

5.7.2 Stormwater

Existing Conditions

As the majority of the Precinct is undeveloped it provides a large pervious catchment area with no existing stormwater management features.

Impacts and assessment

Without stormwater management measures, development has the potential to affect the existing hydrology of the Precinct and downstream areas with the following potential impacts on stormwater quantity and quality:

- Increased stormwater peak flows, leading to increased flood risk and erosion (on-site and off-site).
- Impediments to flow at creek crossings – the proposed creek crossings could lead to afflux at those structures, thereby affecting the flood level of South Creek and flood planning levels of adjacent development.
- Stormwater pollution by pollutant entrainment runoff.
- Impacts to water balance - including on groundwater recharge and salinity.

The following key issues with the draft ILP have been highlighted:

- No land has been set aside in the small landholdings area to the south of the Precinct for stormwater treatment of the larger catchment draining to Narellan Creek.
- In some instances the indicative bio-retention basin areas shown are marginal in size.
- Some basins are located too close to riparian corridors. The locations of basins needs to respond to the riparian corridor category and associated land uses.
- Flood inundation currently extends beyond the edge of the proposed urban development in places. This may necessitate filling of the flood plain and provision of flood protection.

Management response

In response to the above issues, the following matters are to be addressed and resolved during detailed design and prior to subdivision:

- treatment of stormwater from the south of the precinct draining to the Narellan Creek catchment;
- size, location and function of bio-retention basins in the riparian corridors; and
- provision of flood protection in areas affected by the 100 year ARI.

5.7.3 Water Sensitive Urban Design

With the exception of South Creek, waterways across the Precinct are ephemeral receiving flows only after periods of moderate to heavy rainfall. Category 1, 2 and 3 creeks have been identified across the Precinct and several dams are dotted along these creeks and channels (see **Section 5.3.3** of the report). The GCC requires that development within the Growth Centres should protect Category 1, 2 and 3 riparian corridors.

The existing hydrology will be significantly impacted by urban development due to an increase in the impervious areas, and the introduction of a large new population will increase demand on the potable water supply.

WSUD can be implemented at a lot, neighbourhood, precinct and regional scale. The objectives include:

- protection and enhancement of natural water systems (creeks, rivers and wetlands) within urban catchments;
- reducing potable water demand by using stormwater as a resource;
- minimising changes in water balance and flow patterns potentially resulting from urban development;
- protection and enhancement of water quality, by improving the quality of stormwater runoff from urban areas;
- adding long-term value while minimising development costs; and
- integrating stormwater management into the landscape by using stormwater treatment systems that serve multiple uses and provide a variety of benefits, including water quality protection, stormwater retention and detention, public open space and recreational and visual amenity for the community.

A Water Cycle Management Strategy has been prepared for the Precinct. The key elements of the strategy are shown in **Figure 28** and listed below:

- on site detention for employment, commercial, industrial and selected residential areas;
- combined detention/bio-retention systems at various locations;
- harvesting of rainwater via rainwater tanks in industrial and commercial buildings;
- vegetated swales along the identified main overland flow routes and roadside verges;
- wetlands near proposed playing field /open space areas to treat suspended solids and associated contaminants, and to capture stormwater for water reuse.

The above strategies will be implemented through appropriate DCP controls.

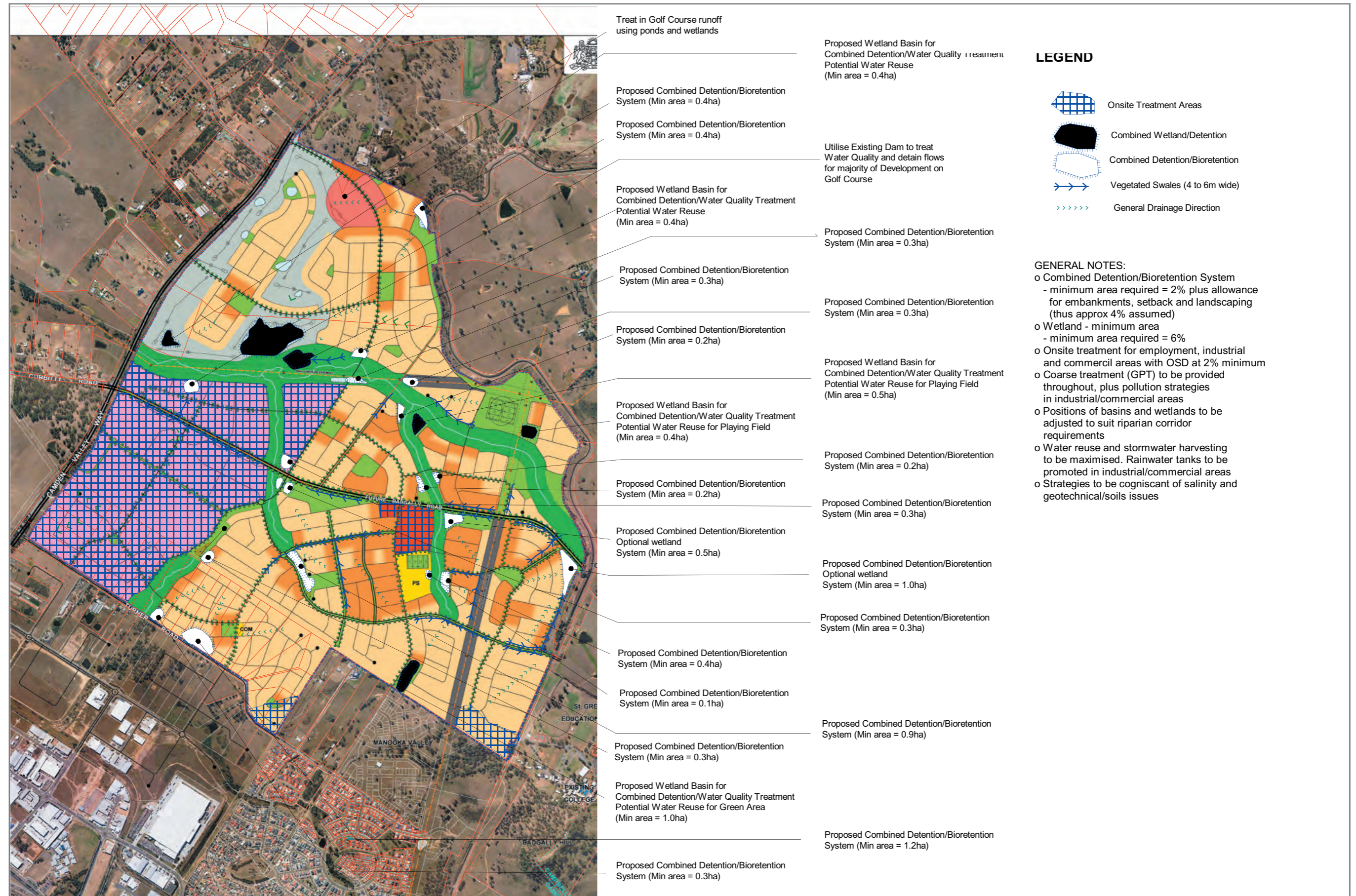


Figure 28 – Turner Road Water Cycle Management Strategy

Source: GHD

5.8 Noise

The proposed development of the Turner Road Precinct will result in a mix of land uses with the potential to both generate and be affected by noise. In addition, the Precinct is in close proximity to Smeaton Grange an industrial area, and Camden Valley Way an arterial road. Accordingly, an Environmental Noise Assessment was undertaken of the draft ILP (see **Appendix H**).

In accordance with the GCDC the relevant guideline for managing road traffic noise is the Department of Environment and Conservation’s ‘Environmental Criteria for Road Traffic Noise’ (ECRTN). Industrial and operational noise from commercial developments is usually assessed in accordance with the DEC Industrial Noise Policy (INP).

Potential noise sources that could affect the proposed development were identified as road traffic, future industrial development within Smeaton Grange and the future Turner Road Precinct, licensed and community developments, and the Camden Aerodrome.

Long term noise monitoring was conducted to extrapolate the ambient noise levels across the site. The report used the relevant DEC guidelines as specified by the Development Code to assess the potential noise impacts on the site.

5.8.1 Acoustic environment

Traffic noise

The road traffic noise assessment was not based on noise levels at specific locations on the site as land uses, boundaries and dwelling layouts had not been finalised at the time. Therefore, noise levels were predicted according to road type shown in the draft ILP. Noise monitoring was, however, carried out at two locations to provide a representative sample of the acoustic environment to be found along the two major site boundaries. The main traffic noise source was identified as Camden Valley Way.

Industrial and commercial noise

There are two sources of noise that could affect residential amenity in the Precinct. Firstly, Smeaton Grange, an industrial area located to the immediate south of the Precinct which is currently partially developed and with vacant sites set for development in the near future; and secondly, the 87 hectares of future employment land within the Precinct. As the specific locations of industrial development were not known, a complete assessment of the industrial noise impacts could not be made for the purposes of the acoustic assessment.

Licensed and community development noise

Future licensed premises would have to comply with noise criteria issued by the Liquor Administration Board, while future community developments such as school facilities, childcare centres, multi purpose-halls, clubs and sporting fields would also be considered against their relevant standards.

Aircraft noise

The Turner Road Precinct is located 3.5 km east of Camden Aerodrome. The acceptable level for aircraft noise is based on AS2021-2000. The assessment used the Australian Noise Exposure Forecast (ANEF) index to assess the cumulative impact of aircraft noise on the proposed land uses. The Turner Road Precinct will not be adversely affected by aircraft noise as it is located outside of the 20 ANEF contour.

5.8.2 Potential impacts

Predicted traffic noise

The predicted road traffic noise impacts for the Turner Road Precinct for development by 2029 are detailed in **Table 8**. The table shows exceedances will occur along all roads except minor streets. Therefore noise mitigation measures would be required for residential development at these locations to meet the DEC standards required by the Development Code.

Industrial and commercial noise

The modelling did not cover existing and future industrial and commercial uses in Smeaton Grange and future development in the Turner Road Precinct. However, the study concluded that there would be no impact on future commercial or residential development in the Precinct provided that any future and existing industrial sites are developed in accordance with relevant standards and development controls.

Licensed and community development noise

The exact locations of licensed and community developments will be subject to future detailed planning. Impacts have been addressed in the assessment through the mitigation measures detailed in **Section 5.8.3**.

5.8.3 Management response

Traffic noise

A range of measures will be required to mitigate the impacts of traffic noise. As detailed in **Table 9**, these use typical building treatments rather than roadside noise walls and mounds and would need to be applied to dwellings along all roads except minor streets. An exception to this is Camden Valley Way, an arterial road, where noise mounds will be required to mitigate the high level of predicted noise. As there are no likely impacts on minor roads, special treatments are not required.

In addition to the measures in the table, the DCP includes a range of dwelling design options and architectural treatments that could be used alone or together with these measures.

Table 9 indicates that even residences on some of the quieter streets within the Precinct, such as collector and local streets, in addition to those dwellings fronting sub-arterial roads, may require specific acoustic treatments which could add significant costs to dwelling construction. This is because the ECRTN external noise criteria will be exceeded at the front façade of dwellings. However, these exceedances are only likely to occur during the day, during AM and PM peak hour traffic periods and only at the front of dwellings. At other times of the day and night, noise levels are likely to comply with the set criteria and outdoor private open space areas located to the rear of dwellings would also comply. It is therefore recommended that the daytime criteria be relaxed at the front façade of dwellings by approximately 5 dB(A) during peak hours as this would reduce the need for costly treatments, but still limit traffic noise levels during the rest of the day and night. This matter will need to be the subject of further departmental negotiation.

It is noted that the use of building (acoustic) treatments to mitigate traffic noise leaves areas at the front of dwellings exposed to noise and adequate ventilation must therefore be provided in rooms facing roads as windows would need to remain shut. This raises, in turn, issues in relation to sustainable (natural) methods of ventilation and requires innovative design to ensure that the requisite area of private open space attached to dwellings is not impacted by traffic noise.

Table 8 – Traffic noise predictions for 2029

Road Type	ECRTN Daytime External Noise Criteria dB(A)	Predicted Daytime Traffic Noise*	Relevant Streets/Roads
Arterial	L _{Aeq, 15hr} 55	L _{Aeq, 15hr} 68	Camden Valley Way
Sub-Arterial	L _{Aeq, 15hr} 55	L _{Aeq, 15hr} 65	Badgally Road (east)
Collector	L _{Aeq, 1hr} 60	L _{Aeq, 1hr} 67	Nth Spine Rd Sth Creek Rd
Local	L _{Aeq, 1hr} 55	L _{Aeq, 1hr} 60	Ctrl Spine Rd Kenny Crk Rd Sth Boulevard Sth Spine Rd 1 Sth Spine Rd 2
Minor	L _{Aeq, 1hr} 55	L _{Aeq, 1hr} 55	Smeaton Grange Link

*Level at nearest residential façade dB(A)
Source: Renzo Tonin and Associates

Table 9 – Noise mitigation measures

Road Type	Typical building treatment for first row of dwellings	
	Bedrooms	Living Areas
Sub-arterial	Windows closed; 10.38mm laminated glazing, acoustic seals on windows and doors	Windows closed; 6.38mm laminated glazing; acoustic seals on windows and doors; solid core 45mm doors on external facades
Collector	Windows closed; 10.38mm laminated glazing, acoustic seals on windows and doors	Windows closed; 6.38mm laminated glazing; acoustic seals on windows and doors; solid core 45mm doors on external facades
Local	Windows closed; 6.38mm laminated glazing; acoustic seals on windows and doors	Windows closed; standard glazing

Source: Renzo Tonin and Associates

It is further noted that the ECRTN goals for setback distances would require residential properties to be set back 200 metres from sub-arterial roads and 100 metres from collector roads. While the ECRTN recommended setbacks would be ideal, in most cases this would not be feasible as it would impact on land take and ultimately on dwelling yield (and the Structure Plan's targets). Accordingly, a combination of setback distance, architectural treatment and internal dwelling layout and building design will be used.

An exception to this is the treatment of the part of Camden Valley Way (an arterial road) which aligns with residential development in the golf course. This will involve a combination of building treatments and landscaped noise mounds in accordance with the guidelines of the Development Code. To manage and mitigate acoustic impacts on residential amenity, the following building design controls have been incorporated in the Turner Road DCP:

- Courtyards and open space areas are to be located away from the road.
- Adequate ventilation, in accordance with the BCA, is to be provided to compensate for closed windows on street frontages. This may require mechanical ventilation.
- Higher than standard fencing with a suitably solid mass will be acceptable to reduce the level of noise in yard areas.
- Dwelling layouts are to be designed to minimise noise in living and sleeping areas.
- Wherever possible, dwelling access is to be located off smaller local roads to avoid reducing the efficiency of acoustic boundary walls with driveway access points fronting major roads.
- Compliance with the ECRTN external noise criteria at rear private open space areas.
- Building treatment and design is to be consistent with the internal noise goals of Australian Standard 2107-2000.
- To reduce the visual impact of traditional noise walls, landscaped earth mounds with lower height walls to be used on arterial roads.

In addition, 'quiet' road pavement surfaces such as Open Graded Asphaltic Concrete or Stone Mastic Asphalt can be used for roads where speed limits exceed 80 km/hr. As the impact of the surface is less effective at speeds less than 80 km/hr and as the speed limit for most roads in the Turner Road Precinct will be less than 80 km/hr, the more expensive 'quiet' surfaces will in most cases not be necessary.

Industrial and commercial noise

In order to ensure that future industrial and commercial development does not affect residential amenity, these forms of development will be required to comply with the amenity criteria set out in the Industrial Noise Policy (DEC 2000).

Licensed and community development noise

The noise impacts of licensed premises will be minimised through the location and design of building envelopes. In locations where physical noise treatments are not practical, separation distances of 100 metres or more will be maintained between residential areas and licensed premises.

In relation to community developments, noise from playing fields, schools and childcare facilities is a natural function of a lively, active and happy neighbourhood and these uses will be integrated into walkable neighbourhoods. Accordingly, only the following minimal design measures are proposed to minimise noise from these sources:

- Where possible, schools bus/car drop-offs should be located away from common boundaries with residential properties.
- Childcare centres should have solid boundary fences around play areas abutting dwellings.
- Construction of multi-purpose community facilities (halls) will incorporate acoustic design.

Hours of operation/use of sporting fields and multi-purpose halls will be determined by Camden Council in accordance with its usual policies.

5.9 Odour

As Turner Road is located in a rural area with active farming, odour from nearby agricultural activities has the potential to impact on urban development. In order to establish potential sources and impacts of odour on the draft ILP, a Level 1 Odour Impact Assessment was prepared. The assessment was conducted using the techniques described in the DEC Technical Notes 'Assessment and management of odour from stationary sources in NSW' (November 2006). The specific factors considered in the assessment of the Turner Road Precinct are detailed in the contractors report found at **Appendix I**

5.9.1 Existing conditions

The land surrounding the Turner Road Precinct is currently generally used for agricultural purposes. St Gregory's College adjoins the Precinct on the eastern side, while the land to the south at Smeaton Grange is being developed for employment uses.

The meteorological conditions for the site show north-east-east through to south winds in summer, southerly winds in autumn, north-west-westerly winds in winter and southerly winds in spring. Southerly winds are most dominant with an occurrence frequency of approximately 10%. Winds are strongest in spring with an average wind speed of 3 m/s⁻¹

5.9.2 Potential impacts and assessment

The Odour Impact Assessment found that there were a number of potential odour sources in the area surrounding the Precinct. However, with the exception one poultry farm, these sources were considered of sufficient distance from the Precinct to be of no consequence for future development.

The assessment identified a nearby poultry farm as a key potential source of odour. The operation, located approximately 200 metres south of the Precinct on Camden Valley Way in Smeaton Grange, consists of four naturally ventilated sheds housing 70,000 broiler chickens, which correspond to 318 standard broiler chicken shed units.

The odour assessment calculated the appropriate separation distance between the poultry farm and proposed development in the Precinct and considered the shed, receptor, terrain, vegetation and wind frequency factors against the number of standard broiler chicken shed units.

There are currently no technical controls in place at the poultry farm, such as bio-filters or short stacks, to reduce the impact of the odour on the surrounding area. The receptor factor was based on the proposed population in the area. The precinct would be uphill from the farm and there is no significant vegetation between the sites to assist in the dispersion of odour. Wind analysis showed that “normal wind conditions” apply for the purposes of the calculation.

As shown in **Figure 29** the potential odour from the poultry farm requires a separation distance of up to 500 metres into the Turner Road Precinct and this will therefore impact on future urban development.

Employment uses are proposed in the ILP in the area affected by potential odour. The study supports the land uses because:

- they are generally self-contained;
- there are few windows or openings that allow air (and odour) to flow inside;
- they are large enough to effectively alter the flow of wind around them; and
- the worst odour impacts occur in the evening, when businesses are generally closed and wind conditions are still.

5.9.3 Management response

A Level 1 Assessment provides a conservative assessment of the situation. However, at this stage a Level 3 Odour Assessment is not considered necessary.

The allocation of employment land uses in the odour affected area results in odour having no significant impact on the Turner Road Precinct. Nevertheless, while the poultry farm continues to operate, the impact of odour will be further mitigated by:

- including planning controls which discourage windows and doors being positioned on elevations facing the odour source; and
- a requirement for landscaping along the Turner Road frontage, including fences and tall vegetation.



Figure 29 – Land potentially affected by odour

Source: Benbow Environmental

5.10 Roads, traffic and access

An important objective of the Growth Centres Development Code is to ensure the coordinated provision of transport infrastructure for new Precincts in the Growth Centres. It further seeks to ensure that sustainable forms of transport, such as walking and cycling, are encouraged and that public transport services are provided upfront to encourage a public transport culture from the outset.

The transport assessment (**Appendix J**) of the draft ILP for the Turner Road Precinct included all modes of transport: walking, cycling, buses, cars and freight vehicles. Recommendations were then made to ensure that the proposed layout of the draft ILP would meet the objectives of the Growth Centres Development Code.

The layout and road names used in the assessment are shown in **Figure 30**.

5.10.1 Road network

Proposed conditions

The proposed road hierarchy for the Turner Road Precinct, shown in **Figure 31**, is as follows:

- Camden Valley Way is a four lane arterial road connecting the Precinct with Leppington;
- A new four lane sub-arterial road, Badgally Road, will link the Precinct directly with Campbelltown Station; and
- A new two lane sub-arterial road, North Spine Road, will provide an alternate link to Camden Valley Way.

B-Double truck access to the employment area in the Turner Road Precinct will be via Narellan Road and Camden Valley Way.

Impacts and assessment

Traffic modelling software was used to predict the impact of locally generated car trips on the Precinct road network and to confirm whether or not the proposed form of the draft ILP is appropriate. The model was developed for 2016 and assumed full development of the Precinct. For the purpose of assessing the draft ILP it was expanded to include the Oran Park Precinct, The Northern Road, Cobbitty Road and Camden Valley Way.

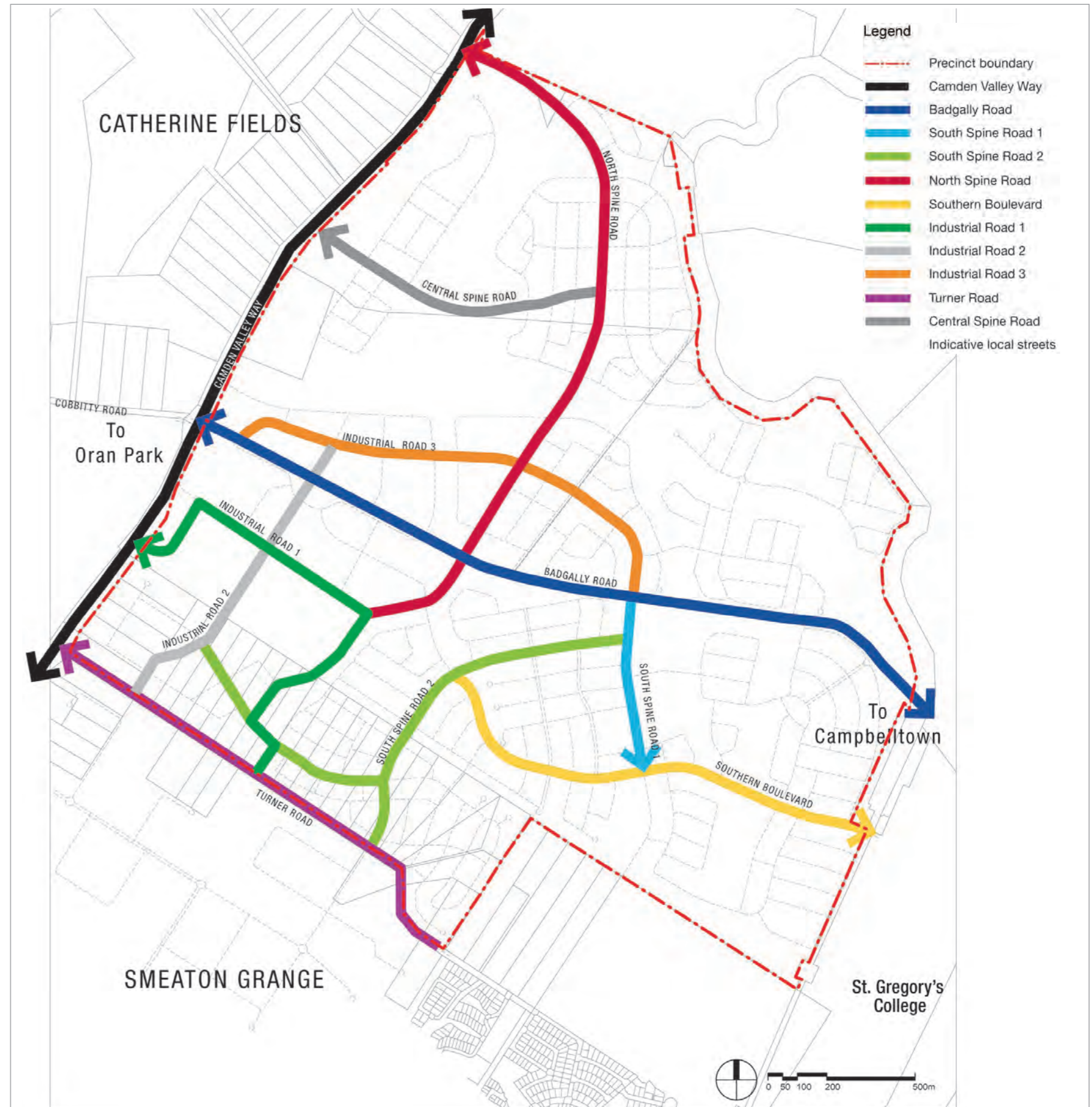


Figure 30 - Temporary road names for the Turner Road Precinct

Source: Growth Centres Commission

The following issues were identified with the draft ILP:

- The model indicates that in the AM peak, there will be high traffic volumes on the Southern Boulevard East travelling from Oran Park towards Camden Valley Way. No capacity issues were found in the PM peak.
- The signalised intersection of Camden Valley Way and Badgally Road is expected to reach capacity between 2016 and 2021 and will not be able to serve a significant proportion of the 4,000 dwellings and more than 60ha of employment land uses within the Precinct.
- Where local roads connect to higher order roads - such as the Central Spine Road (a collector road) connects to Camden Valley Way (an arterial) through the golf course – connections should be revised to maintain road the hierarchy.

Overall, the study concluded that the proposed commercial/employment zone is well located in terms of its accessibility to the regional road network and there are no apparent rat runs or areas where heavy goods vehicles would use lower order roads to avoid network problems.

Management Response

While the majority of roads within the Turner Road Precinct will provide adequate capacity, it is recommended that the following changes be made in order to improve performance:

- In the longer term increasing the number of through lanes on Camden Valley Way to three lanes in each direction as this would result in a satisfactory level of service. In the interim four lanes will be constructed.
- Providing an alternative signalised intersections on Industrial Road 1 to reduce the number of vehicles turning right from Camden Valley Way into Badgally Road.
- Integrating the Oran Park Southern Boulevard East/Camden Valley Way intersection and the Turner Road North Spine/Camden Valley Way intersection into a four-way signalised intersection to improve traffic efficiency on Camden Valley Way and resolving the issue of high traffic volumes on Southern Boulevard East towards Camden Valley Way.

It should be noted that the RTA has indicated a preference for minimising signalised intersection along Camden Valley Way. The second recommendation above will require further negotiation with the RTA.

Road hierarchy and function affect the efficiency of road networks. As discussed in the transport assessment, the role of higher order roads (arterial and sub-arterial) in carrying traffic should be maintained by restricting access from local streets to these roads. The road hierarchy is to be reviewed at the detailed design stage.

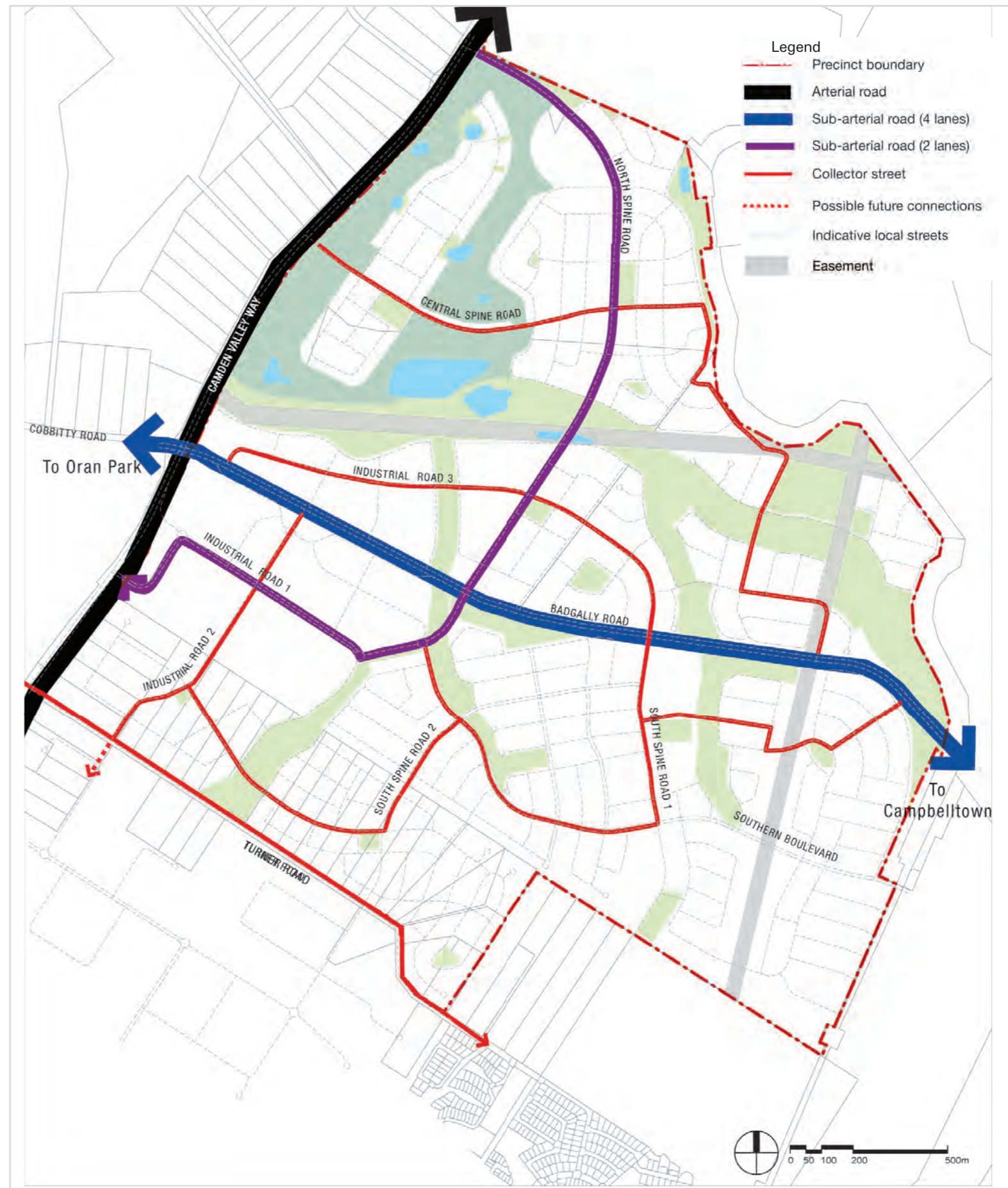


Figure 31 – Road hierarchy

Source: Maunsell

5.10.2 Public Transport Framework

Proposed conditions

The provision of public transport within the Turner Road Precinct has been developed to cater for three different stages of the development. These are:

- Short term – buses will connect new communities to existing facilities at Harrington Park and Narellan with access to the rail network at Macarthur and Campbelltown stations;
- Medium term – Oran Park will become a destination for public transport services with connecting services to Narellan and Camden via Harrington Park; and
- Long term – Leppington will become the new Regional Centre, with Oran Park, Narellan and Catherine Fields being District Centres.

Turner Road would not have sufficient bus routes or services to warrant a bus interchange. Based on the Ministry of Transport’s indicative bus routes and in response to the draft ILP, the bus routes shown in **Figure 32** have been proposed.

Impacts and assessment

The public transport network for the Turner Road Precinct is required to provide 90% coverage of the Precinct, meeting the Ministry of Transport target. Further negotiations with the Ministry of Transport will be required as detailed planning continues for the Precinct in order to determine final bus routes for local, district and regional bus services.

The locations of bus stops can only be determined once specific land uses are better defined.

Management response

During detailed design, consideration will be given to the impact of topography on bus capability. Detailed road and intersection design will also consider the impact on bus manoeuvrability.

The proposed bus routes connect the Precinct to Currans Hill via Manooka Valley. As no direct road connection is proposed in this location, it will be necessary to divert buses towards Turner Road in order to provide the connection into Currans Hill (as shown in **Figure 32**). This change to the bus routes may affect the achievement of 90% coverage of the site, however further detailed planning for bus routes, in conjunction with the Ministry of Transport, will need to be undertaken.



Figure 32 - Bus servicing strategy

Source: Maunsell

5.10.3 Walking and Cycling Networks

Proposed conditions

Cycle and pedestrian routes have been incorporated into the draft ILP. Pedestrian paths are provided on all streets and the cycle paths are shown in **Figure 33**. These have been designed to allow easy access from residences to local centres and public transport nodes.

Impacts and assessment

The analysis of the draft ILP against the planning principles of the Growth Centres Development Code revealed that:

- pedestrian / cycle connections were not provided between culs-de-sac to adjacent streets and / or green spaces; and
- some links had a high gradient, thereby affecting the comfort of cyclists.

If sections of a cycle route are too steep they are likely to discourage cycling as a preferred method of transport. Due to the natural topography of the Precinct, the following sections of the cycle network are too steep:

- Industrial Road 2, on approach to South Spine Road 2;
- South Spine Road 1, on approach to the Southern Boulevard;
- South Spine Road 2, south of Southern Boulevard; and
- Central Spine Road, in the vicinity of the golf course.

Alternative routes to Industrial Road 2 are available via Camden Valley Way or Industrial Road 1, but it should be noted that any realignment should not increase journey distance to the extent that it counteracts the effect of reducing the gradient.

The walking and cycle routes are generally in accordance with the Growth Centres Development Code requirement of 400m walkable neighbourhoods. All high schools and primary schools will be accessible via the proposed cycle network.

Management response

The issues identified in relation to walking and cycling routes can be resolved through detailed planning. Generally, the cycle network provides direct and continuous routes, however consideration will be given to relocating or altering bike paths that are too steep and do not provide a comfortable route for cyclists. This may involve adjusting the road alignment along a smoother gradient or providing a stepped system, so that steep lengths are alternated with flat sections.

The cycle and pedestrian networks will be better integrated by ensuring culs-de-sac are connected to adjacent streets or green spaces, and to facilitate safety these will be designed in accordance with 'Safer By Design' principles.



Figure 33 - Proposed pedestrian & cycle routes

Source: Maunsell

5.10.4 Air quality

South Western Sydney is known to experience high levels of air pollution. Despite this, due to the increased use of unleaded petrol and other emission control strategies, air quality in Western Sydney has actually improved in recent years. Nevertheless, private motor car usage remains a key contributor to poor air quality.

In order to manage the issue of air quality, the State Government, through the Metropolitan Strategy and other policies, is seeking more efficient provision and use of public transport, and future communities therefore need to be designed to reduce dependency on private cars to reduce associated emissions.

As described in this section and elsewhere in this report, planning for the Turner Road Precinct is consistent with the above objectives in that the draft ILP facilitates walking, cycling and the use of buses, and walkable neighbourhoods concentrate shopping, schooling and community activities at the local level. At the level of district and regional planning, bus connections to public transport nodes further contribute to the reducing reliance on private vehicles.

In land use terms, a fundamental principle of the draft ILP is the early provision of local employment opportunities – so contributing to reducing travel to work trips, while heavy industry – another major contributor to poor air quality - is not a proposed use.

6.0 Population, density and employment

Drawing on specialist studies (Appendix K and L), this chapter of the report presents the forecast demographic characteristics of the likely incoming residential and worker population to the Turner Road Precinct. Density targets set by the GCC are also presented. The demographic profile has implications for the development and delivery of social infrastructure discussed in the following chapter.

6.1 Existing population

The Camden LGA is experiencing rapid population growth due to considerable urban development in the last decade or so. Between 1996 and 2001 the annual growth rate for Camden was 7.3%, which is substantially higher than the Sydney Statistical Division average of 1.3%.

In 1996, the Camden LGA had a population of 32,000, which grew to 43,700 in 2001. The population will continue to grow considerably in the next few years due to the approval of the Harrington Grove, the Mater Dei site, Manooka Valley, Mount Annan South, Spring Farm and Elderslie release areas. Once these are completed it is expected that the Camden population will increase to around 77,200 people.

Based on the 2001 census, Camden’s population is younger, households are larger and median income is higher than the Sydney Statistical District. Specifically:

- Camden’s median age is 30 years versus 34 years in Sydney;
- 48% of Camden households are families with children compared with 36.6% in Sydney;
- the average Camden household consists of 3 people compared with 2.7 in Sydney; and
- median household income is \$1000 - \$1199 compared with Sydney’s \$800 - \$999.

This profile has implications for long term planning and provision of the range of community services, education and open space/recreation facilities.

6.2 Future population

6.2.1 Density targets

The Planning Report for the South West Growth Centre which supports the Structure Plan, nominated a dwelling yield of 2,000 for the Turner Road Precinct. This was increased by the GCC to 4,000 as a result of the increased size of the Precinct.

The SCDC sets out the minimum net residential densities that need to be achieved in the Growth Centres (see Table 10), while the distribution of dwelling types in the draft ILP is shown below in Table 11.

Table 10 – Minimum net residential density

Residential development type	Dwellings per hectare
In mixed use areas	66
High density	40
Medium density	20 - 40
Low density development	12.5 - 20

Source: GCDC

Forecast population

This assessment has assumed household occupancy rates based on other release areas in the South West. When the assumed occupancy rates are applied to the development mix in the ILP outlined above, the anticipated size of the future population can be calculated. As shown in the table below, the projected population for the Turner Road Precinct is approximately 12,600 with an average household of 3.1 people.

Table 11 – Forecast average dwellings and household size

Dwelling type	Number	Occupancy rate	Number of people
Apartment	191	1.8	344
Attached	987	2.9	2862
Detached	2842	3.3	9379
Total	4020		12585

6.2.2 Demographic characteristics

The projected population age distribution (based on Edmondson Park) is shown in Table 12. Forecasts of the ethnic make-up of the population are not included as these are unreliable over an extended timeframe of development and have little bearing on the broad nature of facilities proposed.

Compared to other nearby release areas, the Turner Road Precinct will be characterised by:

- A comparable proportion of young couples and families.
- A greater range of family types, reflecting the wider range of housing types and price markets to be provided.
- A comparable small proportion of empty nesters and older people - however this is expected to increase once wider district services and public transport become well established.
- An initial peak of young families that will reduce as the population becomes more diverse as more young adults and older people are attracted by established facilities.

The study concludes that:

- There will be greater population diversity in Turner Road than has characterised other nearby release areas because the proposed mix of housing forms will provide a greater range of housing choices.
- The detached dwellings are likely to accommodate households with above average incomes and occupational status.
- The provision of smaller and medium density forms of housing will provide more affordable opportunities for first home buyers and lower income families.
- The higher proportion of medium density housing is likely to provide a significant stock of rental accommodation, resulting in a much higher degree of socio-economic diversity than characterises most release areas.

Table 12 - Forecast age distribution by percentage of population

Age cohort	Within 5 years of initial settlement	10 years after settlement	15 years after settlement
0-4	12	9	7
5-9	9	10	7
10-14	7	8	9
15-19	6	7	8
20-24	7	7	8
25-34	24	18	15
35-44	18	19	17
45-54	10	10	12
55-64	4	6	8
65+	3	6	9
Total	100	100	100

Source: Elton Consulting

6.3 Employment and industry characteristics

Consistent with the Structure Plan and the objectives of the Growth Centres Development Code, planning at the regional and neighbourhood level must incorporate a range of local employment, retail and commercial opportunities. Accordingly, the capacity to absorb, and the need for, retail and commercial facilities within the Oran Park and Turner Road Precincts was assessed (refer to **Appendix L**).

In the context of future development in the South West Growth Centre, Turner Road will provide employment and retail opportunities both for people who live within the Precinct and also within the broader Camden region and the South West Growth Centre.

6.3.1 Employment land

Future growth in Sydney’s population and labour force will require more jobs and more employment land. Up to 500,000 additional jobs will be needed in Sydney by 2031, 80,000 of which will be needed in South West Sydney. The Sydney Metropolitan Strategy estimates a further 7,500 hectares of employment land may be needed in addition to the current 15,000 hectares.

Currently 2,346 hectares of industrial land is available in the South Western Sydney area in the local government areas of Camden, Campbelltown, Liverpool and Wollondilly, of which 470 hectares or nearly 20% is vacant. Of this:

- Smeaton Grange (84.11 hectares) and Moorebank (85.34 hectares) are the two largest nodes available in terms of land;
- Campbelltown has the lowest share of vacant land at 9.2%; and
- Wollondilly has the highest share of vacant land at 38.4 %, especially in Maldon.

Vacant sites are not evenly distributed, are tightly held across limited locations and parcel sizes and will be fully absorbed within five to six years.

The economic strategy for the Oran Park and Turner Road Precincts requires the provision of approximately 100 hectares of employment lands (comprising industrial and bulky goods uses) to be located on major routes and highly visible and suitable lands.

6.3.2 Need

The population in the Oran Park and Turner Road catchment will be approximately 35,500 by 2023. It is expected that in 2012 the number of residents seeking employment will reach nearly 6,000 (45% of the total resident population). By 2023 the labour force will have increased to approximately 16,000 workers in the catchment across all industries.

It is expected that, consistent with the Camden labour force, approximately 37% of this labour force will be blue collar workers – i.e. tradespersons, workers in the production and transport sector and labourers. By 2023 the number of blue collar workers seeking employment will reach 5,900. Assuming the Sydney average of 40 blue collar jobs per hectare of industrial land, it is estimated that the land required for blue collar employment self sufficiency will be approximately 148 hectares by 2023 (see **Table 13**). This equates to approximately 10 hectares per year if the full amount were to be supplied.

Table 13 – Blue Collar Self-Sufficiency – Oran Park and Turner Road Precincts

Year	2008	2010	2012	2014	2016	2018	2023
Forecast Population	772	5873	12134	21631	29125	33065	35479
Employed (45% of total population)	347	2643	5910	9734	13106	14879	15966
Blue Collar (37% of total population)	129	978	2187	3602	4849	5505	5907
Employment land required (hectares)	3	24	55	90	121	138	148

Source: MacroPlan Australia

6.3.3 ILP provision and assessment

A total of 104 hectares of employment land is provided within the Oran Park (16.67 hectares) and Turner Road Precincts (87.33 hectares). The release of 87 hectares of employment land at the Turner Road would equate to just over 3% of the South West Sydney market and increase the supply of vacant land in the same market by 20%.

The assessment cautions that the product mix of early stages of development is likely to be lower employment yield uses such as warehousing, distribution and bulky goods, meaning that the estimated employment yield of 40 jobs per hectare may not be achieved in the early years. The employment yield could be as low as 10 jobs per hectare if warehousing and transport industries are the first to take up land parcels. This will increase the short term requirement for industrial land supply, including industrial service centres, if employment self containment is to be maximised.

It is not possible to deliver full employment self sufficiency in fringe development areas in early stages of a residential development due to a shortage in labour supply across various skills and the need for industry clusters to form.

While the total allocation of land would not lead to full self-sufficiency in blue collar employment it would be adequate for the following reasons:

- Around 50% of residents in the Oran Park and Turner Road Precincts are expected to work in the wider region while around 30% or less would actually work in a business located or associated directly with the employment nodes at Turner Road and Oran Park.
- Many of the blue collar workers at Oran Park and Turner Road will seek employment opportunities at Lowes Creek or Bringelly as these industrial nodes begin to develop in the medium to longer term.

In addition to the jobs to be provided within the Turner Road Precinct employment lands, the draft ILP makes provision for 18,500 square metres of retail space within the neighbourhood centre and clubhouse precinct, which could generate approximately 740 retail jobs based on one position per 25m² (JBA).

6.3.4 Management Response

It should be noted that that the 87 hectares of employment land will not be allocated solely to industrial uses and that a substantial amount of land could be taken up by bulky goods retail. As the final mix cannot be determined at this stage, the likely level of employment self-sufficiency cannot be determined.

Nevertheless, as demonstrated above, together the quantum of industrial, bulky goods and retail land uses would contribute substantially to employment self-sufficiency at Oran Park and Turner Road. The 87 hectares of employment land at Turner Road is well located in terms of regional accessibility – both for distribution purposes and bulky goods customers.

6.4 Retail facilities

Oran Park is nominated as a large town centre within the hierarchy of centres within the South West Growth Centre. Turner Road will be served by the Oran Park Centre and therefore requires more limited local retail facilities. The Development Code states that retail facilities should be located at major intersections and on public transport routes to maximise accessibility.

6.4.1 ILP provision and assessment

The retail facilities in the Turner Road Precinct are intended to serve the incoming resident population of around 12,600 and a substantial number of workers, as well as residents from the surrounding areas. The range and size of shops and other services will encourage people to shop locally and avoid travelling elsewhere for food, groceries and other weekly needs.

The floor space limits shown in **Table 14** are intended to maintain the hierarchy of centres in the Camden area and obviate competition with the major retail offerings in the Oran Park Town Centre.

Table 14 – Turner Road retail provision

Centre	Retail features
Neighbourhood Centre	<ul style="list-style-type: none"> ▪ 15,000m² aggregate Gross Floor Area (GFA) ▪ Individual retail premises size unrestricted
Clubhouse precinct	<ul style="list-style-type: none"> ▪ 3,500m² aggregate retail premises GFA ▪ 500m² maximum GFA for individual premises (except food & drink premises)
Employment Lands	<ul style="list-style-type: none"> ▪ maximum aggregate GFA of 25,000m² for bulky goods premises ▪ 500m² maximum GFA for neighbourhood shops

6.4.2 Management response

The provision of a 15,000 square metre Neighbourhood Centre at Turner Road will service the 4020 new dwellings, accommodate the greater catchment to the north, east and south, reduce car travel - with its attendant environmental costs - for general shopping, and provide local facilities for the future workers in Turner Road and potentially Smeaton Grange. Assuming a supermarket of approximately 3,500 square metres, the overall viability of the centre is assured with enough residual space for other services and facilities. Importantly, as discussed elsewhere in the report, the number of dwellings in Turner Road is to be double that originally proposed in the Structure Plan – thus supporting greater retail space. The proposed limit on the size of the Neighbourhood Centre will protect the centres hierarchy for Camden and the SWGC.

The provision of 3,500 square metres of retail in the clubhouse precinct is considered appropriate to serve the population in the north of the Precinct and to activate and complement the other uses proposed in this locality.

Bulky goods retailing is a specific sector within the retail market, and plays an important role in newly developing communities where there is generally high demand for the products sold. Examples include large furniture stores, homewares and related products. While siting bulky goods facilities in established urban areas is generally a challenge, new master planned precincts provide the opportunity to locate these facilities more appropriately.

At Turner Road, the key drivers in relation to bulky goods have been to ensure that they are well located relative to key arterial roads and that the opportunity to provide jobs early is captured.

Zoning of the employment land will allow a range of uses, including industries, warehousing, distribution and bulky goods, so enabling the employment land to respond to market demand over time, and diminishing the risks of over or under supply within any one category. The key strategic principle underpinning this approach is the desire to maximise local employment opportunities, particularly in the early phases of development. This will contribute to reduced travel demand and increase local employment for both the existing and future Camden communities.

7.0 Social infrastructure

This chapter identifies the need for social infrastructure such as schools, open space, recreation and community facilities in the Turner Road Precinct and the region.

Consistent with the Structure Plan and the objectives of the Growth Centres Development Code, planning at the regional and neighbourhood level must provide local facilities and services such as parks, shops, libraries, schools, health facilities, childcare, recreation facilities and the like. The draft ILP must in conjunction with Council's Section 94 plan provide the right size land for social infrastructure in the right locations.

The Turner Road Precinct is to be delivered over an approximate 15 year period subject to market demand. Accordingly, as emphasised by the Development Code, community facilities should be flexible and adaptable in order to be responsive and relevant to changing needs, expectations and life cycles.

Some social services and infrastructure (such as hospitals, regional sporting facilities, tertiary education, etc) for residents of the Precinct will, necessarily, be located elsewhere. Consistent with its status as the major centre for the South West Growth Centre and its proposed high accessibility by bus and rail services, it is understood that Leppington is the preferred location for these higher order services that will serve the whole Growth Centre population. At the same time, the Oran Park Town Centre will become the preferred location for many local services and an anchor for services and facilities servicing the southern third or so of the Growth Centre. Nevertheless, a range of local services will need to be provided in the Turner Road Precinct, as described in this chapter.

The relative uncertainty of the future composition and precise needs of the population within the Turner Road Precinct give rise to a need to plan for flexibility in social infrastructure so that service providers can respond and adapt as the particular requirements and lifestyle preferences of the population are ascertained.

This chapter utilises information in the Turner Road Precinct Community Facilities and Open Space Assessment (see **Appendix K**), and the draft Turner Road Precinct Section 94 Contributions Plan.

7.1 Education facilities

7.1.1 Requirements

The Department of Education (DET) provides the following guidance on the provision of schools in new release areas based on the number of dwellings:

- One public primary school per 1,500 to 2,000 new dwellings each with a minimum site area of 3 hectares;
- One public high school per 4,500 to 6,000 new dwellings on a site of 6 hectares.

Schools should be located:

- on collector roads, not arterials or sub-arterials, to reduce noise impacts;
- central to their catchment, with a catchment radius of 1.6km road distance to minimise the demand for bus transport and to maximise opportunities to walk to school (primary only);
- adjacent to community playing fields (an advantage but not mandatory);
- on land substantially regular in shape with a slope no greater than 1:10; above the 1 in 100 year flood level; and free of possible restrictions such as power easements, contamination, etc.

7.1.2 Provision and assessment

Primary schools

Based on a target of 4,000 dwellings and departmental guidelines, two primary schools are required in the Turner Road Precinct, however only one primary school is provided. DET has advised that two primary schools will be required to serve the Turner Road Precinct because:

- adjacent government schools will not have the capacity to accommodate the overflow of students if there is only one school to service the whole Precinct; and
- further low density development is forecast to the north of the Turner Road Precinct, in the Scenic Hills area, which will rely on access to a primary school within the Turner Road Precinct.

High schools

There is no high school proposed for the Turner Road Precinct. The need of students within the Precinct will be met primarily by Mount Annan High School, where there is spare capacity. When Badgally Road is extended to Campbelltown in the longer term, Eagle Vale High School could serve high school students from the Precinct if it had the capacity at the time. This is, however, a long term proposition.

7.1.3 Management response

Further discussions the DET and detailed planning is required regarding the size and location of a second primary school north of Badgally Road and central to the residential catchment area.

The primary schools should be co-located with community facilities and open space, and negotiations should occur with the DET regarding the opportunity to reduce the land required for schools that are co-located with other community facilities, as well as opportunities for the joint use of public open space.

7.2 Health facilities

7.2.1 Requirements, provision and assessment

The Turner Road population will require access to local level health services and medical practitioners.

NSW Health and the Sydney South West Area Health Service have advised that a Community Health Centre will be established in Oran Park in about 2012. This facility will have good access to public transport and parking and will serve the Turner Road population.

The proposed zoning and land uses for the Precinct permit general medical services and facilities in all most areas: doctors can set up private consulting rooms everywhere except in the light industrial zone, and medical centres will be permissible in mixed use centres and the neighbourhood centres.

The draft ILP is considered adequate and no further changes are required.

7.3 Community facilities

7.3.1 Requirements

Children's services

Childcare centres are a permitted use within residential areas and are generally provided by the private sector. As such they do not necessarily need to be designated at the ILP stage. However, Camden Council requires, through its Section 94 Plan, provision of long day-care/preschool places and out of school hours care places calculated according to the following ratios:

- 20 long day-care/preschool places per 1000 population (6.5 sq m of indoor floor space per place) – discounted to cover 70% of total provision by Section 94 funds.
- 8.8 out of school hours care places per 1000 population – discounted to calculate the 25% of total provision required by Section 94.

Based on an approximate population 12,600 at full development, the Turner Road Precinct would therefore require approximately 170 long day-care/preschool places and approximately 30 out of school hours care places. This would translate into 3 long day-care/preschool centres (assuming an average size of 60 places). Out of school care could also be accommodated within these facilities.

In addition, the future employment population is likely to generate additional demand which could potentially be provided by private sector providers.

Community facilities

Camden Council requires, through its Section 94 Plan, multi-purpose community facilities based on 42 square metres per 1,000 people and land space provision 2.5 times this requirement (i.e. 105 square metres per 1,000 people). A community centre of 350 – 500 square metres usually serves a population of 12,000 people.

Turner Road would therefore generate the need for approximately 500 square metres of community centre floor space and a land area of approximately 1,300 square metres, equating to one multi-purpose neighbourhood community centre to serve the whole precinct.

Facilities and services for young people

Youth centres are provided on the basis of 20.8 square metres for a population of 1,000 people. On this basis a facility of about 720 square metres is required to serve the combined Oran Park and Turner Road population.

Facilities and services for older people

Leading practice steers away from providing age-specific buildings, such as senior citizens buildings. Rather, multi-purpose buildings are preferred as these tend to be better utilised.

Residential care facilities are permitted uses within residential neighbourhoods and therefore may be provided anywhere within the Precinct without the need to identify sites at this stage.

Emergency services

The precise requirements for these services within the Precinct have not yet been identified.

Civic and cultural facilities

Civic and cultural facilities are to be provided in the Oran Park Town Centre. The allocation is considered adequate.

7.3.2 Provision and assessment

Children's services

The draft ILP has not identified any specific sites for Council childcare facilities. This is not considered to be an issue that needs to be addressed at this stage as there are no significant land use restrictions on their locality and they can be provided as development occurs funded via Section 94 contributions.

A number of locations lend themselves as suitable - the employment land, the neighbourhood centre and school sites which are to be co-located with community facilities.

Community services

Given that community facilities will be permissible in the neighbourhood centre there is potential for space to be used here for a multi-purpose community centre and for community services.

Facilities and services for young people

A youth centre will be located within the Oran Park Precinct which will have capacity to serve the needs of the Turner Road population.

7.3.3 Management response

Children's services

While further detailed planning is required regarding the specific locations of child care facilities, as a rule they should be located:

- adjacent to the neighbourhood community centre; or
- adjacent to the proposed primary school; or
- close to or in the employment lands.

Community services

Further detailed planning with regard to the specific locations of community centres will need to be undertaken. Suitable locations which should be considered are adjacent to/co-located with the neighbourhood centre and proposed primary school.

7.4 Open space and recreation facilities

7.4.1 Requirements

The GCC has established an indicative parameter of 30 hectares of public open space for the Turner Road Precinct, including both active and passive uses. Based on the GDC requirement of 2.83 hectares per 1000 people, 35.7 hectares would be required.

Camden Council has agreed to the provision 0.4 hectares of local open space per 1000 people within the Turner Road Precinct. For an incoming population of approximately 12,600 people, approximately 5 hectares of local open space would be required.

In relation to calculating district open space, rather than applying a fixed standard, a demand based approach is to be used for the Oran Park and Turner Road Precincts based on consideration of Camden Council's recreation demand assessment study, ABS participation rates and the forecast size and characteristics of the incoming population. Regard will also be given to the quality of facilities to be provided and the availability of indoor facilities.

7.4.2 ILP provision and assessment

Local facilities

When providing local open space within the Precinct, Camden Council requires:

- a minimum area of 2,000 square metres, no further than 500 metres walking distance from any dwellings;
- a range of play spaces and recreational opportunities catering for different age groups; and
- co-location with other community uses where possible.

In accordance with the above requirements, the following open space strategy for local open space provision within the Turner Road Precinct has been prepared. The facilities nominated in **Table 15** have been costed on a preliminary basis and are included in the draft Section 94 Plan for the Precinct.

Table 15 – Local open space requirements

Facility	Total area required (ha)
3 x Children’s Playgrounds (suitable for 0 – 4 year olds fenced with equipment)	0.9
3 x Play Spaces (suitable for 5 – 12 year olds with more independent play facilities)	0.9
2 x Managed Lawn Area/ Green Space (0.5 ha in size) suitable for informal recreation use	1.0
1 x Sports Park (2.1 ha) including facilities for soccer, cricket, AFL, tennis, netball and basketball; plus lighting, change rooms and parking	2.1
Total	4.9

Source: Elton Consulting

The draft ILP provides 31.6 hectares in total of open space for active and passive recreation excluding riparian corridors and buffers, or the area of land to be retained as a golf course. This represents a shortfall of 4.1 hectares of open space compared to the GCDC requirement for 35.7 hectares.

The shortfall is a result of the iterative nature of development of the draft ILP which resulted in additional medium density development opportunities being identified close to the neighbourhood centre. This additional development contributes to the Precinct achieving the target dwelling yield.

Further assessment is therefore required to determine whether the total provision of open space is sufficient for the population. In addition, assessment is also required of the breakdown of the open space in the draft ILP in terms of local and district open space and land that is flood affected or otherwise constrained by detention basins, drainage facilities, vegetation for conservation and the like. This would confirm whether there is sufficient open space in the Precinct suitable for active recreation purposes at a local and district level to meet the recommended requirements.

The draft ILP has identified significant land areas within riparian buffer zones for passive recreational use. These have potential to provide suitable opportunities to meet the passive recreational needs for the future population, consistent with the GCDC which states that passive recreation uses are appropriate within the vegetated buffer of a riparian corridor.

Further negotiation with agencies about achievement of multiple objectives for open space (riparian corridors, APZ, recreation etc) will be required.

District facilities

The following design considerations for district open space have been specified:

- Minimum area of 5 hectares, located near public transport and no further than 2 kilometres from all dwellings. (The requirement of the district open space to be within 2 kilometres relates to smaller residential subdivisions and may not be feasible for a precinct like Turner Road).
- Provision of flexible training areas and a range of sporting activities including passive and recreational leisure activities.

The following district open space strategy has been prepared for the combined Oran Park and Turner Road Precincts (**Table 16**). The facilities nominated in the district open space strategy have been costed and included within the draft Section 94 Plans for the two Precincts.

Table 16 – District open space requirements

Facility	Size
Leisure Centre designed to service population of 90,000	6.5-10 hectares depending on components
‘Adventure based’ Recreation Centre designed for population of 35,500	2.5-5 hectares depending on land availability and building layout
3 x District Sports Grounds	6 hectares each

Source: Elton Consulting

It is proposed that district level facilities such as an indoor leisure centre be located within the Oran Park Precinct and as such allocation of land within the Turner Road Precinct for such facilities is not necessary.

7.4.3 Management response

Further information is required on the breakdown of open space within the Precinct. The breakdown should include details of the following for both local and district open space:

- passive open space;
- active open space;
- flood affected open space;
- open space that will contain drainage facilities;
- open within power easements;
- open space containing vegetation to be conserved; and
- open space within riparian buffers.

Once this breakdown is available, further assessment of, and possibly amendments to, the draft ILP may be required to ensure that adequate open space facilities are provided within the Precinct. Notwithstanding this, the local and district open space facilities nominated in **Tables 15** and **16** have been included within the draft Section 94 Plan, thereby ensuring that the funds to provide these facilities will be available.

Local open space and recreational facilities are to be designed to maximise the availability of the vegetated for buffers for passive uses. Design controls will be incorporated into the Precinct DCP.

8.0 Conclusions and recommendations

8.1 Overview

The purpose of the PPR has been to support the precinct planning process for the Turner Road Precinct by documenting and integrating the environmental, social and economic analysis undertaken in support of the draft ILP for the Precinct. The report has documented and assessed the capability of the Turner Road Precinct to be rezoned for urban development – specifically for residential and employment uses – and has examined the environmental, human services and infrastructure issues and impacts associated with the proposal as shown in the draft ILP, within the context of:

- the requirements of the South West Structure Plan;
- the objectives and principles contained in the Development Code; and
- the provisions of the Growth Centres SEPP and other relevant legislation.

The assessment addressed the impacts of proposed development on the environmental features and biodiversity values of the land – creeklines, existing vegetation, ridgelines and views to the Scenic Hills, and indigenous heritage – and examined potential site constraints to development, including noise, odour, land capability and geotechnical conditions. In order to ensure that the draft ILP provides for the future needs of the incoming population, the report also assessed the adequacy of proposed road infrastructure, employment opportunities, community facilities and open space.

The development of the plan was an iterative process characterised by numerous revisions to address, manage or mitigate issues as they emerged. Provisions are incorporated in the Turner Road DCP to further manage or mitigate any potential impacts, to ensure sustainable environmental and social outcomes and to facilitate best practice design.

In preparing this report, the extent to which the draft ILP accords with the objectives of the Growth Centres SEPP and the Development Code was also examined. There were no matters identified where the proposal departs from the requirements or intent of either document and a summary of compliance with these instruments is attached to this report (see **Attachment 1**).

There are, however, variances between the draft ILP and the Structure Plan in relation to the western boundary of the Precinct (along Camden Valley Way), the alignment of the future Badgally Road, the quantum of employment land, and the number of walkable neighbourhoods. As explained in **Section 4.3** of this report, all of these variances facilitate development and enhance the outcomes for the Turner Road Precinct and none detract from the overall planning intent for the SWGC.

To promote a sustainable outcome and manage potential environmental impacts, the draft ILP incorporates the following key features:

- vegetated riparian corridors consisting of core riparian zones and buffers;
- a strategy for water sensitive urban design to manage stormwater run-off, detention and reuse;
- retention and revegetation of Cumberland Plain Woodland in line with the draft Growth Centres Conservation Plan;
- a robust network of arterial, sub-arterial and connector roads to facilitate public transport;
- Asset Protection Zones to manage bushfire risk;
- a vegetated buffer and perimeter road along the Sydney Water Supply Canal;
- Conservation Zones to protect Aboriginal heritage and cultural values;
- vegetated mounds along Camden Valley Way to attenuate noise; and
- the protection of important views and vistas.

The draft ILP provides for a fully socially integrated community through the inclusion of the following:

- land for one primary school;
- land for community facilities;
- nearly 32 hectares of public open space for active and passive uses;
- a neighbourhood centre and several walkable communities;
- a private golf course and associated entertainment facilities;
- 87 hectares of employment land to provide local job opportunities; and
- a street layout that facilitates a mix of housing types and achievement of the GCC's dwelling yield target.

Based on the information provided in the specialist assessments, it is concluded that subject to the recommendations listed in **Section 8.3** and the provisions of the draft Turner Road Development Control Plan:

- there are no impediments or constraints to the land being developed for urban purposes;
- the draft ILP meets the requirements of relevant policies and statutory instruments; and
- the draft ILP provides for the orderly and economic development of the land.

Accordingly, it is recommended that, subject to the recommendations in **Section 8.3**, the Precinct be rezoned in accordance with the land uses described in **Section 8.2** below.

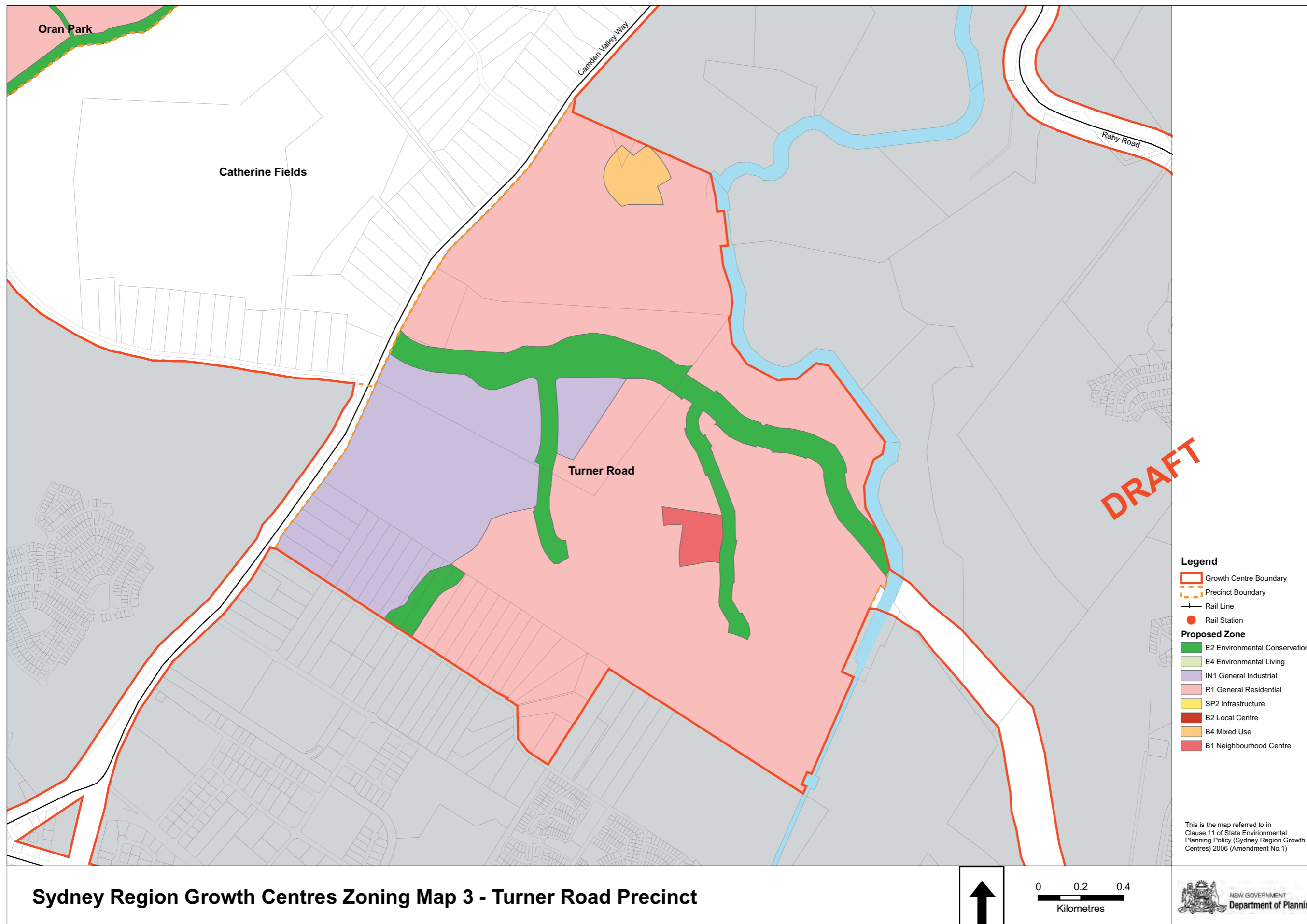
A number of recommendations indicate that further assessment of certain matters is required in relation, for example, to potential archaeological deposits and the final locations and treatments of some watercourses and riparian corridors. To assist in the identification of these and other issues that will be further investigated, a map identifying next steps is provided at **Attachment 3**.

8.2 Proposed land uses

The recommended land use zones for the Turner Road Precinct are illustrated in **Figure 34**. They are deemed appropriate to meet the intent of the draft ILP, achieve the GCC's land use objectives and to protect natural environmental values. The objectives of each zone, specific controls and permitted and prohibited uses are set out in the draft amendment to the SEPP.

In addition, the draft amendment to the SEPP (Sydney Region Growth Centres) 2006 designates land that would be subject to special controls in relation to vegetation clearing and sets maximum height and minimum lot sizes.

It is intended that the Turner Road DCP will control residential yield of 4020 dwellings by splitting the Precinct into several sub-precincts and setting the minimum number of dwellings that must be achieved within each - as illustrated in **Figure 35**.



Sydney Region Growth Centres Zoning Map 3 - Turner Road Precinct

Figure 34 – Draft zoning map

Source: Growth Centres Commission



Figure 35 – Sub precinct densities

Source: JBA Urban Planning Consultants

8.3 Recommendations

This section summarises the recommendations arising from the investigations and planning analysis undertaken for the Turner Road Precinct. The recommendations draw on:

- the analysis of the specialist contractors;
- the inputs of, and outcomes of negotiations with, Government agencies; and
- inputs from the Project Control Group and specialist staff at Camden Council.

It should be noted that this PPR has considered a wide range of views and that in some instances the advice of specialist contractors has had to be balanced against a range of competing needs. In these cases, the recommendations set out below may differ from the views of a particular contractor – but these differences have arisen only after careful consideration.

All relevant recommendations are incorporated in the Turner Road DCP.

8.3.1 Zoning and dwelling yield

Recommendation 1: The land known as the Turner Road Precinct is to be rezoned in accordance with the zoning map accompanying the proposed amendment to the SEPP (Sydney Region Growth Centres) 2006.

Recommendation 2: The dwelling yield for the Precinct is to be in accordance with the Turner Road DCP (see Figure 35).

8.3.2 Landscape and visual character (see section 5.1)

Recommendation 3: Landscape treatments reflecting the scale of each road type are to be included in the DCP.

Recommendation 4: The visual impact of residential development is to be mitigated through the creation of a significant tree canopy via planting of trees in street verges, public parks and residential lots where possible.

Recommendation 5: Controls defining maximum building heights are to be included in the draft amendment to the SEPP (Sydney Region Growth Centres) 2006 to ensure that the built form reflects the locality.

8.3.3 Land capability (see section 5.2)

Recommendation 6: Development is to be restricted in areas identified as being subject to soil creep and erosion unless appropriate engineering works can provide acceptable levels of risk for the development.

Recommendation 7: Salinity management strategies are to be applied to areas affected by moderate to high levels of salinity, including management of associated problems of aggressivity and sodicity.

Recommendation 8: Any land that has not been assessed for salinity, aggressivity and sodicity is to be fully assessed prior to any development.

Recommendation 9: A Soil Management Plan is to be prepared and submitted with all subdivision applications directed at maintaining natural water balance; maintaining good drainage; avoiding disturbance or exposure of sensitive soils; retaining or increasing appropriate native vegetation in strategic areas; and implementing building controls and engineering responses where appropriate.

Recommendation 10: A Stage 2 environmental assessment is to be submitted for development applications on land identified as being potentially contaminated.

8.3.4 Biodiversity *(see section 5.3)*

Recommendation 11: Patches of vegetation (CPW) with high ecological value and recovery potential are to be retained and restored.

Recommendation 12: A detailed tree survey is to be undertaken at subdivision development application stage to identify the location of specific trees which should be retained. In particular, large hollow bearing Eucalypts which have the potential to provide habitat for species within the Precinct are to be retained.

Recommendation 13: Potential stepping stone biodiversity corridors incorporating the riparian corridors and containing remnant vegetation, public reserves and stormwater detention and/or treatments ponds are to be identified, established and maintained.

Recommendation 14: Further discussions are to occur with DNR to ensure that a Category 1 outcome can be achieved in South Creek for locations affected by the power line easement and to resolve the treatment of Category 3 streams within the Precinct.

Recommendation 15: A Conservation Management Plan (CMP) for the Precinct – to be agreed with Camden Council and DEC - is to be prepared which provides a detailed framework for the restoration and ongoing management of the identified conservation areas.

Recommendation 16: Riparian corridors are to be managed in accordance with the categorisation shown in **Figure 20**.

8.3.5 Bushfire *(see section 5.4)*

Recommendation 17: Asset Protection Zones are to be in accordance with the requirements of Planning for Bushfire Protection 2006 and are to be incorporated within perimeter roads and front yard setbacks and within the buffer area to the Core Riparian Zones.

Recommendation 18: Neighbourhood parks and Category 3 riparian zones are to be managed as 'fuel reduced' areas and bounded with perimeter roads to reduce the need for a wider APZ.

8.3.6 Aboriginal cultural heritage *(see section 5.5)*

Recommendation 19: A Conservation Management Strategy (CMS) is to be prepared to establish a Conservation Zone (from Zone 1 lands) which comprises a representative sample of intact archaeological landscapes. Once identified, no development or archaeological investigation is to occur within the nominated area.

Recommendation 20: The Conservation Zones are to be selected from the Zone 1 areas focusing particularly on PAD-TR1 (shown in **Figure 23**).

Recommendation 21: Where land within Zone 1 areas, but outside of the defined Conservation Zone, is to be impacted by development, a program of archaeological salvage excavation is to be undertaken prior to destruction. The selection of areas for salvage are to be in accordance with current best practice (i.e. sampling a defined area usually around 6 hectares in size and achieving open area excavation in the order of 100 metres squared).

Recommendation 22: An indigenous heritage strategy is to be developed in consultation with Aboriginal stakeholders.

8.3.7 Non-indigenous cultural heritage *(see section 5.6)*

Recommendation 23: A detailed assessment of potential archaeological remains is to be undertaken in accordance with the requirements of the NSW Heritage Manual and provisions of the *Heritage Act 1977*.

Recommendation 24: An uninterrupted vegetated corridor or perimeter road is to be provided between the eastern boundary of the Precinct and the Upper Canal System and development along this frontage is to be in accordance with height and setback controls stipulated in the Precinct DCP.

Recommendation 25: Consideration is to be given to renaming the original alignment of Badgally Road as 'Old Badgally Road' and the placement of a commemorative plaque describing its original alignment.

Recommendation 26: The Bunya Pine is to be retained and suitably interpreted.

8.3.8 Water cycle management *(see section 5.7)*

Recommendation 27: Habitable floor levels of future development is to be above the 100 year ARI level with a freeboard of 600mm. Alternatively, a flood evacuation strategy is to be prepared. This matter is to be resolved at the detailed design stage based on further modelling. Further investigation is to be carried out to determine the impact of creek crossings on flood levels.

Recommendation 28: Applications for subdivision within the small landholdings to the south are to address the treatment of stormwater draining to the Narellan catchment.

Recommendation 29: The WSUD strategy prepared will be implemented through DCP controls.

8.3.9 Noise *(see section 5.8)*

Recommendation 30: The ECRTN external noise goals and Australian Standard 2107-2000 internal noise goals are to be adopted as the noise standards within the Precinct DCP for all new dwellings. Further negotiation is to be undertaken with DEC with regard to the relaxation of the noise criteria at the front of dwellings where it can be demonstrated that the AS2107-2000 internal noise goals can be met and where a suitable alternative area of outdoor space can be provided on site that meets the noise criteria.

Recommendation 31: To achieve the required noise goals on all roads except Camden Valley Way, noise mitigation measures are to be incorporated into building design involving a combination of setback distance, architectural treatment and internal dwelling layout.

Recommendation 32: In addition to the above, noise mounds are to be constructed along Camden Valley Way, adjacent to the golf course to mitigate the noise impacts on dwellings in the golf course precinct.

Recommendation 33: Industrial and commercial development is to comply with the amenity criteria set out in the Industrial Noise Policy (DEC 2000) to ensure that such development does not affect residential amenity.

8.3.10 Odour *(see section 5.9)*

Recommendation 34: Within the area potentially affected by Odour, **Figure 28**, buildings are to be designed to ensure that windows and doors do not directly face the odour source. Planning controls relating to odour mitigation in the identified location are to be incorporated in the Precinct DCP.

8.3.11 Roads, traffic and access *(see section 5.10)*

Recommendation 35: Further investigation is required to ensure that the signalling and capacity of Camden Valley Way is adequate to serve the incoming population of Turner Road.

Recommendation 36: Further negotiation to be undertaken with the Roads and Traffic Authority with regard to proposed intersections along Camden Valley Way.

Recommendation 37: Further detailed planning of bus routes be undertaken, in conjunction with the Ministry of Transport, to determine the most appropriate routes that will ensure suburbs are connected and that will ensure adequate coverage of the Turner Road Precinct.

Recommendation 38: Cycle and pedestrian routes are to be connected to community facilities and open space.

Recommendation 39: The road hierarchy is to be reviewed at the detailed design stage, particularly the linking of local and collector roads to higher order roads.

8.3.12 Community facilities *(see section 7.3)*

Recommendation 40: Further discussion with DET is required to determine an appropriate location for a second primary school in the north of the Precinct.

Recommendation 41: All primary schools within the Precinct are to be co-located with community facilities and open space.

Recommendation 42: Negotiations should occur with DET regarding the opportunity to reduce the land required for schools that are co-located with other community facilities.

8.3.13 Open space and recreation *(see section 7.4)*

Recommendation 43: Further assessment of the proposed open space areas is to be undertaken to determine the breakdown of active and passive local open space and district open space within the Precinct. Land that is flood prone, containing vegetation, constrained by power easements or containing detention basins need to be identified.

Recommendation 44: Once district open space facilities and their respective embellishments are identified, the costings of the embellishments and any required land acquisition are to be incorporated into the draft Section 94 Plan.