

Our Ref 8201819401-016-100
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30/05/2019

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Dear Sarah,

Calderwood Urban Development Project (CUDP) Concept Plan

MP 09_0082 MOD 4

Lendlease is the developer of the majority of the Calderwood Urban Development Project (CUDP), controlling about 600 ha out of a total site area of 700 ha. The CUDP Concept Plan was approved on 8 December 2010 by the Minister for Planning. A mix of residential, employment, retail, education, conservation and open space uses were subsequently approved. Lendlease has commenced the development of its component, and will continue to develop the project in stages over 15-20 years.

Lendlease recently submitted a Proposed Modification (Calderwood Concept Plan MP 09_0082 MOD 4) of the Approved Concept Plan to increase the residential development yield from 4,800 to 6,500. A traffic and transport report (T&TR) in August 2018 was prepared to directly respond to the Secretary's Environmental Assessment Requirements (SEARs) requirements. The T&TR was put on exhibition allowing stakeholders to comment.

Detailed submissions in relation to the Proposed Modification have now been received from Wollongong City Council, Shellharbour City Council, Transport for NSW, Roads and Maritime Services and other stakeholders.

Lendlease modified the indicative layout plan (ILP) in March 2019. The revised layout proposes modification of development yield from 4,800 to 6,000 dwellings. This is 500 dwellings less than previously proposed in the Calderwood Concept Plan MP 09_0082 MOD 4 submission.

This cover letter includes Lendlease's response to stakeholder comments received from the Calderwood Concept Plan MP 09_0082 MOD 4 submission. The responses in this cover letter reference the Calderwood Urban Development Project Town Centre Yield Review – Updated 6,000 Dwellings report (to be referred to as the updated Traffic and Transport Report (T&TR)) accompanying this cover letter.

The traffic and transport analysis identified that the traffic and transport impacts associated with the revised development yield are acceptable. Localised measures are proposed to mitigate these impacts where necessary as documented in more detail in the updated Traffic and Transport Report.

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0.0	Department of Planning and Environment	
0.1	<p>Please address the issues raised by Councils and agencies regarding traffic modelling, assumptions, road upgrades and indicative road designs and demonstrate the proposal would not result in adverse traffic impacts.</p>	<p>The updated traffic and transport report seeks to address the SEARS requirements and the comments raised by stakeholders from the MOD 4 submission. The key findings of the updated T&TR are that additional upgrades to those recommended in the TMAP (2010) would be required - as assessed in the revised yield scenario (6,000 dwellings):</p> <ul style="list-style-type: none"> • Upgrade Tripoli Way / Calderwood intersection from roundabout to traffic signals • Upgrade Illawarra Highway / Broughton Avenue intersection from roundabout to traffic signals • Change the configuration of the Escarpment Drive / Marshall Mount Road intersection to give priority to Escarpment Drive traffic (Option B) • No change to Calderwood Road, east of the proposed Town Centre, to Tripoli Way (i.e. 2 lane profile, one lane in each direction).
0.2	<p>Concerns are raised whether the proposed road and infrastructure upgrades can be accommodated within the existing road reserve corridor.</p> <p>Please provide concept designs for the proposed road and intersection upgrades to demonstrate the upgrades are consistent with relevant policies, including:</p> <ul style="list-style-type: none"> ▪ Guidelines for Public Transport Capable Infrastructure in Greenfield Sites (TfNSW, 2018) ▪ RTA Traffic Signal Design Guidelines ▪ Austroads Guide to Road Design 	<p>Concept designs of the proposed upgrade (listed above) are included in the updated T&TR (Appendix E).</p> <p>The upgrades have been designed in accordance with "Guidelines for Public Transport Capable Infrastructure in Greenfield Sites (TfNSW, 2018)" and "Austroads Guide to Road Design: Part 3 Geometric Road Design". Only the horizontal alignment has been designed at this stage. This includes:</p> <ul style="list-style-type: none"> • Kerb side lane (centre travel lane) = 3.5m • Shoulder = 3m with line marked bus stopping areas • Bus stop spacing = around 400m • Typical cross section requirements • Horizontal curve length and radius requirements • Bus stopping area requirements • Cyclist use requirements • Considering design speed of 70km/h and posted of 60km/h <p>Traffic signal design would be subject to the detailed design stage.</p>

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0.3	Please consider providing a shared path on both sides of the north-south sub-arterial road through the CUDP to improve pedestrian and bicycle connectivity.	<p>The shared path on the eastern side of Escarpment Drive is proposed for consistency with the current approved layout which is built and already in place, south of Calderwood Road. Having a pedestrian footpath on one side and a shared path on the opposite side is considered appropriate and sufficient for this location. It provides pedestrians the choice to walk on one side to the road or the other, and helps clearly direct cyclists to the designated shared path route and provides a safe pedestrian only route.</p> <p>Having a shared path on the western side of the north-south sub-arterial (Escarpment Drive) would result in cyclists travelling south along this corridor having to cross the road at the intersection with Calderwood Road, given there is no shared path on the western side of the road past this point. Having shared paths that don't follow logical routes and force cyclists to do multiple crossings generates safety risks for all users, especially more vulnerable groups such as children riding to/from school.</p>
0.4	Please demonstrate future roads intended for bus services are consistent with Section 4.1 of the Guidelines for Public Transport Capable Infrastructure in Greenfield Sites (TfNSW, 2018).	The proposed internal road network with bus services are generally consistent with the TfNSW 2018 guidelines. Localised widening of the parking lane (from 2.5m lane to a 3.0m lane) is proposed at bus stop locations.
1.0	Roads and Maritime Services	
1.1	Intersection Upgrade Works: RMS notes that the above Traffic Assessment and associated modelling indicate upgrade works will be required at the intersections of the Illawarra Highway/Broughton Avenue and Calderwood Road/Tripoli Way. Both intersections to be upgraded to signals. RMS also notes that minimal detail on these proposed upgrade works has been provided as part of this current application. RMS requires a greater level of detail in relation to the design of the proposed intersection upgrade works (i.e. a strategic/concept design). This information is required so as to demonstrate that a compliant design can be constructed within land available/within the legally defined road reserve boundaries and to allow RMS to undertake a preliminary assessment of the works proposed.	Concept design of the upgrades to Broughton Ave / Illawarra Hwy and Calderwood Rd / Tripoli Way intersections are presented in the updated T&TR.
1.2	Illawarra Highway / Escarpment Drive Intersection: RMS notes that the assessment provided as part of this modification does not propose to change the existing intersection treatment of a roundabout at the Illawarra Highway/Escarpment Drive	The model assessment performed as part of the study RMS is referring to was based on a different modelling approach and infrastructure, residential and employment land use forecasts at the time. It has been superseded by the current (as of November 2018)

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	<p>intersection as a consequence of the increased densities that are being proposed. While RMS notes the trip containment estimates provided it is also noted that modelling that has been undertaken for the Tullimbar development to the south of the Illawarra Highway shows that by 2026 the intersection of Illawarra Highway/Escarpment Drive/Yellow Rock Road is failing (i.e. intersection is shown to be overcapacity and oversaturated, operating at a level of service of F in the peak periods). Noting that the proposed intensification of development as is currently proposed is contributing to the need to upgrade the existing intersection of Illawarra Highway/Escarpment Drive/Yellow Rock Road. Should works be need RMS requires details of the works including the provision of strategic/concept design plans as detailed in the dot point above to ensure that a compliant design can be constructed within land available/within the legally defined road reserve boundaries and/or identify what additional land is required</p>	<p>Tullimbar development site plans, which now includes access via Church Street. The model approach and assessment was updated, and the results indicated the Illawarra Highway / Escarpment Drive and Tongarra Road / Broughton Ave intersections would operate satisfactorily with a LOS B or better during the 2026 AM and PM peak.</p> <p>The model assessments performed as part of the yield review and the latest Tullimbar development report, both indicate no further upgrades are required to the intersection (noting the Escarpment Drive intersection has been recently upgraded to a four-arm roundabout).</p>
2.0	Transport for NSW	
2.1	<p>The existing further assessment requirement C6: 'The 'Bus Service' map in Appendix L of the PPR is indicative only. The bus routes shall be determined in consultation with Transport NSW and bus service providers.' should be retained and revised to reflect the latest indicative bus routes proposed by the Applicant. Given that the new roads and subdivisions would be delivered through staged project applications, the Applicant should consult with the local bus operator regarding potential routes and bus stops as part of the design development for subsequent stages. It should be noted that the final bus network would be dependent on demand, funding availability and the relevant stage of development. The Applicant has been previously advised that TfNSW currently cannot commit to funding or timing of specific bus network enhancements.</p>	<p>Consultation with the local bus operator and TfNSW will be performed for each subsequent stage of the project.</p>
3.0	Wollongong City Council	

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3.1	<p>It is difficult to understand the inclusions of the updated Cardno 2036 Tracks models as there are no model network plots or land use zone tables attached to the report. This is especially so for the modelling done to assess the impacts of the proposed yield increase in the 'ultimate' West Dapto development scenario (section 4.3.4 of the report). This clarity should be provided.</p>	<p>The CUDP land use assumptions adopted for the model assessment in the updated T&TR is documented in Table 4-1. Further detail is provided below.</p> <table><tr><th>Land use</th><th>2036 CUDP Proposed Modification</th></tr><tr><td>Residential</td><td>6,000 dwellings</td></tr><tr><td>Town centre – retail (GFA) – 20,000 sqm</td><td>600 jobs</td></tr><tr><td>Town centre – other (GFA) – 20,000 sqm</td><td>400 jobs</td></tr><tr><td>Neighbourhood centre – retail (GFA) – 5,000 sqm</td><td>150 jobs</td></tr><tr><td>Neighbourhood centre – other (GFA) – 1,000 sqm</td><td>20 jobs</td></tr><tr><td>2 Public Primary Schools (2,000 students total)</td><td>200 jobs</td></tr><tr><td>1 Public High School (2,000 students)</td><td>200 jobs</td></tr><tr><td>Community centre</td><td>40 jobs</td></tr><tr><td>Town centre – additional retail (GFA) – 5,000 sqm</td><td>150 jobs</td></tr><tr><td>Aged care</td><td>60 jobs</td></tr><tr><td>Retirement living</td><td>80 jobs</td></tr><tr><td>Construction work (civil works and building)</td><td>180 jobs</td></tr></table> <p>The non-CUDP land use is presented in Table 1-2 and is inherited from the APRB TRACKS model provided by RMS. The background and reasoning behind using these updated models are discussed in further detail in Section 1.4.3 and Section 4.1.2 of the updated T&TR.</p>	Land use	2036 CUDP Proposed Modification	Residential	6,000 dwellings	Town centre – retail (GFA) – 20,000 sqm	600 jobs	Town centre – other (GFA) – 20,000 sqm	400 jobs	Neighbourhood centre – retail (GFA) – 5,000 sqm	150 jobs	Neighbourhood centre – other (GFA) – 1,000 sqm	20 jobs	2 Public Primary Schools (2,000 students total)	200 jobs	1 Public High School (2,000 students)	200 jobs	Community centre	40 jobs	Town centre – additional retail (GFA) – 5,000 sqm	150 jobs	Aged care	60 jobs	Retirement living	80 jobs	Construction work (civil works and building)	180 jobs
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3.2	<p>It is noted that Cardno recommends changing the 2010 TMAP arrangements for the road connection from Calderwood Urban Development Project (CUDP) to the Wollongong Council area (Marshall Mount). Whilst it is acknowledged that the recommended T-intersections would provide priority for the Escarpment Drive/Marshall Mount Road traffic, it appears the two proposed intersections are</p>	<p>Cardno assessed two (2) options for the proposed Escarpment Drive / Marshall Mount Road intersections using the operational microsimulation traffic model. The intersection performance of the preferred design (Option B – separate T-intersections) indicate <u>both</u> intersections would operate satisfactorily (and there would be no operational issues) with a LOS B during the AM and PM peak hour in the 2036 CUDP Proposed Modification</p>																										

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	<p>closely spaced and there may be operational issues under the ultimate development scenario. The Cardno/WCC agreed ultimate development Tracks modelling that was used to inform VPA negotiations shows a daily volume of 27,500vpd on Marshall Mount Rd/Escarpment Dr at this location. At this volume level, it is likely there would be interactions between the two intersections (queuing etc.) and consideration should be given to performance of the recommended arrangements under these demands to ensure satisfactory long-term operations.</p>	<p>scenario. Furthermore, the average queue length results (<5 vehicles) indicate queueing from the approaches of either intersection are not at risk of impacting each other.</p> <p>Escarpment Drive and Marshall Mount Road (east) will carry the highest volume and thus should take priority over Marshall Mount Road (west).</p> <p>This assessment is detailed in Section 4.2.3.2.2 of the updated T&TR.</p>
3.3	<p>Section 4.3.4 states 6000 dwellings were modelled for CUDP as part of the VPA work. Assumptions modelled by Council for the Lend Lease development area were 4,800 dwellings, and 7,700 for the whole Calderwood Valley. Council recommends the Department seek clarification of what was modelled for Cardno's analysis in section 4.3.4. No details of model inclusions (land use zone tables etc.) are provided.</p>	<p>The Calderwood Voluntary Planning Agreement (VPA) with Wollongong City Council outlines contribution amounts for road upgrades in the local area. For the purposes of the modelling done as part of the VPA discussions, the CUDP yield was assumed to be 6,000 dwellings.</p> <p>The Calderwood Voluntary Planning Agreement (VPA) executed with Wollongong City Council and Lendlease Communities on 13 December 2017 refers to contributions for up to 6,000 allotments (see Schedule 4 of the VPA).</p> <p>In the previous version of the traffic and transport report, some commentary and analysis was included in Section 4.3.4 to compare the traffic impacts between the scenario modelled at the time (6,500 dwellings) and the scenario adopted in the VPA work (6,000 dwellings). The yield has since been revised to 6,000 dwellings (consistent with the scenario modelled for the VPA) and therefore, the comparison is no longer required.</p>
3.4	<p>There is minimal explanation provided in Section 4.3.4 regarding modelling done to determine impacts at ultimate development. The peak period volume differences shown in Table 4-8 do not show the percentage increase in Calderwood traffic on Yallah Marshall Mount roads, only numerical increases. There is no LOS analysis documented for this assessment – the “relatively minor” increase in volumes may push LOS into an unacceptable category, requiring infrastructure upgrades to address. When considered as percentage, it is found that there are notable increases, for example, Marshall Mount Road (west) of +8%. Further information should be provided regarding the impact of this change on road infrastructure requirements.</p>	<p>See above - This is no longer applicable given Lendlease has revised the yield review to 6,000 dwellings.</p>

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3.5	The 2010 TMAP included a 10% shift away from private car. It is unclear if the updated 2036 modelling undertaken by Cardno for MOD4 retains this mode shift as the report does not give any details. The applicant should also clarify what mode shift was included for West Dapto development at 2036. If it is 15%, then it is likely underestimating traffic generation, as the 15% mode shift target is long term and based on the final development scenario for West Dapto (circa 2060).	Cardno's approach to the model assessment includes adopting the APRB TRACKS model. Trip generation rates including mode shift, are inherent to the model. Any mode shift % incorporated in the trip generation rate is therefore consistent with previous and other modelling assessments that are based on the outputs of the APRB model and its parent – WOLSH TRACKS model. These include West Dapto, Tallawarra, CUDP (2010), Tullimbar, and has informed infrastructure such as Albion Park Rail Bypass and even S94 contributions plans. It is important to note that mode shares for different transport modes are not coded into the model. Based on land use and transport infrastructure assumptions, the model helps forecast transport demands at a strategic level.
3.6	The proposed road types B1, B2, C2, D1, D3 (major/minor collectors & village centre roads with bus services) in Table 4-10 have parking lanes of 2.5m width. TfNSW "Guidelines for Public Transport Capable Infrastructure in Greenfield Sites" specify a minimum parking lane width of 3m to allow for bus stops and to allow the bus to move out of the through lane.	Localised widening of the parking lane (from 2.5m lane to a 3.0m lane) is proposed at bus stop locations and reflected in the updated T&TR.
3.7	Proposed Penrose Station – the reference to this station in 4.6.6, included as part of the Long Term Public Transport Plan Figure 4-28 of the Cardno EAR report is incorrect. The concept of a station at this location was abandoned in 2008 following feedback from RailCorp/Transport for NSW and through Council planning which recognised the constraints to delivering efficient land use outcomes around a station at this location. It is not reflected in any of Council's current planning documents pertaining to West Dapto, including the draft West Dapto Vision & Structure Plan (2018). The long term bus strategy shown in Fig 4-27 would therefore need to be modified, however ultimately this is subject to planning/negotiation with Transport for NSW. Council recommends the Department seek comment from Transport for NSW in that regard.	Reference to Penrose Station has been removed in the updated T&TR. The Strategic Bus Network is, as acknowledged by Council, ultimately subject to TfNSW and the local bus provider (Premier Illawarra). The Strategic Route is derived based on the 2036 design horizon and is proposed to align with the likely development locations in West Dapto, Huntely , Cleveland and Avondale.
3.8	It is noted that the modified street typology for CUDP (Table 4-10 in Cardno report) allows for a 2.5m shared path on a number of road types including Sub-Arterials and Type B3 (major collector adjacent rural lands). This change is supported as it will better allow for active transport connectivity and continuity between the West Dapto and Calderwood release areas. In order to further strengthen the attractiveness of this linkage and active transport in general, it is suggested that consideration be given to	Note Escarpment Drive is now built to Calderwood Road (approximately 55-60%) with the proposed street profile (2.5m share way to the east and 1.5m footpath to the west). Refer to discussion in Section 0.3 above.

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	<p>allowing for a shared path on both sides of the main north-south sub-arterial road through the CUDP. This would then provide seamless connectivity with West Dapto release area, as Marshall Mount Road is proposed to have a 2.5m wide shared path on both sides of the road. It is also noted that the verge widths for all Sub-Arterial roads as shown in Table 4-10 are capable of accommodating a shared path on both sides. In relation to Marshall Mount Road to the north-west of the CUDP, it is agreed that a shared path on one side only (i.e. as per Type B3) is appropriate given the rural lands on the west side of the road.</p>	
4.0	Shellharbour Council	
4.1	<p>The Traffic and Transport Report (T&TR) for Mod 4 uses land use projections for the TRACKS modelling which is consistent with the agreed residential and employment forecasts used in the Albion Park Rail Bypass – Addendum Traffic and Transport Assessment Report September 2017.</p> <p>It is noted that the T&TR is using vehicle trip generation rates that are consistent with those previously used by Cardno in their modelling for other stages in Calderwood. The T&TR indicates that an additional 1645 trips will be generated in the peak hour of which 1316 will be by vehicles. However, the actual trips generated in the AM and PM peaks is well below what is expected for an additional 1700 dwellings. Figure 4-10 and Figure 4-11 in the T&TR show that in the AM peak only an additional 525 vehicles are added to the external road network and in the PM peak only an additional 614 vehicles. This is in stark contrast to the Traffic Report submitted with the Stage 1 application (Cardno – 4 March 2010) which indicates that the proposed 442 dwellings would result in an additional 497 vehicles in the AM peak and 519 vehicles in the PM peak on the external road network. On that basis, more than half of the claimed vehicle trips are missing from the traffic modelling projections in the T&TR. The traffic modelling results appear erroneous and should be reviewed and rerun. One of the most questionable claims of the traffic modelling results shown in Figure 4-11 is that in the AM peak the proposed development of an additional 1700 dwellings will only result in an additional 40 vehicles using the M1, north of Fowlers Road Dapto which is roughly only 3% of the total trips generated. This is contrary to the, Census Journey to Work data provided in the Traffic Impact Assessment Report (Cardno 11 April 2017)</p>	<p>The trip estimations shown in Section 3.4 of the T&TR consists of an indicative calculation of the number of trips by mode based on historical data sources. It does not factor in the changes in land use, transport infrastructure and transport patterns planned for the region and how these can affect the above forecasts. This can only be investigated with transport modelling of future year scenarios. This is assessed in more detail in Section 4 of this report.</p> <p>The updated T&TR is based on updated residential and employment forecasts, which have significantly changed since the TMAP (2010) was approved. Cardno was given access to the APRB TRACKS model by Roads and Maritime, which contains the updated land use forecasts and infrastructure assumptions in the region.</p> <p>The updated T&TR assessment is based on identifying if additional upgrades to those recommended in the TMAP (2010) are required with the yield review.</p> <p>The Stage TIAs referred to in Council's submission are based on RMS trip generation rates, simplified trip distribution assumptions, static route assignment, linear growth rate assumptions and isolated SIDRA intersection modelling. Given how the updated T&TR assessment is based on a TRACKS and AIMSUN model that includes updated residential and employment land use forecasts, it is inappropriate to equate and compare the 'additional' trips (and their distributions) from the T&TR comparison, to simplified trip generation (and distributions) estimates presented in the Stage TIAs.</p> <p>The trip generation rates are inherent to the strategic models and Cardno have not (and cannot) change them.</p>

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	submitted with Calderwood Stage 3C which indicated that 40.2% of trips generated using the external road network should be using this section of the M1. Additionally, that report indicates 57.8% of external trips would use the Princes Highway south of Tongarra Road (or Albion Park Rail Bypass when completed) yet Figure 4-11 shows only an additional 34 vehicles using this route which represents again only about 3% of the total trips generated. These results question the credibility of the traffic modelling conducted for the T&TR.	<p>The APRB/WOLSH model and its inherent trip generation rate have been used for the planning of numerous developments including West Dapto, Tallawarra, CUDP, Tullimbar, and informed infrastructure such as Albion Park Rail Bypass and S94 contributions plans. It is important to note the provision of local employment at the proposed Town Centre within CUDP as part of the revised land use scheme (with 6,000 dwellings). Many of these jobs will be taken up by future residents of CUDP including additional dwellings proposed in the yield review. Most of the additional dwellings proposed in the latest ILP are located in close proximity (or within) the Town Centre, whereby local employment is provided. This results in an increased percentage of "internal trips". The strategic TRACKS modelling accounts for this and the result is that many of the additional dwellings proposed in the yield review are not generating additional peak hour trips to the external network because they are working within CUDP.</p> <p>Given how the updated T&TR includes the development of an operational model (AIMSUN), it is proposed that traffic assessments for each future stages of the project adopts the AIMSUN model for consistency. The other benefit of this approach is that the Aimsun model considers the impact of employment and dynamic trip assignment. For detailed intersection assessment, SIDRA can still be used to refine layouts and optimise traffic signal plans. Further detailed discussion is found in the updated T&TR (see sections 1.4.3 and 4.1.2).</p>
4.2	<p>The T&TR indicates that the only necessary network upgrades required are the provision of 4 travelling lanes on Calderwood Road and the installation of traffic signals at the intersection of Calderwood Road and Tripoli Way in place of a roundabout. Again, this is in stark contrast the Traffic Impact Assessment Report (Cardno 11 April 2017) submitted with Calderwood Stage 3C which identified that the intersection of Tongarra Road, Calderwood Road and Macquarie Street needed to be upgraded. The report draws the following conclusion.</p> <p>The Illawarra Highway / Calderwood Road / Macquarie Street will require optimisation of its existing phasing sequence and upgrades to the intersection configuration to accommodate the additional traffic generated by the CUDP Stage 3C development.</p>	<p>The updated T&TR is based on updated infrastructure, residential and employment land use forecasts using the APRB/WOSLH model to forecast future traffic volumes on the road network. It is an assessment based on strategic and operational traffic models with a dynamic traffic assignment method. The strategic models also consider the impact when employment opportunities are proposed within the CUDP and resulting increased percentage of ` lead to higher volumes given that a simplified trip distribution does not consider congestion on the road network, whereas a dynamic traffic assignment better reflects travel behaviour in 'busier' parts of the road network by reassignment of trips to less 'busier' roads.</p> <p>The Stage TIA assessments are therefore considered conservative when compared to the model assessment in the updated T&TR.</p> <p>It should be noted that the proposed modification to the development yield (to 6,000 dwellings) and corresponding traffic modelling indicated that the upgrade of Calderwood</p>

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		Road to a four lane cross section is no longer required. The volumes carried by this corridor in both peaks (2036 future year horizon) do not reach the thresholds defined in the RMS Guide to Traffic Generating Developments to justify an upgrade to four lanes. This is explained in more detail in Section 5.3 of the updated T&TR.
4.3	<p>T&TR also indicates that an upgrade of the Illawarra Highway, Yellow Rock and Escarpment Drive intersection is not required. Again, this is in stark contrast to Traffic Report (prepared by Cardno 12 July 2018) in support of a proposal for the development of an additional 275 lots in Tullimbar which indicated.</p> <p>By 2026 and with all the Tullimbar development in place, the intersections of Illawarra Highway / Yellow Rock Road and Tongarra Road / Broughton Avenue will fail. SIDRA results indicate that both intersections will be overcapacity and oversaturated, operating at a level of service of F in both peak periods.</p>	<p>The model assessment performed as part of the study referred to by Council was based on a different modelling approach - including different infrastructure, residential and employment land use forecasts at the time. It has been superseded by current (as of November 2018) Tullimbar development site plans, which now include access via Church Street as well as an updated approach to the model assessment.</p> <p>The model results indicate that the Illawarra Highway / Escarpment Drive and Tongarra Road / Broughton Ave intersections would operate satisfactorily with LOS A during the 2036 AM and PM peaks.</p> <p>The model assessment performed as part of the updated T&TR indicates no further upgrades are required to the intersection (noting the Escarpment Drive intersection has been recently upgraded to a four-arm roundabout).</p>
4.4	<p>Whilst not directly related to the T&TR, Mod 4 does not propose alternative access arrangements in place of the existing Illawarra Highway and North Macquarie Road intersection. A recent assessment in conjunction with a development application for non-core land in the CDUP identified that the existing junction could not be upgraded to meet the necessary AUSTROAD alignment and sight distance design criteria. In the assessment of Mod 4 an alternative the Illawarra Highway and North Macquarie access point needs to be investigated and an alternative solution found.</p>	<p>The yield review would not have a material impact to this intersection given that the majority of the trips generated by the development will head to the north, east and south, based the APRB/WOLSH TRACKS model.</p>
4.5	<p>Council is of the opinion that details of the required upgrade of the following intersections must be provided prior to any determination of the application Tongarra Road, Calderwood Road and Macquarie Street intersection</p> <p>The Illawarra Highway, Yellow Rock and Escarpment Drive intersection.</p>	<p>Cardno assessed the aforementioned intersections using the AIMSUN model for the yield review. The modelling results indicate both the intersections operate satisfactorily with a LOS B or better during the AM and PM peak hours.</p> <p>See Section 4.2.3 of the updated T&TR shows further details.</p>
4.6	<p>The illustrated additional collector road between the Broughton Avenue and Escarpment Drive roundabouts has not been mentioned in any document.</p>	<p>Although illustrated in the road network in previous iterations of the T&TR, this road is not generating nor attracting traffic in the traffic model and is the current haul/construction route for the project. It is not connected to residential houses or traffic generating land</p>

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		use. It has no impact on the results of the model assessment and was subsequently removed in the updated T&TR.
4.7	There is also no mention of the required North Macquarie Road / Illawarra Highway intersection upgrade, which has been determined during the assessment of current development applications.	This intersection is located outside the modelled study area and 'area of influence' (as agreed with RMS) to the west. The yield review would not have a material impact to this intersection given that the majority of the trips generated by the development will head to the north, east and south, based on the strategic TRACKS model.
4.8	<p>Council would like to work with the Department as well as Lendlease to ensure that all requirements as a result of the modification are fully met, and that fairness is ensured to all parties including the residents of Shellharbour.</p> <p>Noted within the EA is that Lendlease will negotiate with Council in good faith, Council believes given the above discrepancies, these negotiations must be completed and agreed to prior to any approval of the modification.</p> <p>a) Calderwood Road</p> <p>The need to upgrade to four lane is more than just widening of the road within the confines of the existing road reserve and will require realignment and land acquisitions. This is especially pertinent at the location of the bridge over the Macquarie Rivulet. As the bridge needs to be widened, to reinstate the current angle would create an unsafe bend immediately South of bridge. As a flow-on effect, the intersection with Tripoli Way may need to be relocated westward, and require signalisation of the Calderwood Road and Tripoli Way intersection earlier than both adopted and draft Council concept designs. This is especially problematic as it will require further multiple land acquisitions and costly redesign of Tripoli Way. These changes are not recognised within the findings of the Traffic and Transport assessment undertaken, or the Environmental Assessment (EA) for the modification.</p> <p>(b) Tripoli Way</p> <p>Tripoli Way will require four lanes for the full length by 2026-28 based on the Traffic and Transport Report. It is unclear whether, if this assumption was not made, could suitable performance of the local traffic network be achieved. This is different to the original TMAP with regards to timing, as well as previous Council concept designs. The statement "<i>the design of Tripoli Way (Albion Park Bypass) is consistent with Council current preferred configuration</i>" is incorrect. The original 2007 Albion Park</p>	<p>Based on the revised yield of 6,000 dwellings, two lanes on Calderwood Road (one lane in each direction) has been assessed as satisfactory based on the midblock traffic flows, which are within the RMS thresholds for single lane flow. Refer to Section 4.1.5 of the updated T&TR.</p> <p>Accordingly, concern regarding the road alignment and design specifications associated with the four lane profile on Calderwood Road is considered to be somewhat alleviated by maintaining a two lane profile (generally consistent with the 2010 TMAP). The timing of the Calderwood Road upgrade is to coincide with the development of the Town Centre which is expected to align with the forecast 2026-28 upgrade of Calderwood Road / Tripoli Way, thus reducing or removing the need for rework on Council's behalf.</p> <p>The updated report clarifies this item, by acknowledging that Tripoli Way between Illawarra Highway and Calderwood Road is one lane in each direction. East of Calderwood Road, Tripoli Way is identified as being four lanes. This is shown in the concept design plans provided in Appendix E of the updated T&TR.</p>

Item No	Item	Response
	<p>Traffic Study assumed one lane in each direction, and since that time, Council has not endorsed any concept to the contrary. Council can provide a timeline of the Tripoli Way Design if required. The latest concept plans current being developed in conjunction with Cardno, also only cater for four lanes East of Calderwood Road, yet the four lane requirement were only identified due to updated modelling from Cardno, for both Calderwood Concept Approval and the SPIR model, in lieu of widening Tongarra Road identified within the APTS. Prior to this, endorsed plans from Council were for two lanes only.</p> <p>Based on the most recent draft concept plans developed for Council by Cardno in 2017, Tripoli Way only required two lanes (one each way) for the section between the Illawarra Highway and Calderwood Road. Contained within the Traffic and Transport Report is the assumption of four lanes in this section. This has major implications for possible land acquisitions, land contributions, and the construction cost of Tripoli Way. Council is willing to share these models with the Department to confirm the discrepancy.</p>	
5.0	Public Submissions	
5.1	Relocate the entrance/exit of Escarpment Road to another area along Marshall Mount Road where it will not have such a huge impact on another household.	The preferred Option B relocates the entrance/exit further to the west when compared to Option A which introduces a 4-leg roundabout entrance/exit to CUDP at Marshall Mount Road / North Marshall Mount Road. That is, Option B minimises the impact to nearby households and individual property access. Note that the approved Concept Plan provided access to Calderwood from Marshall Mount Road. See figure 12 of the Consolidated Concept Plan (March 2011).
5.2	Increased traffic congestion in Albion Park	The yield review has been assessed in the updated T&TR and the model assessment is based on the 2036 APRB/WOLSH TRACKS and AIMSUN models. A review of the road and intersection performance was undertaken and mitigation measures have been proposed to ensure satisfactory operation of the surrounding road network, and includes upgrades to intersections such as Illawarra Highway / Broughton Avenue and Tripoli Way / Calderwood Road.

Item No	Item	Response
5.3	Road infrastructure upgrades must be completed prior to the sale of lots	The timing of infrastructure upgrades is to be reviewed during the development application process for future stages of the project. See conditions C1 and C5 of the approved Concept Plan which also address this matter.
5.4	Increased pressure on on-street parking due to increased density	The updated T&TR recommends parking strategies (based on the TMAP 2010) to appropriately manage parking demand. For example, provision of time restricted car parking should be encouraged within the village and town centres to encourage parking turnover that benefit local businesses.

Kind Regards,



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Project Manager
For **Cardno Traffic and Transport**