Planner at TfNSW confirmed the overall approach to traffic modelling for the proposal.

Evidence to support Gateway Determination (Stage 1 preliminary assessment - Now and early 2023):

– TfNSW to provide Strategic Traffic Forecasting Model (STFM) outputs so the likely impacts on the external road network (i.e. The Northern Road) can be quantified. SCT Consulting will then undertake a preliminary capacity/performance analysis and the traffic assessment and reporting will be updated based on this high-level assessment of strategic network impacts.

Post-gateway determination (Stage 2 detailed assessment - Early to mid-2023):

– The scope and methodology of the detailed assessment can be confirmed post-Gateway and agreed upon between TfNSW/Council using the modelling scoping note process.

– The overall methodology is a detailed AIMSUN mesoscopic and SIDRA intersection modelling to support the planning proposal. TfNSW can review and validate AIMSUN/SIDRA base models during pre or post-gateway, as long as it is accepted by TfNSW before any detailed assessment.

– The detailed assessment should align with TfNSW's release of Future Transport Strategy 2056, Movement and Place Framework (i.e. Network Planning in Precincts), DPE-led review of the South West Growth Area Structure Plan as well as the latest traffic modelling forecasts being prepared by TfNSW.

– The detailed assessment needs to consider carefully active and public transportation networks (as requested by Council).

This memo is to provide TfNSW with the land use and transport inputs required to undertake the STFM modelling. The outputs of the STFM modelling will be used to inform a preliminary capacity/performance analysis and the traffic assessment and reporting will be updated based on this high-level assessment of strategic network impacts.

It was agreed that no further intersection and network traffic modelling will be required pre-Gateway Determination. The scope of further detailed traffic modelling will be discussed and agreed upon with all relevant stakeholders before the commencement of Stage 2 detailed Traffic and Transport Assessment to support the rezoning (post-Gateway determination).

2.0 Proposed Indicative Layout Plan (ILP) and land use

The Draft ILP (as shown in **Figure 1-2**) has been prepared to support the planning proposal and precinct rezoning and has been informed by extensive specialist consultant studies. The site (Precinct 5 under BHL ownership) will comprise approximately 2,600 dwellings and a population of 8,200 people within a thriving community supported by:

– Easy access to jobs in the Western Sydney Aerotropolis

– Local shops, community uses and services, and proximity to the Oran Park Town Centre

– Open space typologies also include creeks, grasslands, playgrounds, and other nature-based recreations areas

– Pedestrian and cycling connections including a central green corridor

– Prominent creeks and riparian areas that retain water in the local environment

– A future local school

– Integrated stormwater and services infrastructure that improve local amenity.

The yield of the Precinct 5 (part with BHL ownership) ILP is shown in **Table 2-1** .

Table 2-1 Precinct 5 (part with BHL ownership) ILP yield

Use	Yield[1]	Source
Environmental living (10 dwellings/ha)	8 dwellings	
Low density housing (20 dwellings/ha)	835 dwellings	Design+Planning Yield Calculation Rev E, dated 9 September 2022
Low density housing (25 dwellings/ha)	1,177 dwellings	
Medium density housing (35 dwellings/ha)	476 dwellings	
High density / apartments in local centre (from 35-60 dwellings/ha)	100 dwellings	
School	1 primary school	
Non-residential including a supermarket and specialty retail	7,500 m^2 GFA	Urbis Cobbitty Sub-Precinct 5 Retail Demand Analysis - Update, dated 13 September 2022

The traffic modelling undertaken in the previous *Lowes Creek Maryland Precinct Traffic, Transport and Access Assessment, 2018* (GHD) considers the yield of not just the LCM precinct but the whole SCW precinct to the west of The Northern Road. It assumed a total of 5,750 dwellings in Precinct 2 and Precinct 1.

Since the 2018 Lowes Creek Maryland Precinct Traffic Assessment was completed, the Lowes Creek Maryland Precinct was rezoned on 16 July 2021. The Lowes Creek Maryland Precinct accommodates up to 7,000 new homes 2,200 new jobs, a local centre, a new school and a community facility, along with open space, cycling and pedestrian paths.

It is also assumed the remainder of Precinct 5 (outside of BHL ownership) could yield approximately 1,200 residential dwellings (we suggest this part of the precinct should be modelled as a separate zone in the STFM modelling such that the specific impacts of the subject site under BHL ownership can be assessed specifically through select link analysis).

[1] It is noted that the yields are the best and most realistic estimates at the time of preparing this version of the ILP and will continue to evolve as the ILP develops. Updates to the yield post and modelling of the maximum development potential will occur post gateway.

3.0 Key strategic modelling assumptions

3.1 Modelling year

All previous traffic modelling and assessments relating to LCM and SCW Precinct 5 were undertaken for the future years of 2021, 2026, 2031, 2036 and 2041.

For the purpose of ongoing traffic modelling and assessments for the SCW Precinct 5 planning proposal, the STFM modelling should be undertaken for the year 2036 and 2041 (weekday AM and PM peaks) to provide an understanding of the interim and full development implications of the proposed development on the surrounding road network.

3.2 Modelling study area

The modelling area for the SCW Precinct 5 planning proposal is defined as the precinct boundary of the ILP as shown in **Figure 1-2**.

3.3 Trip generation rates

Trip generation rates that were adopted for the *Lowes Creek Maryland Precinct Traffic, Transport and Access Assessment, 2018* (GHD), were agreed to be used for the previous SCW Precinct 5 traffic modelling and assessment for consistency purposes.

However, feedback and further discussions with TfNSW noted that:

1. TfNSW won't accept 0.65 trips for 'small lots medium density housing'. This rate is appropriate for Fonzie Flats or attached dwellings/townhouses.
2. TfNSW is open to accept a different trip generation rate to be applied for all detached dwellings which would require justification based on appropriate benchmarks or studies.
3. TfNSW recommends an internal containment rate to be applied for primary school (confirm if it is private or public as this would influence the rate) and local retail centre based on appropriate benchmarks or studies.
4. Proponent may consider applying a discount rate to the total traffic generation for **only work trips** to reflect working-from-home trend. TfNSW recommends considering the latest NSW Remote Working Insight Report for justification. The appropriate discount rate should reflect the likely future demographic profile of this precinct and would be subject to TfNSW's discretion.

3.3.1 Residential trip generation rates

The *Lowes Creek Maryland Precinct Traffic, Transport and Access Assessment, 2018* (GHD), that was prepared to support the rezoned LCM Precinct adopted residential trip generation rates of 0.95 and 0.99 trips per dwelling for low density dwellings. As a result of further development of the ILP of Precinct 5 and market trends, it proposes a mix of housing products including smaller lots medium housing such as Fonzie Flats or attached dwellings/townhouses together with the more traditional detached dwellings.

Hence, TfNSW proposed a single trip generation rate to be used for all types of residential dwellings proposed in Precinct 5. SCT Consulting has considered selected surveyed sites (instead of the average of all surveyed sites) presented in *TD 13-04a*, that has more similar characteristics to Precinct 5 such as size and population of the precinct, inclusion of centres and services to support the local area and accessibility to public transport. Of the surveyed sites, Site 3 (North Epping), Site 5 (West Hoxton) and Site 6 (Westleigh) are considered to have similar characteristics to Precinct 5 and hence the surveyed peak hour trip rates of these 3 locations were averaged and used for trip generation of all residential dwellings of Precinct 5.

Table 3-1 Residential trip generation rates

Surveyed site	Site 3 (North Epping)	Site 5 (West Hoxton)	Site 6 (Westleigh)	Average
Surveyed peak hour vehicle trip rate (trips per dwelling)	0.59	1.32	0.71	0.87

3.3.2 Non-residential trip generation rates

As suggested by TfNSW's feedback in letter dated 17 August 2022, additional research and analysis has been undertaken to determine trip rates for retail uses based on the *2018 RMS Trip Generation Surveys Small Shopping Centres Analysis Report*.

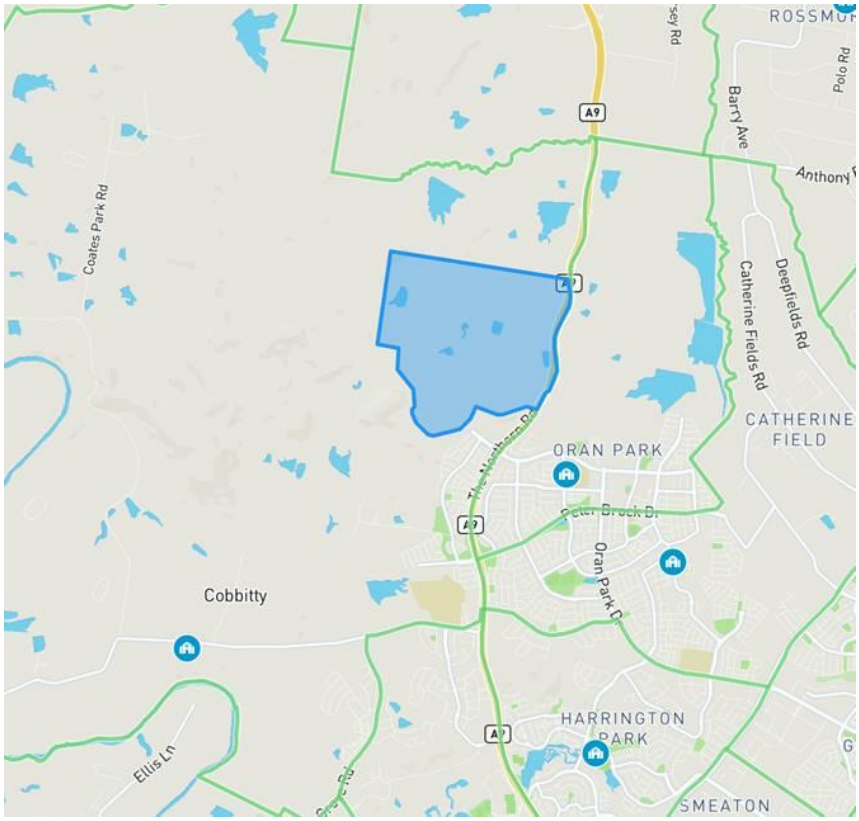
For sites between 2,000 and 10,000 m^2 GLFA, the AM and PM peak hour trip rates should be 7.76 and 10.41 / 100 m^2 GLFA.

3.3.3 Trip containment

TfNSW acknowledged that internal containment rate should be applied for the proposed public primary school and the local retail centre.

SCT Consulting is currently undertaking a Rapid Transport Assessment for the proposed 1,000-student (capped) public school in Precinct 5. Consultation with SINSW has confirmed that the potential school catchment as shown in **Figure 3-1**. The school intake area is bounded by the southern, western and eastern extent of Precinct 5 and Maryland Link Road No 2 as the northern extent which encompasses Precinct 5 and a small portion of the southern extent of the LCM precinct to the south of Maryland Link Road No 2.

Figure 3-1 Precinct 5 (part – BHL ownership) Indicative Layout Plan



Source: SINSW, 2022

Based on the school catchment almost exactly the same as the Precinct 5 boundary, it is expected that the majority of the future students attending the public school will be living within Precinct 5. This is validated through every surrounding residential precinct has schools planned in them such as Cobbitty, Lowes Creek Maryland and Oran Park. The majority of students would be within 800m of the future public school and hence it is expected they will be walking, cycling and catching buses to travel to bus based on the active and public transport network planned within Precinct 5.

Even if a small amount of students were to be driven to school, those vehicle trips would not be expected to be crossing The Northern Road (external to the precinct). Hence the vehicular trip containment for this public school within Precinct 5 is expected to be very high. We are only expecting the teachers may be driving to and from external of the precinct.

Based on a typical student-to-teacher ratio of 15.6 for public primary school, we expect there could be 60-70 staffs for the school in Precinct 5. Using a trip rate of 0.67 per student in the AM peak according to Table 4-3 of the *RMS Trip Generation Surveys, Schools Analysis Report 2014*, the 1000-student school could generate a total of 670 peak hour trips (internal and external). Therefore, we would propose that 10% of these trips would be generate by the teachers (67 trips) to and from external of the precinct and 10% of these trips would be generate by future students that may live outside of the school catchment area / external of the precinct.

Hence, we propose to apply an 80% trip containment factor to the AM school trips.

The retail GFA proposed in Precinct 5 has reduced to 7,500 m^2 to suit the reduced size of Precinct 5 and the site given the intent of this local centre is to support the local population. Hence the catchment of the local centre will also be targeted for Precinct 5 only. This is again validated through every surrounding residential precinct has centres planned in them such as Cobbitty, Lowes Creek Maryland as well as a regional centre in Oran Park.

Similar to the school discussion above regarding trip containment, it is expected that the majority of visitors of the local centre would be travelling to and from residential dwellings within the precinct, except staffs which may be travelling to and from external to the precinct. The Lowes Creek Maryland and the previous Precinct 5 Traffic Assessment Reports hence assumed 100% internal trip containment.

Hence, we propose to apply a 50% trip containment factor to the AM and PM retail trips.

3.3.4 Trip generation discount for commuter trips to reflect working-from-home trend

According to *NSW Remote Working Insights 2 Why hybrid is here to stay and how to seize the opportunities (November 2021)*, it is forecast that 30% of total work will be done remotely which would have an implication of work-related travel patterns. For peak hour travel and trip generation rates, not all trips are work-related and according to the latest household travel surveys only 17% of trips are work-related. Hence, as an estimate, we propose to apply a 5% trip reduction (30% x 17%) to the residential trips expected to be generated in Precinct 5 to account for discount for commuter trips to reflect working-from-home trend.

3.3.5 Trip generation summary

The revised traffic generation rates and total (internal and external) traffic generation for each of the proposed land use in Precinct 5 are shown in **Table 3-2**.

It is noted that the primary school and residential land uses are destinations while residential land uses are an origin in the morning peak.

The land use and trip generation assumptions for 2036 modelling should be 70% of the proposal at full development.

Table 3-2 Total traffic generation for Precinct 5 (part with BHL ownership)

Proposed land use	AM peak hour (In / Out proportion)	PM peak hour (In / Out proportion)	Trip generation rate source	Yield	AM (1-hour) Peak total trips	PM total (1-hour) Peak total trips	Trip reduction / trip containment factor	AM (1-hour) Peak external trips	PM (1-hour) Peak external trips
Residential	0.87 / dwelling (20% / 80%)	0.87 / dwelling (80% / 20%)	Guide to Traffic Generating Developments - Updated traffic surveys (TDT 2013/04a	2,596 dwellings	2,259	2,259	0.05	2,143	2,143
Non-residential including a supermarket and specialty retail	7.76 per 100 m^2 GLFA (50% / 50%)	10.41 / 100 m^2 GLFA (50% / 50%)	Page 11 of the 2018 RMS Trip Generation Surveys Small Shopping Centres Analysis Report	7,500 m^2 GLFA	582	781	0.5	291	390
Primary school	0.67 / student (60% / 40%)	0 / student	Table 4-3 of the RMS Trip Generation Surveys, Schools Analysis Report 2014	1,000 students	670	0	0.8	134	0
				Total trip generation	**3,511**	**3,039**	**-**	**2,568**	**2,534**

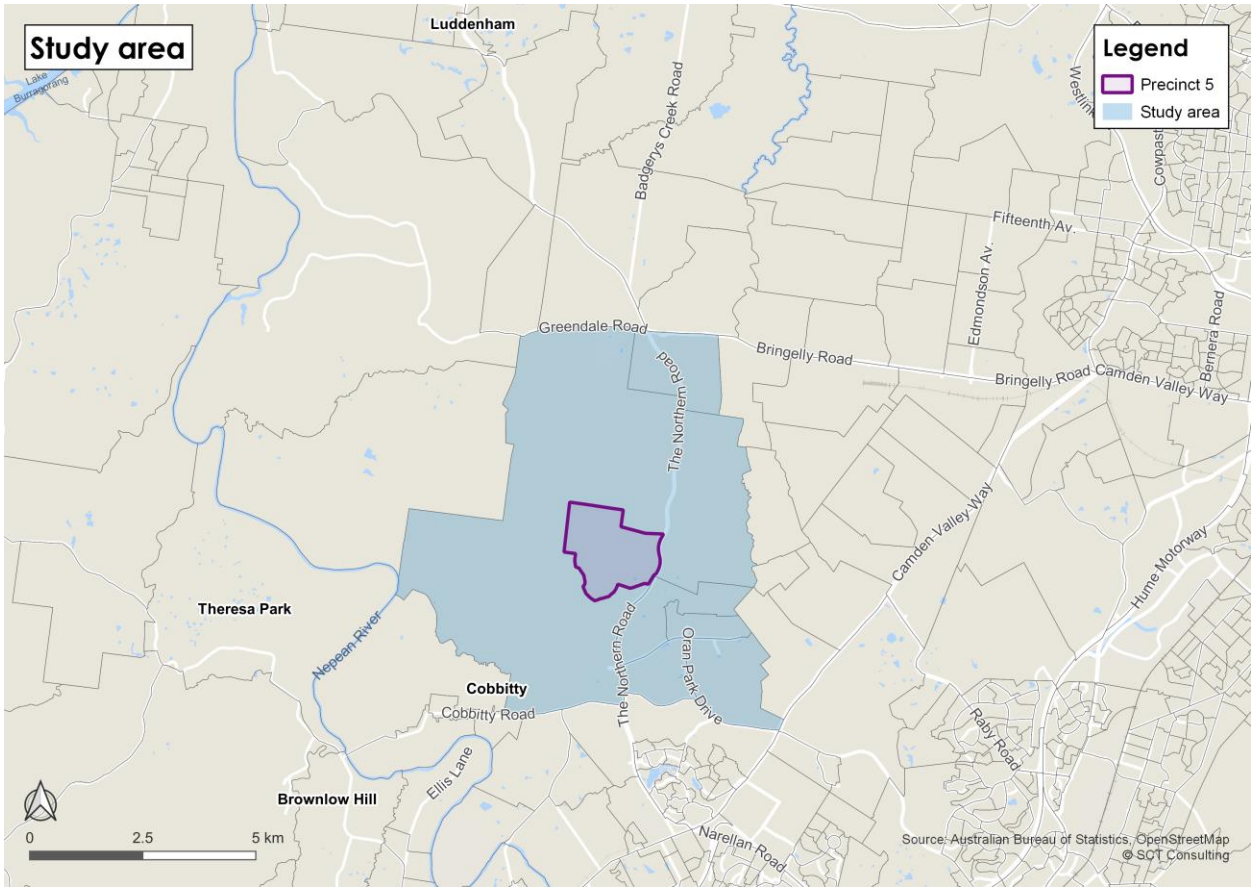
3.4 Trip Distribution

The adopted distribution pattern within STFM modelling would be used. Future discussion of any updates to the trip distribution rate can be considered in Stage 2.

3.5 Mode share

2016 Method of Journey to Work (JTW) data from relevant statistical areas level one including Oran Park were analysed to determine the travel behaviour of the existing residents in the vicinity of the site as shown in **Figure 3–2**.

Figure 3–2 Study area for the method of JTW analysis



At the time of the JTW data being collected in 2016, about 2,862 trip samples were included in the survey for the area. According to the Australian Bureau of Statistics, people in employment are those of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit.

The study area showed a higher proportion of drivers, 72 per cent, in comparison to the 53 per cent of Greater Sydney, showing a high dependency on private car use. Train and bus usage was low at nine per cent given the commuting time to jobs by public transport, whereas Greater Sydney showed a total of 22 per cent.

Active transport use was very low, i.e. zero per cent for cycling and one per cent for walking, given limited employment opportunities in the vicinity and the gap in cycling infrastructure provision to connect to the regional network. Around 20 per cent of the samples were working at home or other transport modes.

Of the 24,386 people who work in Camden Council Area, a large majority of workers (48 per cent) live in Camden LGA, followed by Campbelltown (17 per cent) and Wollondilly (14 per cent). Smaller origins include Liverpool (five per cent), and other origins across the Greater Sydney region each generating less than two per cent of work-related trips to Camden.

Around 30 per cent of the residents worked in the same Camden LGA followed by Campbelltown (16 per cent) and Liverpool (11 per cent). Other destinations for work-related trips were all below five per cent except the City of

Sydney (seven per cent). Hence, the medium-long commuting distance to major employment tallies with the fact of high car use, which is relatively convenient and cost-effective in the transport context.

It is expected that future travel private car uses of SCW Precinct 5 could be lower with the introduction of metro services in the vicinity of Precinct 5 supported by good and frequent bus services to connect to future metro stations. Therefore, a mode shift towards more sustainable targets would be considered beneficial and the development of the precinct must include measures to assist in achieving these targets. However, for the purpose of traffic modelling, the potential mode shifts would not be considered in the strategic modelling and hence the agreed trip generation rates would not be further reduced to account for the target mode shares. This is considered to be a conservative assessment and would lower the risk that any required network capacity upgrades would be insufficient.

3.6 Network/access assumptions

We have assumed that the STFM models would have the latest network configurations (confidential) assumed by TfNSW according to the latest planning assumptions to support the land use changes in Western Parkland City up to the year 2041.

The Lowes Creek Maryland ILP identified a road network structure that extended beyond the precinct that could be extended further south towards the Oran Park precinct. The Precinct 5 ILP proposes to continue these north-south connections as they form legible alternatives to The Northern Road for travel between precincts as well as ensuring that vehicles can access the main intersections along The Northern Road.

The Northern Road upgrade has already identified several intersections that have recently been constructed along with the corridor interfacing with the South Creek West Land Release Area, so the main role of the Precinct 5 ILP is to connect effectively with these intersections with the right hierarchy roads.

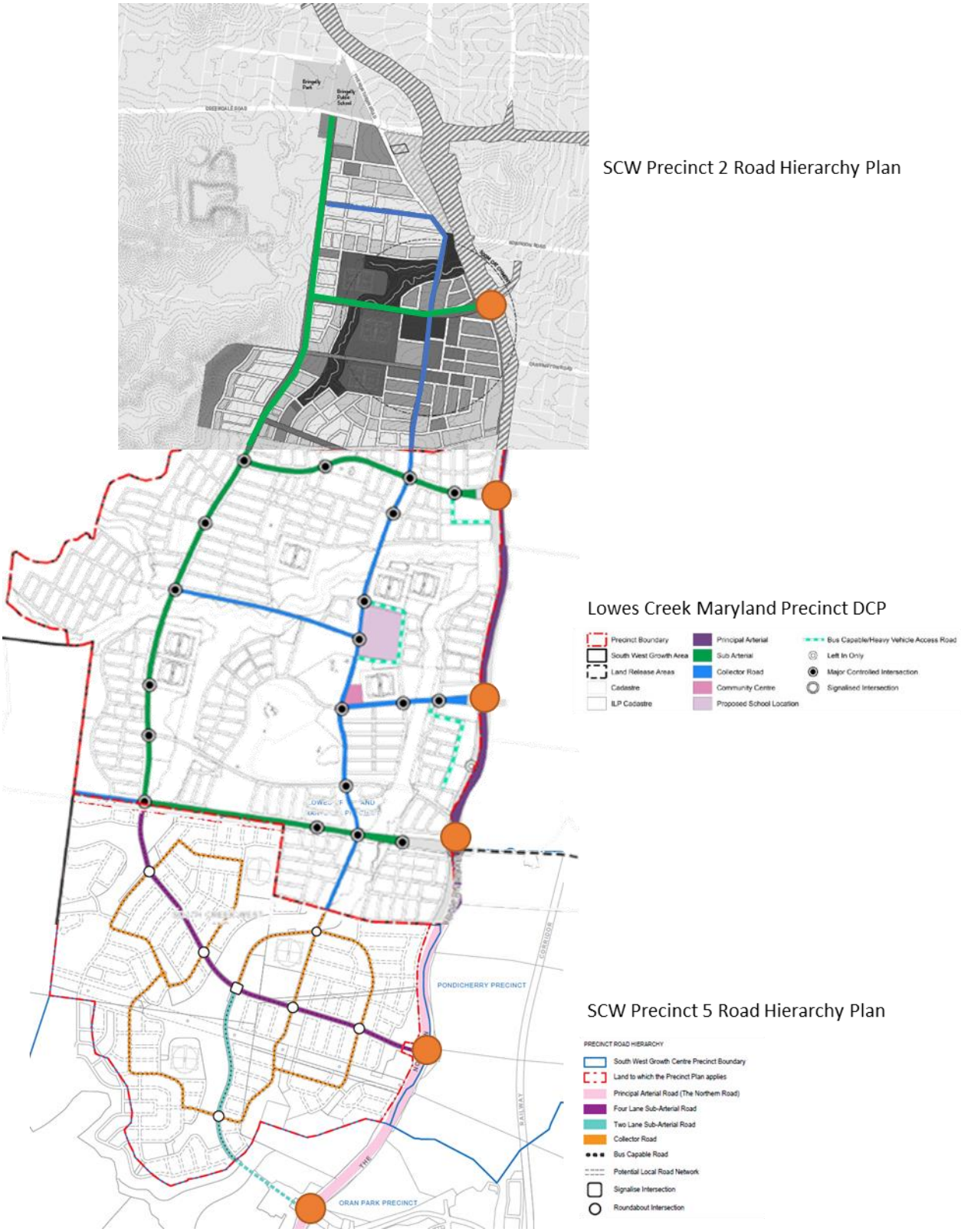
Key access and internal road network assumptions for SCW Precinct 5 as well as the LCM and SCW Precinct 2 are shown in **Figure 3–3**:

– A north-south (four-lane) sub-arterial road network within Precinct 5 that connects from Precinct 2 at Greendale Road through Lowes Creek Maryland precinct and to Oran Park and provides an alternative to The Northern Road between Bringelly Road and Maryland Link Road 1

– A 2-lane sub-arterial as a branch from the north-south sub-arterial road to provide a connection to Dick Johnson Drive

– A network of collector roads that provide connections between the sub-arterial roads and the local road network.

Figure 3–3 Development accesses and internal road network assumptions



3.7 STFM modelling scenarios

The following modelling scenarios are proposed for TfNSW to run and provide results and outputs, as summarised in **Table 3-3**.

Table 3-3 STFM modelling scenario for Precinct 5 (part with BHL ownership)

Modelling scenario	TfNSW base case network assumptions	Land Use Assumptions			
		TfNSW base case land use assumptions	LCM Precinct (Rezoned)	Precinct 5 in BHL ownership (subject precinct)	Precinct 2 (precinct subject to separate Planning Proposal)
#1 – 2041 Base Case	✓	✓	✓		
#2 – 2041 Base Case + Precinct 5	✓	✓	✓	✓	
#3 – 2041 Base Case + Precinct 5 and Precinct 2 (cumulative)	✓	✓	✓	✓	✓
#4 – 2036 Base Case	✓	✓	✓		
#5 – 2036 Base Case + Precinct 5	✓	✓	✓	✓ (70% of Precinct 5 development)	
#6 – 2036 Base Case + Precinct 5 and Precinct 2 (cumulative)	✓	✓	✓	✓ (70% of Precinct 5 development)	✓ (Partial Precinct 2 development)

The purpose of each of the scenarios is as follows:

– Scenarios #1 and #4 provide a land use and transport baseline to assess the net impacts of the proposed land use changes of Precinct 5 (in BHL ownership). Hence the land use of SCW Precinct should include the approved residential and employment targets in the DPE forecasts minus those in Precinct 5 (in BHL ownership).

– Scenarios #2 and #5 when compared with Scenarios #1 and #4 respectively would specifically evaluate the impacts of the proposed land use change of Precinct 5 (in BHL ownership).

– Scenarios #3 and #6 were specifically requested by TfNSW in an email dated 1 December 2022 that the impacts of the proposed land use change of Precinct 2 are to be considered in cumulative to the impacts of Precinct 5.

The specific land use assumptions as presented above will be reviewed (in consultation with TfNSW) upon commencement of the modelling exercise, to confirm the scenarios are set up properly to assess the impacts of Precinct 5 only (for the purpose of the planning proposal).

The zone structure of the STFM modelling in the study area will also be reviewed (in consultation with TfNSW) upon commencement of the modelling exercise, to reflect realistic trip distribution between the development and the surrounding road network.

3.8 STFM modelling outputs

TfNSW will provide the following data such that SCT Consulting can undertake a general impact assessment on network capacity and key intersections for the Stage 1 Traffic Assessment:

– Select link analysis based on BHL Group site (all vehicles)

– 2-hour traffic volume plots (all vehicles, AM and PM Peak)

– Volume over capacity rate (VCR) plot (all vehicles, AM and PM Peak)

– 2-hour capacity.

A review of the STFM modelling outputs provided by TfNSW dated 23 November 2022 and a subsequent meeting with TfNSW dated 1 December 2022, confirmed that TfNSW has only provided modelling outputs for Scenarios #1 and #4 (due to limited resources of TfNSW to prepare detailed land use and network changes required for all other modelling scenarios).

Hence it was agreed with TfNSW that subsequent spreadsheet analysis can be initially used to understand impacts on the external road network to support pre-Gateway. SCT Consulting will prepare additional trip generation of Precinct 5 (and also in cumulative with Precinct 2) and mid-block capacity analysis will be undertaken for The Northern Road to undertake a high-level assessment of strategic network impacts.

Attachment 2: TfNSW approval of two-staged modelling approach

From:	Alan Chen
To:	Andy Yung; Jonathan Busch; Simon Wilkes; Brigitte Bradley
Subject:	TfNSW - Stage 1 Preliminary Analysis - Precinct 5 - BHL Group site
Date:	Monday, 24 October 2022 4:29:31 PM
Attachments:	image001.png image004.png image003.png STFM(EMME)_Data__agreement_latest.doc

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Hi all,

This email contains the key points of our discussion and actions. Please forward this to Simon Burk as I do not have his contact.

Andy/Jonathan, please confirm if there are any other matters which we need to discuss and action. There are a number of working parts here. Key first steps are as bolded for both TfNSW and SCT.

- TfNSW accepts a Stage 1 Preliminary Traffic and Transport Analysis by utilising TfNSW EMME modelling. TfNSW confirms that further detailed traffic modelling to be discussed at post-Gateway stage.

- **TfNSW to confirm on STFM data regarding latest land use assumptions (TZP 19 or 22?)**
- **SCT to refer and sign the attached confidentiality agreement and return to TfNSW to process STFM request; and provide updated trip generation rates to TfNSW (subject to agreement) as inputs for STFM.**

- Trip Generation:
    - TfNSW won't accept 0.65 trips for 'small lots medium density housing'. This rate is appropriate for Fonzie Flats or attached dwellings/townhouses.
    - TfNSW is open to accept a different trip generation rate to be applied for all detached dwellings which would require justification based on appropriate benchmarks or studies.
    - TfNSW recommends an internal containment rate to be applied for primary school (confirm if it is private or public as this would influence the rate) and local retail centre based on appropriate benchmarks or studies.
    - Proponent may consider applying a discount rate to the total traffic generation for **only work trips** to reflect working-from-home trend. TfNSW recommends considering the latest NSW Remote Working Insight Report for justification. The appropriate discount rate should reflect the likely future demographic profile of this precinct and would be subject to TfNSW's discretion.
- Trip Distribution:
    - The adopted distribution pattern within EMME modelling would be used. Future discussion of any updates to the trip distribution rate can be considered in Stage 2.
- Scenarios:
    - TfNSW accepts in-principle the suggested modelling scenario and development take up rate. Full confirmation to be provided subject to internal STFM discussion.
- TfNSW to provide the following data:
    - Select link analysis based on BHL Group site (all vehicles)
    - 2-hour traffic volume volume plots (all vehicles, AM and PM Peak)
    - Volume over capacity rate (VCR) plot (all vehicles, AM and PM Peak)
    - 2-hour capacity
- TfNSW requests proponent to provide a general impact assessment on network capacity and key intersections (further discussions or clarifications can be had).

TfNSW notes that Council has requested proponent to remove the second landholding within Precinct 5 from consideration. TfNSW accepts a high level assessment of BHL's site for Stage 1. However, a cumulative impact assessment of Precinct 5 in its entirety would be expected in Stage 2 Detailed Assessment.

- Internal road network: TfNSW strongly recommends considering implementing the principles and design standards in *Movement and Place Framework (Network Planning in Precincts)* and *Western Sydney Street Design Guidelines*.

Regards,

Alan Chen
Land Use Planner
Planning & Programs
Greater Sydney
Transport for NSW
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Level 5, 27 Argyle Street
Parramatta NSW 2150
I work flexibly. Unless it suits you, I don't expect you to read or respond to my emails outside of your normal work hours.
Working days Monday to Friday

Transport for NSW

I acknowledge the Aboriginal people of the country on which I work, their traditions, culture and a shared history and identity. I also pay my respects to Elders past and present and recognise the continued connection to country.
Please consider the environment before printing this email.