11 a) Open Space and Recreation Objectives and Major Findings

Introduction/Objectives

The Open Space and Recreation Study sought to establish the nature and extent of open space and recreation facilities/areas required to support the proposed new urban community, having regard to its geographical and recreation setting. The findings and objectives from this Study are summarised below.

Findings

The Study findings reinforced the importance of access to a diverse range of quality open space and recreational opportunities, in both developed and natural open space contexts; it being noted that it is important to have access to a diverse range of social open space and recreational opportunities, in both formal (build/structured) and informal (naturalistic) contexts.

The required areas/facilities will be dedicated and/or acquired through Section 94 contributions, including the required acquisition and/or embellishment of open space.

Types of usable public open space settings that may be provided or constructed using S94 contributions include:

- Small and Large Parks
- Courts
- Playing Fields
- Semi Natural Open Space

The identified local needs such as Small Parks and Shared Pathways are to be accommodated in the Precinct. Higher order, more structured, facilities such as Courts, Skate parks and Playing Fields are able to be located more remotely in locations that service the broader catchment such as the proposed Warnervale Town Centre, the Hakone Road precinct (Woongarah) and the northern residential release areas.

In seeking to locate the proposed District Sporting Facilities the proposed site off Spark's Road in the north of the Precinct was deemed to be too constrained by prevailing ecology and flooding.

Open Space and Recreation Objectives

Distribute Local parks (sized and located to perform different functions) equitably within the Precinct, having regard to desired neighbourhood accessibility and/or natural attributes of the land.

Provide Semi Natural open space that aligns with the proposed conservation of sensitive/endangered ecological communities and management of the extensive floodplain.

Meet the demand for higher order facilities (Courts, Skate parks and Fields) outside the Precinct by way of a contribution.

Contribute toward the provision of district level sporting facilities for the Greater Warnervale area, beyond the Precinct.

Plan active areas of Open Space and provide complementary off set areas to ensure that the primary function of the active areas is not compromised by bio diversity, habitat or heritage conservation functions/constraints.

Provide limited structured environmentally sensitive access to select areas of the semi - natural open space.

Provide a broader shared pathway network to enhance access to open space/recreation facilities and accessibility generally, using the principles of the Shared Pathway Strategy.

Establish attractive and usable open space focussed on constructed wetlands and storages.

Develop the principles of a funding strategy for the dedication, acquisition and embellishment of open space/recreation facilities within and outside the Precinct, having regard to nexus and apportionment principles.

The Strategy will have regard to balancing the level of provision with whole of life asset costs and the manner in which many sports and recreational activities are organised/conducted.

11 b) Social Analysis and Human Service Study

Introduction/Objectives

The subject study sought to identify the potential needs of current and future residents of Precinct 7a through analysis of demographic and housing market data for the surrounding area and an examination of the existing level of social infrastructure provision. A typical population profile for the future community and the range of facilities and services required to support its sustainable establishment (as a new community) was identified. The study also incorporates key liveability principles to inform the Structure Plan/Masterplan and ensure integration of the proposed development with the immediate and broader local communities. A brief overview of the analysis and recommended strategic directions is produced below.

Population Profile

Based on projected density targets the rezoning is estimated to produce 2,050 residential lots equating to 5,300 additional residents and a total population of around 5,900 for the Precinct

The indicative population profile was predicated largely on the characteristics of the nearby communities at Hamlyn Terrace/Wadalba and Woongarrah/Warnervale. . It is anticipated that the incoming population will comprise a high proportion of families with young children in comparison to Wyong Shire and a similar proportion of population aged 60 years and over. This population will have a relative high socio-economic status with higher median weekly income levels and lower levels of employment. A high proportion of families will be purchasing their homes with loan repayments higher the Wyong Shire and State averages.

Social Infrastructure

The Precinct is considered to be well positioned in relation to a wide range of retail, commercial, community, recreation, medical and transport facilities and services, including the recently constructed Hamlyn Terrace Community Centre and proposed higher order facilities and services in Warnervale Town Centre.

Hamlyn Terrace Community Centre and Sporting Facility has recently been constructed next to Warnervale School on Minnesota Road. This facility will provide a focal point for the delivery of services, programs and activities to meet the needs of residents in both Hamlyn Terrace and Precinct 7a. A district level multi-purpose community hub is proposed to be built in Warnervale Town Centre incorporating community spaces for children, family and youth programs, active and healthy living programs, library and Council services, art and cultural space and potentially a government transaction centre and telecommuting hub.

Developer contributions, together potentially with VPA's will form the principal funding source and contribute to social infrastructure in the town centre.

A new primary school has recently been completed in the study area at Hamlyn Terrace (Warnervale Public School). Capacity has been built into this school to accommodate additional students from Precinct 7a. The Department of Education and Training (DET) owns land in the north of the study area on Sparks Road which is proposed to be a future high school site. Two private schools, Lakes Anglican Grammar (K-12) and Mackillop College (K-12) are located near the study area.

There are a number of privately operated child care centres located within the Warnervale/Wadalba social planning district. The anticipated proportion of 0 to 4 year olds will create demand for a new centre. The DA plans Warnervale Primary School allow for the provision of a child care centre to be built at a future date.

A community focus neighbourhood shopping precinct is required and is to be provided in an accessible location near the "Warnies"/Warnervale Station attraction node. This will enhance the role of "Warnies" as a popular focal point for the community. Residents will be able to access higher order retail and commercial services in the proposed Warnervale Town Centre, Lake Haven Shopping Centre, Wyong and Westfield Tuggerah.

Precinct 7a is located in close proximity to Wyong Hospital and a new GP Super Clinic located on Sparks Road.

Connectivity and Community Connectedness

The need to ensure a high degree of connectivity (both within the Precinct and to the Warnervale Town Centre); creation of safe movement systems; local places and space exhibiting high amenity for the community to come together; and clustering/co-location of facilities to create community focal points, were highlighted as important liveability principles. Such principles importantly informed the final structure Plan/Masterplan development.

Diverse community building initiatives such as a Welcome Kit and Information Directory, recurrent funding to expand programs and at the Hamlyn Terrace Community Centre, and a community development worker to facilitate and develop a program of social activities and community events with residents to promote social connections and interactions and foster a sense of community within the Precinct, (potentially funded through a VPA) were raised as essential to the establishment of a sustainable new community.

Housing Choice/Affordability

The need for access to diverse and affordable housing opportunities for people on low to moderate income, was highlighted. The housing market analysis demonstrated increases in housing rental and loan repayments in the area and a lack of rental growth impacting on housing affordability. Wyong Shire and the Warnervale/Wadlaba area in particular, are characterized by a high proportion of the population living in separate dwellings and housing choice in the form of medium density or other types of development is limited.

A template of draft residential development principles have merged from the Structure Plan/Masterplan process in pursuit of housing choice and housing affordability objectives. They are reflected initially in the proposed zoning regime and will be further reinforced in a relevant DCP amendment.

Community Safety

The need to facilitate community safety through physical and social measures was highlighted as central to creating a sustainable new community. Pursuit of safety concerns has informed planning to the current level. More detailed DCP provisions and CPTED focused design/assessment should continue to be adopted as the new community is developed.

11 c) Bushfire

Peak Land Management were engaged to prepare a Bushfire Hazard Assessment for Precinct 7A. The objectives of the assessment are:

- Identify the potential bushfire hazards and risks present for Precinct 7A;
- Identify the danger that such hazards and risks would pose to the proposed development;
- Recommend appropriate mitigation measures, if required, to minimise identified hazards;
- Provide an assessment of bushfire hazards within precinct 7A in accordance with "*Planning for Bushfire Protection 2006*" (PBP 2006)

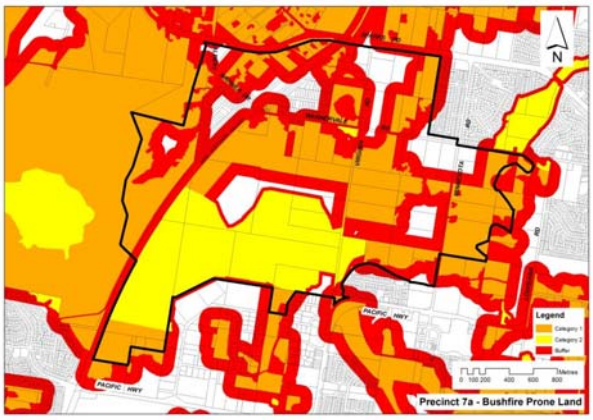

Figure 11.1: Current Bushfire Vegetation Classification

The Bushfire Threat Assessment has outlined recommended Asset Protection Zones (which incorporate perimeter roads, building setbacks on lots, walkways, cycleways, parklands etc) which will separate the proposed development from the hazard. Reticulated water supplies, fire hydrants, through public sealed roads, additional water supply infrastructure (detention basins/dams), underground electricity, and Asset Protection Zone maintenance are also detailed in compliance with PBP 2006. All residential buildings will have to conform with PBP 2006, PBP Amended Appendix 3, 2011, and AS 3959.

Recommendations

The following recommendations are made concerning the proposed development, in order for it to conform to the intent of PBP, 2006.

- ❑ The proposed subdivision (Structure Plan/Masterplan layout) has been designed to conform to PBP, 2006, with adequate Asset Protection Zones and services;

- ❑ All future residential development over the proposed lots will require development approval under Section 79BA of the *Environmental Planning and Assessment Act, 1979* which requires Council to be satisfied that developments in Bushfire Prone Areas comply with "*Planning for Bushfire Protection 2006*"(PBP) guidelines, and relevant standards including the BCA and AS 3959-2009 before granting development consent.

- ❑ The bushfire prone map should be updated for this area once the subdivision is constructed/vegetation removed to save undue bushfire reporting requirements for many future residents.

11 d) Flooding

The objective of the flood study is to:

- optimise developable land within the precinct;
- establish nil flooding impacts on surrounding properties and the natural environment due to the development; and
- consider impacts of proposed floodplain restoration and stormwater harvesting infrastructures.

Cardno have been commissioned by Wyong Shire Council to investigate the flood behaviour and stormwater management for the site. In a previous report, Cardno have prepared a draft Integrated Water Cycle Management (IWCM) Plan to govern the collection, treatment and redistribution of stormwater flows within the study area to both protect the downstream wetland, and to provide the site with harvested stormwater flows to reduce the demand on potable water supplies (Cardno, 2011).

During the Masterplanning process Cardno have been consulted to provide flooding information and recommendations for variations to the structure plan that are considered necessary to offset those effects and which may optimise the developable area.

Figure 11.2 is the result of modelling using the hydraulic behaviour of the proposed infrastructure and change in land use. This modelling was assessed based on the 100yr and 5yr ARI flood events, using the XP_RAFTS hydrology and TUFLOW hydraulic models developed for the wider Porters Creek Flood Study in 2011.

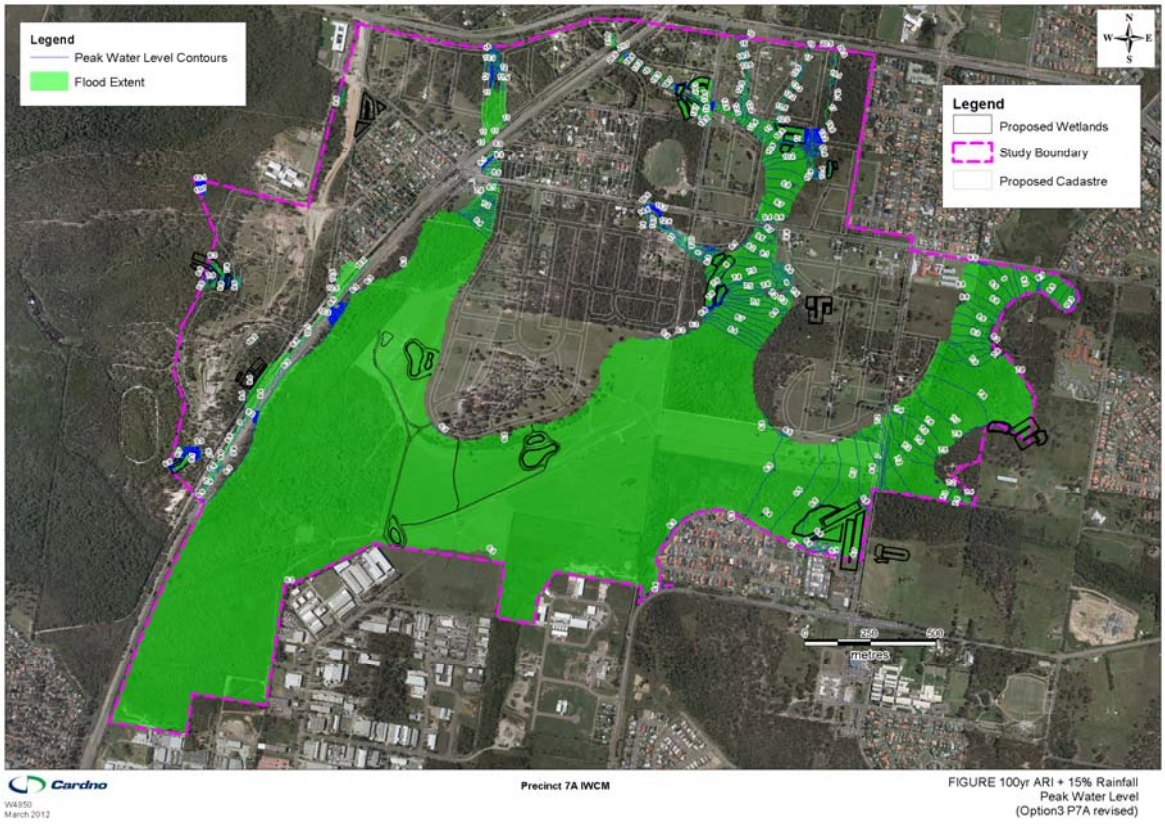

Figure 11.2: Current Flooding Extent 100yr Peak + 15%

The model showed that in all of the ARI events, water level impacts were confined within the Precinct 7A study area. No flood level impacts were evident up and downstream of Precinct 7A

Recommendations

Channels are required with a 100 year ARI peak discharge capacity to manage flood risk to an acceptable level within the upper drainage lines. The overland flowpaths are configured with a low flow channel, channel overbanks/floodplain and riparian zone according to guidelines of the NSW Office of Water and Wyong Shire Council.

Provision of two culvert upgrades along Warnervale Road to convey the flow contained within the overland flowpaths. This will manage increased catchment flows resulting from an increase in impervious area and ensure that Warnervale Road remains flood free in events up to the 100yr ARI event

Conduct a risk assessment and identification of measures to reduce risk of culvert blockage upstream of the railway line along Railway Road north of Warnervale Village.

Conclusion

Overall, the proposed development of the Precinct 7A site performed satisfactorily for both the 100yr and 5yr ARI events. Flows were contained within the designated flow paths of the Masterplan, and the culvert upgrades were successful in conveying sufficient flow to allow Warnervale Road to remain flood free in the 100yr ARI event. No water level increases were observed outside of the study area. Minor water level impacts within the site were confined to the floodway, and did not impact existing or Proposed developed areas.

11 e) Integrated Water Cycle Management

The purpose of the integrated water cycle management (IWCM) study is to:

- Develop a detailed IWCM Strategy and stormwater harvesting solution to service the Precinct 7A – Warnervale and Hamlyn Terrace rezoning. In satisfying this brief the consultant must develop an IWCM solution which::
  - Is compatible with broader stormwater harvesting and reuse schemes which are being developed for the Porters Creek catchment by Wyong Shire Council.
  - Minimises any impacts on Porters Creek Wetland and hydrologically sensitive ecosystems.
  - Is based on ecological, flooding, hydraulic and legal constraints which might affect placement and design of IWCM infrastructure to service new development.
  - Must be cost effective and affordable. Consideration needs to be given to sustainable cost effective maintenance systems.
  - Identify WSUD at lots scale, streetscape and end of pipe, in accordance with draft Chapter 3.2 Water Sensitive Urban Design.
- Provide recommendations to assist site planning and the development of a Masterplan for the Precinct 7A – Warnervale and Hamlyn Terrace rezoning to incorporate WSUD and IWCM strategies.
- Provide designs and estimated costs for each component of the IWCM Scheme which can readily be incorporated into a Section 94 Contribution Plan.

Cardno have been appointed to prepare an Integrated Water Cycle Management Strategy (IWCM) for Precinct 7A taking into consideration the broader Porters Creek Stormwater Harvesting Scheme (See Figure 11.3).

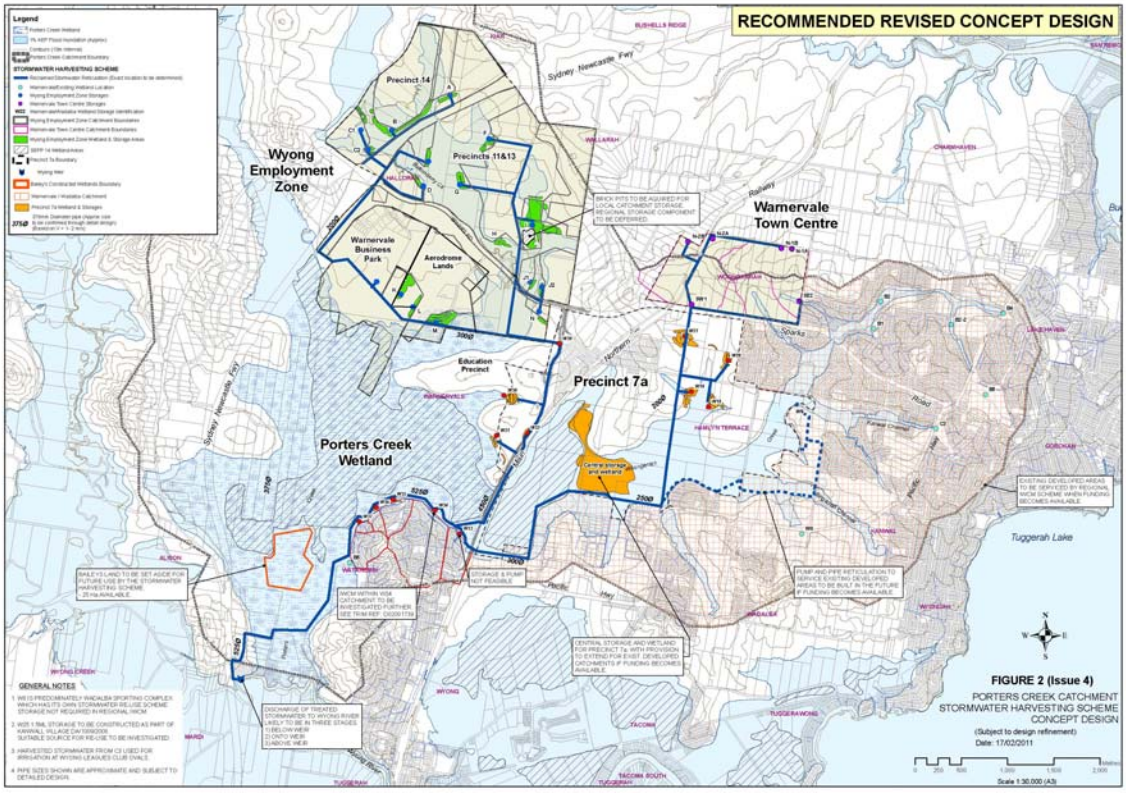

Figure 11.3 Porters Creek Stormwater Harvesting Scheme

The study objectives for the Precinct 7A IWCM include:

- Minimise the impact on Porters Creek Wetland and hydrologically sensitive ecosystems;
- Identify and document ecological, flooding, infrastructure, services and legal constraints on the IWCM strategy;
- Provide water quality and quantity control measure that are cost effective and affordable, with consideration given to ongoing maintenance costs;
- Utilise Water Sensitive Urban Design at lot, streetscape and neighbourhood scales considering Council's Development Control Plan Chapter 3.2 Water Sensitive Urban Design; and
- Be compatible with the broader Porters Creek IWCM scheme currently being developed for the Porters Creek Catchment.

Environmental Constraints Review

An environmental constraints review was undertaken which considered issues such as.

- Maintenance of a 0.5m height difference between the treated stormwater storage and constructed wetland/pond in order to allow drainage through the system;
- Ensure infrastructure was clear of Endangered Ecological Communities;
- Infrastructure is to be clear of acid sulphate soils by limiting the depth of permanent water storages;
- Investigate mitigation measures on sites with moderate to high salinity
- Locate treatment measures clear of services and assets
- Locate treatment measures outside floodways, avoid areas where flood depth is greater than 0.5m

Controlled Activity Approval

The proposed IWCM scheme will be implemented in the catchment by installation of constructed wetlands on the fringe of the floodplain, a central storage facility across the lower floodplain and a reclaimed water pipeline. As such the scheme will involve works in the vicinity of waterways and would be guided by the *Water Management Act 2000*. Council, being a local government authority, are exempt from requiring a controlled activity approval.

Infrastructure Requirements

- Site preparation and earthworks
- Reticulated pipe network
- Drainage structures, pumps and maintenance pits
- Services including electrical supply, controls and switchboard
- Tree planting and landscaping

Key Issues and Recommendations

Porters Creek Wetland is the largest remaining freshwater wetland on the Central Coast. It supports a number of protected species and is an important asset for the community and the environment. The wetland is sensitive to the stresses of decline in water quality and changes to hydrology as a result of development in the catchment. Urban development has been continuing in the eastern part of the

catchment and there is visible evidence that the wetland is suffering such as vegetation die back and weed invasion. Further development within the catchment in the absence of mitigation measures would increase the likelihood of further impacts on the health of the wetland.

In response to the decline in health of Porters Creek Wetland, the Porters Creek IWCM Scheme has been developed to mitigate the impact of development and associated changes in hydrology. The scheme involves the capture, treatment and storage and re-use of stormwater runoff for urban sub-catchments upstream of the wetland.

The IWCM Strategy for Precinct 7A has been prepared based on the objectives of the broader Porters Creek IWCM scheme in order to develop a more detailed concept for the precinct (see Figure 11.4). Elements of the IWCM strategy have been incorporated into the Masterplan for Precinct 7A.

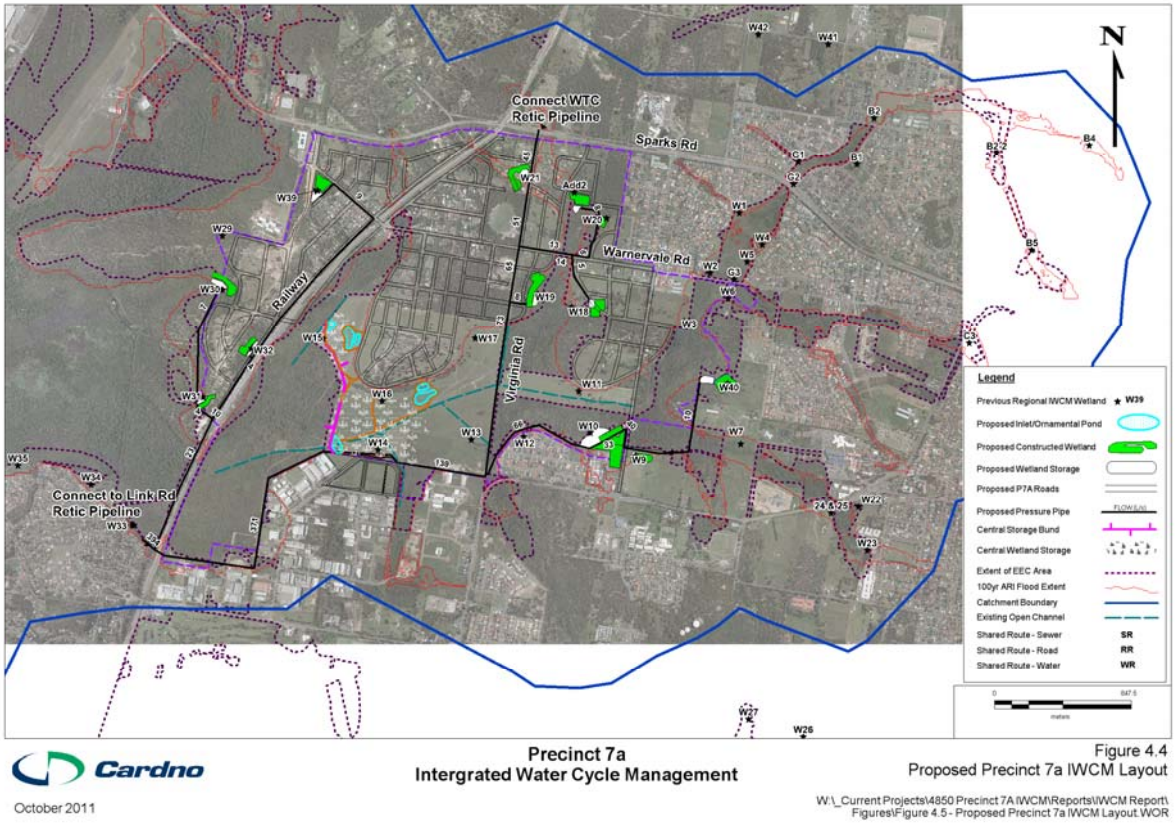

Figure 11.4 Precinct 7A Integrated Water Cycle Management Strategy

11 f) Traffic and Transport Study
25 January 2012

Issue

Impact on Road Network arising from new development

Future traffic conditions in and around the Precinct 7A study area will be influenced by a combination of background traffic growth, additional traffic generated by proposed developments and planned network changes at regional and local levels.

A traffic and transport study is currently being finalised by Hyder Consulting Pty Ltd to identify the road and intersection requirements along Sparks Road and within the Precinct 7A development site to accommodate the projected traffic increases, to cater for forecast traffic flows, at 2021 and 2031.

The scope of the study includes:

- Build a road network model, based on EMME-2 information from the Roads and Maritime Services (RMS - formally Roads and Traffic Authority), and update it with the latest trip tables (etc), land use information and predictions, within the study and surrounding area, for the short (2021) and long (2031) term planning horizons.
- Undertake an assessment of the road network to include an analysis of the impact of both upgrading works designed to increase the capacity of existing roads, and construction of new links within or that impact on the study area.
- Carry out sensitivity analysis to compare and evaluate alternative road networks and land use options within the context of the study.
- Evaluate the Benefit/Cost for any proposed new road links within the study area.

The study takes into consideration public transport accessibility, cycleway networks and pedestrian pathways, including future servicing of the new Warnervale Town Centre, Railway Station and the surrounding area.

Background

In June 2009, Council a ppointed Hyder Consulting to undertake a Traffic and Transport Study for the Precinct 7A planning proposal. The study is being carried out in 4 phases as outlined below.

<u>Phase 1 Preliminary Assessment (Preliminary Land Use Strategy)</u>

Phase 1 of the study to include a preliminary assessment of the existing road network, calculation of traffic generation for Precinct 7A (based on a preliminary Land Use Strategy) and a number of other planned land use proposals, and modelling of a number of road network scenarios within the precinct for 2031.

The following road network was assumed for the 2031 modelling:

- F3 Freeway upgraded to three through lanes in each direction
- Pacific Highway upgraded to two lanes in each direction
- Sparks Road, upgraded to two lanes in each direction.
- Left in and left out only at:
    - Sparks Road and Virginia Road intersection;
    - Sparks Road and Hiawatha Road intersection;

- Sparks Road and Coral Gum Road intersection;
- Sparks Road and Dundonald Road intersection;

The study methodology included but was not limited to:

a. Assessment and recommendations regarding the viability of grade separated vehicular and pedestrian crossing (designs and locations) of the Sydney to Newcastle Railway in the vicinity of the existing Warnervale Village

b. Consultation with RailCorp to determine if the existing Warnervale Railway Station is to remain.

c. Consultation with local bus operator and Ministry of Transport regarding bus routes, particularly taking into account future servicing of the new Warnervale Town Centre, Railway Station and the surrounding area.

d. Assessment and recommendations for general traffic planning issues within the study area including public transport accessibility, cycleway networks and pedestrian pathways.

e. Refining the base year data to reflect the current developments existing within the region, particularly those that impact the area within Wyong Shire.

f. Reviewing the current road network, calibrating and reporting on calibration against existing traffic volumes for 2 hour peak periods for both AM and PM.

g. Simulating the operation of the network for 2 hour peak periods for both AM and PM for 2031, for the land use planning and road network options.

h. Simulating the operation of the road network to include additional road links and improved capacities due to road widening proposals. Two scenarios were tested:

Scenario A - Without the proposed Link Road (connecting Sparks Road (MR 509), at its intersection with Albert Warner Drive, Warnervale to the Pacific Highway (SH 10), Watanobbi), and Scenario B, with the proposed Link Road (connecting Sparks Road (MR509), at its intersection with Albert Warner Drive, Warnervale to the Pacific Highway (SH 10), Watanobbi). Both of these scenarios assessed:

- Without a connector road between Sparks Road (Between Virginia Road and Minnesota Road), and Warnervale Road.
- With a connector road between Sparks Road (Between Virginia Road and Minnesota Road), and Warnervale Road.
- Without widening of Sparks Road (MR509) – single lane in each direction.
- With widening of Sparks Road (MR509) – 2 lanes in each direction.
- With Minnesota Road deviation.
- Without Minnesota Road deviation.
- With a Warnervale Road / Albert Warner Drive railway crossing being available.
- With the Warnervale Road / Albert Warner Drive level railway crossing closed.

<u>Phase 2: Masterplanning & Final Assessment</u>

Phase 2 involved the consultant participating in a workshop to develop a Masterplan for the rezoning proposal. This included providing comment and recommendations based on the investigations undertaken in Phase 1 of the project.

Phase 3: Reviewing modelling and road and intersection requirements

Phase 3 involves the modelling and assessment on the requirements for all roads based on the final land use strategy for the 2021 and 2031 planing horizons. It is also includes:

a. Analysing the performance and capacity and identifying treatments/layouts of the following intersections for 2021 and 2031.
    i. Sparks Road/Link Road connecting Sparks Road and Pacific Highway.
    ii. Sparks Road/Virginia Road.
    iii. Sparks Road/Connector Road (between Virginia Road and Minnesota Road) connecting Sparks Road and Warnervale Road.
    iv. Warnervale Road/Virginia Road
    v. Pacific Highway/Minnesota Road
    vi. Sparks Road/Minnesota Road
    vii. Warnervale Road/Minnesota Road
    viii. Warnervale Road/Connector Road (between Virginia Road and Minnesota Road) connecting Sparks Road and Warnervale Road.
b. Benefit/cost analysis for any new road links within the study area.

Phase 4: Finalise report

Preparation of final draft of the report

Preparation of final traffic report.

Any recommendations for proposed road network designs show a basic schematic layout, indicating general sizing and include an estimate of cost.

Current Status - Future Road Network and Traffic Forecasts

Traffic modelling has been conducted for 2031. Revised modelling for 2031, and new modelling for 2021 will be completed when the final masterplan has been adopted by Council.

The work is to include:

- Reviewing/analysing the AM and PM peaks for the Masterplan currently on exhibition, with the anticipated development uptake and road network for 2021 and 2031 and,
- Carry out SIDRA modelling of the critical intersections (listed above for Phase 3), and identify the treatment and layout of the intersections.

The modelling for 2021 will assume:

- No Link Road, Watanobbi to Warnervale
- Sparks Road duplication (two lanes in each direction)
- No Warnervale Road to Sparks Road connection
- No Changes to existing level Railway Crossing

Two scenarios are to be carried out for the revised 2031 modelling. The two scenarios are to be with and without a grade separated vehicular facility at or near the existing Warnervale Road/Albert Warner Drive railway crossing.

Both scenarios are to assume:

- Completed Link Road, Warnervale to Watanobbi;
- Sparks Road duplication (two lanes in each direction)
- A connector road between Sparks Road (Between Virginia Road and Minnesota Road) and Warnervale Road.
- Traffic control devices on Minnesota Road, between Warnervale Road and Sparks Road.

Comments on modelling carried out for 2031

The traffic modelling which has been carried out for the ultimate development year, 2031 has identified:

- Sparks Road
    - Traffic movement along Sparks Road is forecast in the order of 39,000 vehicles per day east of Minnesota Road. A higher traffic volume is forecast west of Albert Warner Drive in the order of 56,000 vehicles per day. The future traffic demand on Sparks Road justifies the need for upgrading to four lanes.
- Warnervale Road/Albert Warner Drive level railway crossing
    - Traffic on Warnervale Road west of Minnesota Road is forecast in the order of 2,900 to 11,000 vehicles per day depending on scenarios. Without the rail crossing, daily traffic at this location is forecast to reduce up to 33 percent.
    - Traffic on Warnervale Road immediately east of the railway, is forecast to be in the order of 7,600 vehicles per day with a crossing of the railway line. Without a railway crossing (existing level crossing or grade separated facility), this will reduce by 27% to 5,500 vehicles per day.
    - The closure of the level railway crossing would divert additional traffic to Virginia Road and the proposed connector road between Sparks Road and Warnervale Road, located between Virginia Road and Minnesota Road. Daily traffic is forecast to increase on Virginia Road from 2,500 vehicles to 5,300 vehicles. Similar traffic increase is expected on the proposed connector road between Warnervale Road and Sparks Road from 10,000 vehicles to 12,300 vehicles.
- Connector Road, Warnervale Road to Sparks Road (located between Virginia Road and Minnesota Road), aligning with the entry road to Warnervale Town centre/Sparks Road intersection.
    - It is essential that there is a connecting road between Sparks Road and Warnervale Road, located between Virginia Road and Minnesota Road. Traffic on the proposed connector road is forecast in the order of 7,500 to 12,300 vehicles per day, depending on the scenarios with other roads. The 7,500 vehicles per day is with no Minnesota Road deviation and no speed control devices in Minnesota Road. This volume increases to 12,300 vehicles per day with speed control devices in the section of Minnesota Road between Warnervale Road and Sparks Road. Without this connection, the traffic volume along Minnesota Road, between Warnervale Road and Sparks Road, will increase from approximately 5,300 vehicles per day to 13,000 vehicles per day.
    - The anticipated traffic demand justifies the need for this new link between Sparks Road and Warnervale Road.

- Proposed Minnesota Road deviation (proposed under DCP criteria, this was planned to deviate south of Warnervale Road, eventually aligning with entry the future road to the Warnervale Town Centre)
    - Model forecasts traffic on a Minnesota Road deviation in the order of 9,200 vehicles per day. Modelling results suggest that without a Minnesota Road deviation the expected traffic increase on other parallel roads would be low. The analysis does not suggest the need for a new Minnesota Road deviation. A northbound slip lane at Minnesota Road/Warnervale Road intersection would provide adequate capacity (to link to the connector road discussed above).
- Minnesota Road, between Warnervale Road and Sparks Road.
    - Traffic control devices will be required on Minnesota Road (Warnervale Road to Sparks Road) to encourage motorists to use the proposed connecting road between Sparks Road and Warnervale Road, (between Virginia Road and Minnesota Road). Without speed control devices, along Minnesota Road (Warnervale Road to Sparks Road) the traffic volume on Minnesota Road is likely to increase from 6,300 vehicles per day to 13,000 vehicles per day.
- Link Road (Watanobbi to Warnervale)
    - Without the Link Road, by 2031, the traffic volume along Minnesota Road, north of the Pacific Highway is likely to increase from 8,400 vehicles per day to 16,200 vehicles per day.
    - With the Link Road, by 2031, the traffic volume along Highway, west of Minnesota Road, will decrease from 31,900 vehicles per day to 20,600 vehicles per day

Road Hierarchy

A proposed road hierarchy has been developed for Precinct 7A (see Figure 11.5). The proposed road hierarchy has taken into account the long term planning requirements to integrate Precinct 7A with other planned urban release areas outside the precinct, for example, Warnervale Town Centre and Wyong Employment Zone.

Figure 11.5 Proposed Hierarchy

Future Upgrading Sparks Road

The Roads and Maritime Services (RMS – formally the Roads and Traffic Authority) is currently preparing concept plans for Sparks Road. Whilst, initially the road will require upgrading to dual carriageway (two lanes in each direction), the RMS is preparing its design for the ultimate road width of three lanes in each direction. This is to ensure that there will be adequate road reserve width for the future.

The RMS proposes that sufficient land be set aside at each of the intersections, for three through lanes in each direction on Sparks Road, plus the additional turning lanes. In addition, consideration is being given to an appropriately wide median to accommodate fauna movements across Sparks Road at certain locations.

The Sparks Road, road reserve widths, particularly at intersections, will need to be confirmed by the RMS to identify additional land requirements. This will need to be identified for future acquisition in the draft Local Environmental Plan.

Specific Road Upgrading Requirements

The analysis to date has again identified the need for construction of the remaining section of the Link Road, so that there is a direct connection between Watanobbi and Warnervale. The remaining section should be completed between 2021 and 2031. This will facilitate traffic movements between Wyong and the Warnervale Town Centre, Wyong Employment Zone and access for northbound movements on the F3 Freeway to Newcastle etc. It will reduce traffic volumes on Minnesota Road by 49% and the Highway, west of Minnesota Road by approximately 35%.

Public Transport

- **Rail**
    - The study also considers the possibility of grade separated crossings, for both pedestrians and vehicles. Whilst the pedestrian crossing needs to be in the vicinity of the railway station, it may be feasible for a vehicular crossing to be located north of the existing level crossing.
    - Analysis carried out to date has identified that there is adequate capacity within the existing/proposed road network for the future closure of the existing level railway crossing.
    - Transport for New South Wales has not been able to provide a definitive answer on the future of the existing level crossing.
    - It should be noted that one major landowner has made an unsolicited request to the Department of Premier and Cabinet to upgrade the existing Warnervale Village Railway Station to 8 car capacity, with additional carparking provided on the eastern side of the railway line.

- **Bus Servicing**
    - A designated bus route has been identified on the road hierarchy map (Figure 11.5).
    - Bus stops will be provided along the route at maximum of 400 metre spacing. Approval from the local bus company and Transport for NSW is required for the proposed route as it will be an extension of current bus services. The frequency of the services will also need to be determined and approved by the local bus company and Transport for NSW.

Pedestrian and Cycleway Movements

Walkability and the provision of cycleways/shared paths, is a key feature proposed for this precinct. A combination of on and off road cycleways is proposed. These are to encourage residents to walk or cycle to the proposed neighbourhood shopping centre, local schools and Warnervale Village Railway Station. The proposed cycleways/shared pathways are identified in Figure 11.6.

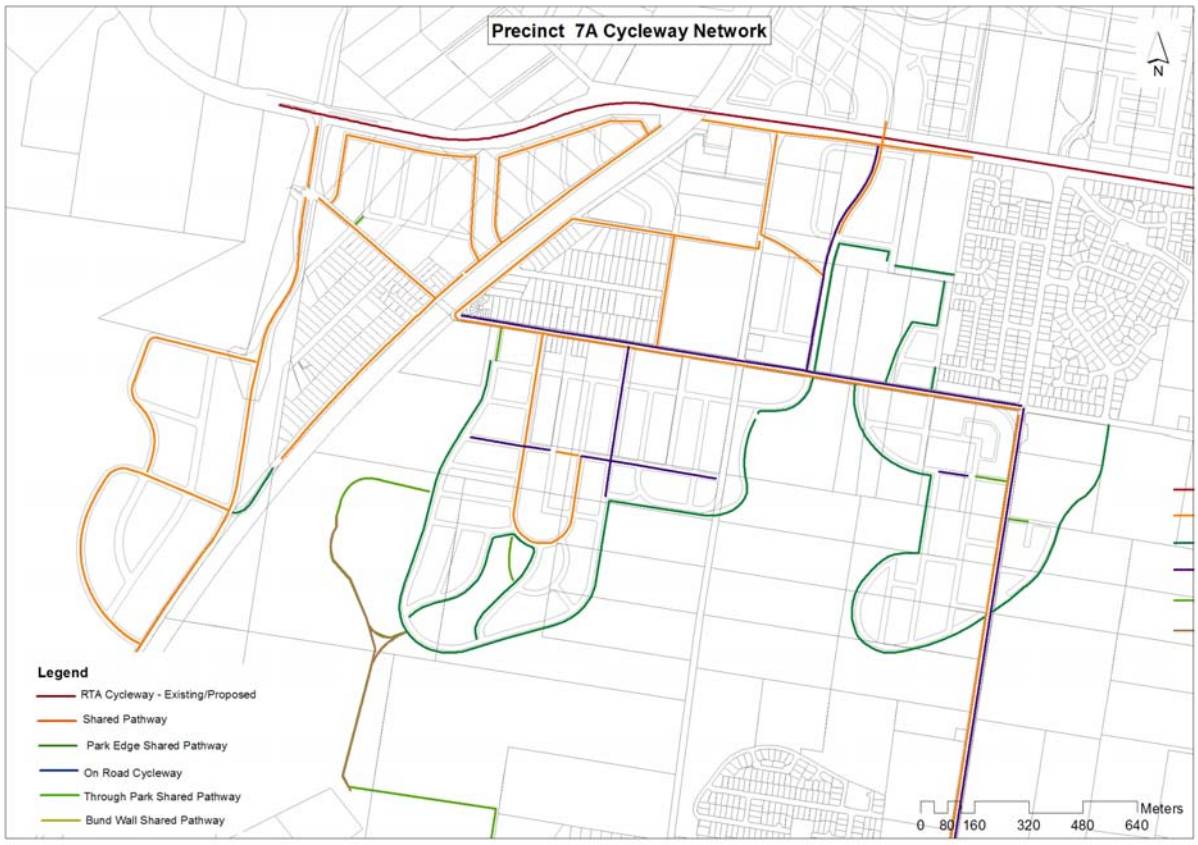

Figure 11.6 Proposed Cycleways/Shared Pathways

Preliminary Recommendations

The study, to date, has highlighted the following:

- The need for Sparks Road to be upgraded to dual carriageway (two lanes in each direction).
- That a new road, connecting Warnervale Road and Sparks Road (located between Virginia Road and Minnesota Road) is essential. The road should align with the proposed entry road to the proposed Warnervale Town Centre, forming a 4-way intersection at Sparks Road.
- There is no need for a Minnesota Road deviation, south of Warnervale Road.
- To encourage direct access along the proposed connecting road (Warnervale Road to Sparks Road) to the Town Centre, the following is required:
    - A left turn slip lane be provided for Minnesota Road northbound traffic at the Warnervale Road intersection.
    - Traffic calming be provided along Minnesota Road, between Warnervale Road and Sparks Road. This is to discourage both excessive speeds and use of this section of Minnesota Road by through motorists.
- There is adequate capacity within the road network to accommodate the closure of the level railway crossing at Albert Warner Drive/Warnervale Road.

- The need for a vehicular grade separated facility over the railway line is not required in the short term. However, for connectivity between communities on both sides of the railway line, the opportunity for a grade separated facility in the future, north of Warnervale Road should be preserved.
- There will be adequate capacity in the road network and street widths identified in the Structure Plan/Masterplan, to accommodate the proposed development at 2031.
- The Link Road between Watanobbi and Warnervale is required during the early 2020's to eliminate excessive traffic volumes along Minnesota Road and other local streets. It will also reduce traffic volumes on the Pacific Highway, delaying the need for the upgrading of the Pacific Highway, between Watanobbi and Gorokan.

11 g) Flora and Fauna

An ecological assessment has been conducted by Umwelt. The ecological constraints discussed in the ecological assessment were considered as part of the development of the proposed Structure Plan for the study area, and this has lead to the retention and protection of 288 Ha (53%) of the study area (much of this area is flood affected and contains Endangered Ecological Communities (EECs), recorded locations of threatened flora and fauna species, or their known habitats. A total of 14 vegetation communities and six different habitat formations were identified and described. Key findings of these investigations included the identification of five threatened flora species, nineteen threatened fauna species, one endangered flora population and four endangered ecological communities (EECs) within the study area (see Figure 11.1 Endangered Ecological Communities).

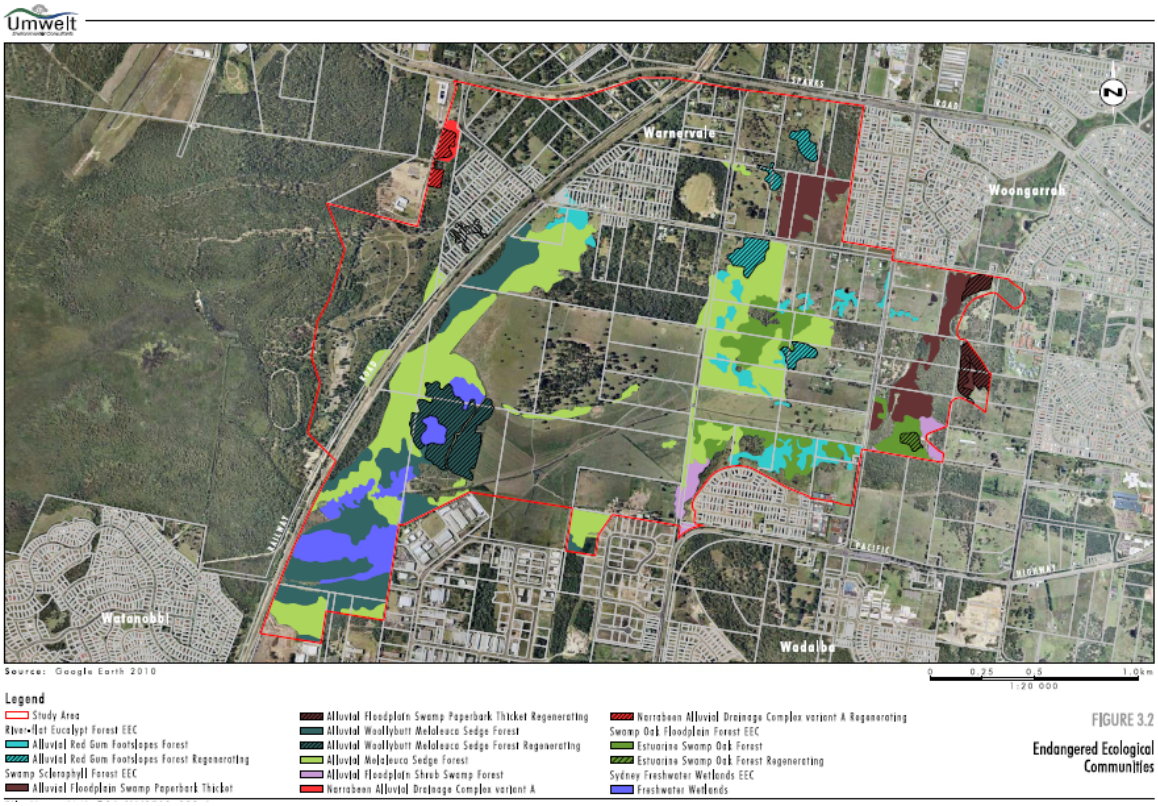

Figure 11.1 Endangered Ecological Communities

Of the 14 vegetation communities identified in the study area, four EEC's listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) were identified. These are:

- River-flat Eucalypt Forest on Coastal Floodplains EEC;
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions EEC;
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions EEC; and
- Sydney Freshwater Wetlands in the Sydney Basin Bioregion EEC.

Threatened plant species

Five threatened flora species and one endangered flora population (all listed under the TSC Act), have been recorded in the study area by Umwelt and in previous flora surveys. These species are:

- heath wrinklewort (*Rutidosis heterogama*);
- biconvex paperbark (*Melaleuca biconvexa*);
- small-flower grevillea (*Grevillea parviflora* subsp. *parviflora*);
- *Thelymitra* sp. *adorata*; and
- *Maundia triglochinoides*.

Of these, heath wrinklewort, biconvex paperbark and small-flower grevillea are also listed as Vulnerable under Commonwealth Legislation under the Environment and Protectionand Biodiversity Conservation Act, 2000 (EPBC Act). The endangered population *Eucalyptus parramattensis* subsp. *parramattensis* in the Wyong and Lake Macquarie LGAs has been recorded by Umwelt in the study area (see Figure 11.2).

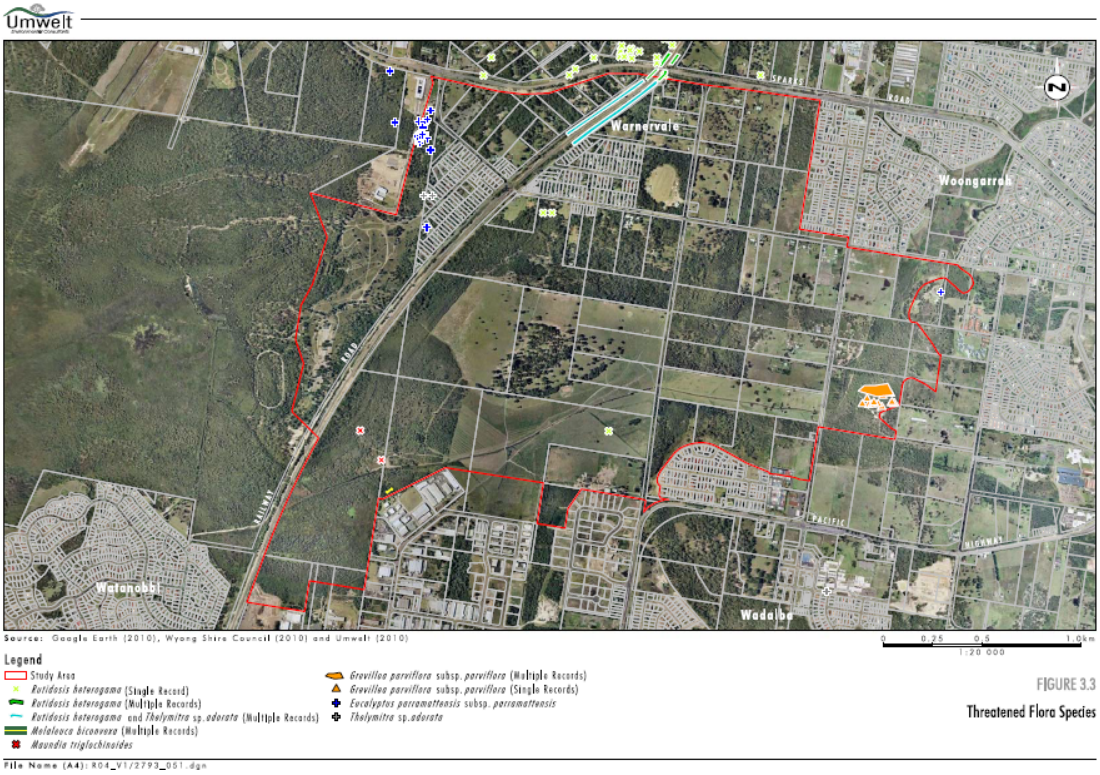

Figure 11.2: Threatened Plant Species

Threatened fauna

Nineteen threatened fauna species have been recorded in the study area by Umwelt and in previous fauna surveys (See Figure 11.3). These species are:

wallum froglet (*Crinia tinnula*);
Australasian bittern (*Botaurus poiciloptilus*)
green and golden bell frog (*Litoria aurea*)
black-necked stork (*Ephippiorhynchus asiaticus*)
little lorikeet (*Glossopsitta pusilla*)
little eagle (*Hieraaetus morphnoides*)
powerful owl (*Ninox strenua*)
masked owl (*Tyto novaehollandiae*)
grey-headed flying-fox (*Pteropus poliocephalus*)
yellow-bellied sheathtail bat (*Saccolaimus flaviventris*)
barking owl (*Ninox connivens*);
varied sittella (*Daphoenositta chrysoptera*);
squirrel glider (*Petaurus norfolcensis*)
koala (*Phascolarctos cinereus*)
large footed-myotis (*Myotis macropus*)
little bentwing-bat (*Miniopterus australis*)
eastern bentwing-bat (*Miniopterus schreibersii oceanensis*)
greater broad-nosed bat (*Scoteanax rueppellii*)
eastern freetail-bat (*Mormopterus norfolkensis*)

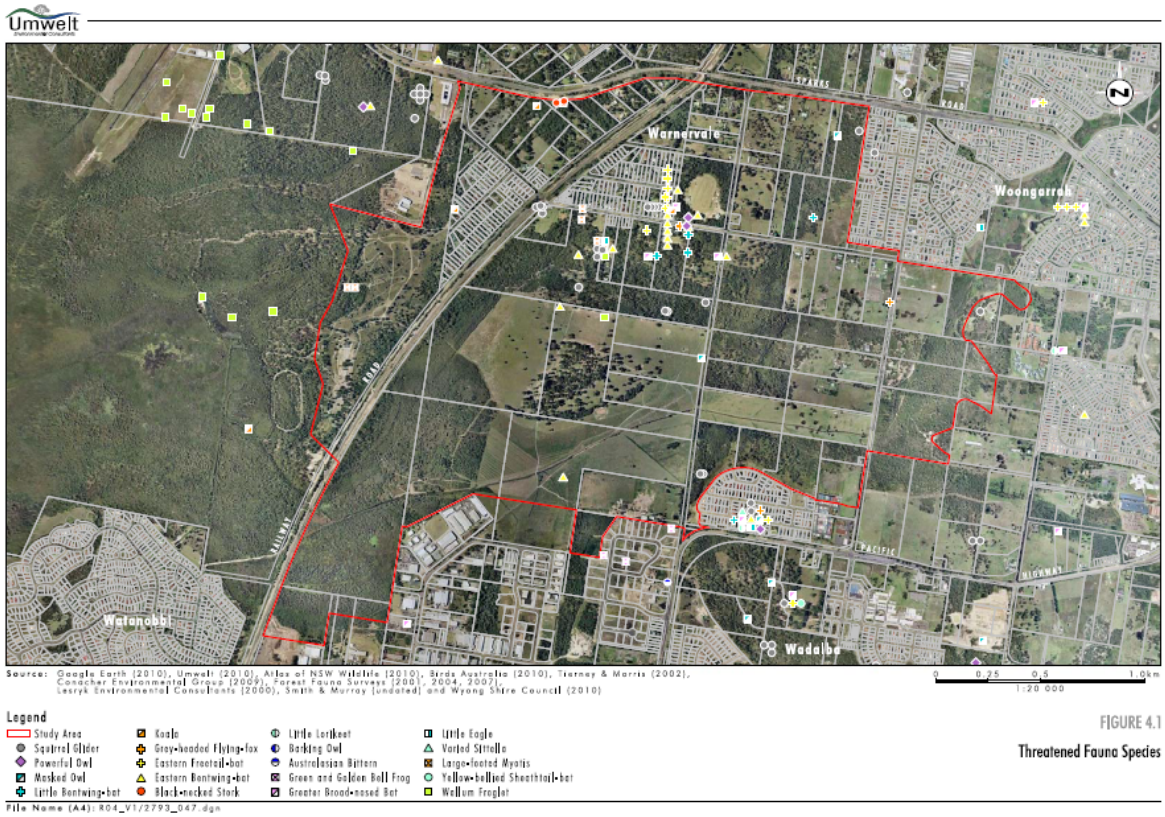

Figure 11.3 Threatened Fauna

There is currently a high degree of connectivity of vegetation in the study area, which will be modified by future urban development. The Precinct 7A Structure Plan shows that significant areas of native vegetation will be protected on the floodplain. Cleared portions of the floodplain will also need to revegetated, and will be targeted to enhance habitat connectivity between habitat fragments on the floodplain.

Future management of conservation lands

Large areas of the Warnervale Floodplain will be protected as part of this rezoning. The majority of these areas are identified for acquisition under the existing Section 94 Contribution Plan for the Warnervale/Wadalba area. However, these acquisition areas will need to be revised to align with the boundaries of conservation zoned land outlined in this Planning Proposal. Much of this land will be transferred to Council ownership over an extended timeframe as Precinct 7A is developed.

A draft Conservation Management Plan has been prepared by Umwelt. This document provides the objectives and management recommendations for the maintenance and enhancement of biodiversity values for those parts of the study area set aside for conservation purposes. Approximately 288 Hectares of the study area is proposed for conservation purposes and it is expected that 80 Ha of the floodplain will eventually be restored. Other parts of the floodplain will be used for stormwater management, drainage and passive recreational uses. Substantial areas of the floodplain are currently grazed by catlle aswell. The majority of the floodplain will eventually be rehabilitated.

Council staff will seek to ensure that the costs of rehabilitating and managing the land are minimised and will explore revenue raising opportunities to offset some of these costs. Some examples of possible options include:

- Swamp forest rehabilitation programmes which link into carbon farming programmes will be explored.
- Grant funding.
- Establish short term grazing lease until land is ready to be rehabilitated.
- Sale of Biobanking credits etc

Conservation Outcomes and Offsetting Approach

The Precinct 7A Structure Plan has been developed to minimise the loss of native vegetation as much as practicable, however vegetation removal will still occur and these impacts will need to be carefully examined and offset with appropriate mitigation measures. The Precinct 7A rezoning will result in the creation of 288 Ha of environmental land or 52% of the entire Precinct 7A study area. This area mostly covers floodplain, wetlands (including a large area of SEPP 14) and EEC's.

Approximately 50 Ha of vegetation and a further 20 Ha of disturbed vegetation will be removed within development areas identified by the Structure Plan. There are a number of different offsetting tools available in NSW. None of which integrate particularly well with the land rezoning process. The main mechanisms include Biobanking, Biocertification and offsets under the *Native Vegetation Act*. Significant community benefits will result in securing the significant environmental assets proposed as part of the Precinct 7A rezoning. However, it will only have minimal value in terms of satisfying the "maintain/improve outcome" as measured by Bio Metric techniques such as Biobanking or Biocertification as a strategy to offset development impacts. These bio Metric techniques are still weighted heavily on a 'like for like' rule which basically means that additional offsets would need to be obtained to offset the clearing of dryland forests which are not well represented in proposed conservation areas (which mostly contain swamp forest vegetation communities).

There would be significant benefits in achieving Biocertification in terms of providing development certainty where threatened species legislation can be turned off in new development precincts, managing future risks in terms of potential impacts arising from new threatened species listings and

different views on interpreting whether EEC's should apply or not to a particular area. However, the benefits for this precinct would need to be more closely scrutinised.

The implication might mean that some future residential subdivision proposals may have localised "significant" impacts under S. 5A of the *Threatened Species Conservation Act, 1995* and will need to be supported by a Species Impact Statement (SIS) with OEH concurrence. This may lead to delays in processing some development applications for future subdivision.

Due to the time consuming nature of preparing biocertification documentation (as experienced by Council with the Warnervale Town Centre example) and the likelihood that large offset areas would need to be purchased off-site to achieve biodiversity certification (which would need to be purchased and managed) biocertification may not be pursued at the present point in time and will need to be examined in more detail post exhibition of the Precinct 7A draft LEP.

11 h) Noise and Vibration

Objective

The subject study sought to identify potential noise and vibration impacts and establish a range of ameliorative measures where the adopted standards were exceeded. Such measures were developed in an interactive manner with the Structure Plan/Masterplan finalisation.

Traffic Noise

The assessment concluded that road traffic noise from Warnervale Road, Albert Warner Drive and Minnesota Road will exceed day peak hour external traffic noise goals by up to 8dB(A), whilst night time exceedances in respect of Sparks Road are likely to be 23dB(A)[1]. The assessment also noted previous study conclusions that noise impacts associated with the Link Road are not likely to exceed adopted day and night time criteria. It was also noted that, with established criteria, future increases in road traffic between 2009 and 2018, noise levels will increase between 2.5 and 3.0 dB(A)[2] on Sparks Road.

A relevant acoustic management strategy was accordingly advanced as follows:

- Consideration should be given to incorporating a setback distance for residences facing Sparks Road, in conjunction with noise barriers and architectural treatment of these buildings.

- A similar strategic approach focussed on the architectural treatment of buildings may be required for Warnervale Road, Albert Warner Drive and Minnesota Road.

Rail Noise and Vibration

The assessment concluded that noise level exceedances of up to 29dB (A) could be expected inside residences closest to the rail corridor[3]. It also concluded that predicted vibration attached to the use of the rail corridor was well below the preferred night time criteria for residences[4].

A relevant acoustic strategy encompassing a setback distance for residences (if possible) facing the rail line in conjunction with architectural treatment of such buildings, shall be implemented.

No vibration mitigation strategy is noted to be required.

Aircraft Noise

The assessment concluded that all of Precinct 7A is outside the 20 ANEF contour and that, in accordance with the relevant Australian Standard, all areas are acceptable for development of all building types.

No aircraft noise mitigation strategy is accordingly noted to be required.

1 At the closest location to Sparks Road.
2 Day peak hour criteria.
3 Assuming losses of 10 to 20 dB(A) as noise moves from outside to inside a building.
4 Such vibration levels are not considered likely to change significantly in the future given no projected change to the rail corridor alignment or operational nature/type of trains.

Acoustic Strategy

Sparks Road

- Utilisation of a combination of setbacks, noise barriers and effective building design.
- Placement of an internal subdivision/service road between the proposed development areas and Sparks Road.
- Construction of noise barriers north of such service road arrangement.
  (The height of the noise barrier will relate to the final profile of Sparks Road)
- General application of best practice residential acoustic design principles.
- Design dwellings facing Sparks Road so as to balance optimum acoustic amenity with the amenity of dwellings and outdoor private spaces.

Albert Warner Drive, Warnervale Road and Minnesota Road

- Setbacks and noise barriers impractical and undesirable (in terms of amenity and accessibility urban design outcomes)
- General application of best practice residential acoustic design principles

Sydney to Newcastle Railway

- Utilisation of a combination of setbacks, noise barriers and effective building design.
- Noise barriers where required should be constructed alongside rail corridor if possible.
- Where not possible noise barriers should be constructed along the property boundary facing the rail line.
  (The height of the barrier can be lower where the rail line is in cut.)

11 i) Structure Plan and Masterplan Principles

Planning Proposal Precinct 7A
Warnervale & Hamlyn Terrace

A Structure Plan and Master Plan Principles document has been developed by Council's consultant (Architectus) to support the Planning Proposal for the rezoning of Precinct 7A.

The Structure Plan is an element of a larger project (including the Planning Proposal) focused on achieving an amendment to Wyong LEP in order to facilitate development and contribution towards achieving the additional population, dwelling and employment targets required for the Shire.

The Structure Plan includes a baseline report that organises and documents an analysis of existing conditions and draws on the various Council and consultant studies as well as the research of the Architectus team. The key opportunities and constraints have been documented. These have identified the potential developable area of the Precinct, and mapped the constraints and therefore the impacts upon the form and type of potential development. Opportunities were then structured into categories.

Structure Plan options were developed and formed the basis of consultation with the community through two design Charette workshops. A sustainability assessment was undertaken against the Preferred Structure Plan

The Final Structure Plan includes an Illustrative Master Plan and Development Principles for Precinct 7A. The latter includes character statements, typical built form guidelines for residential, employment and neighbourhood centre development and an Indicative Lot Layout.

A Sustainability Assessment of the Master Plan is also included.

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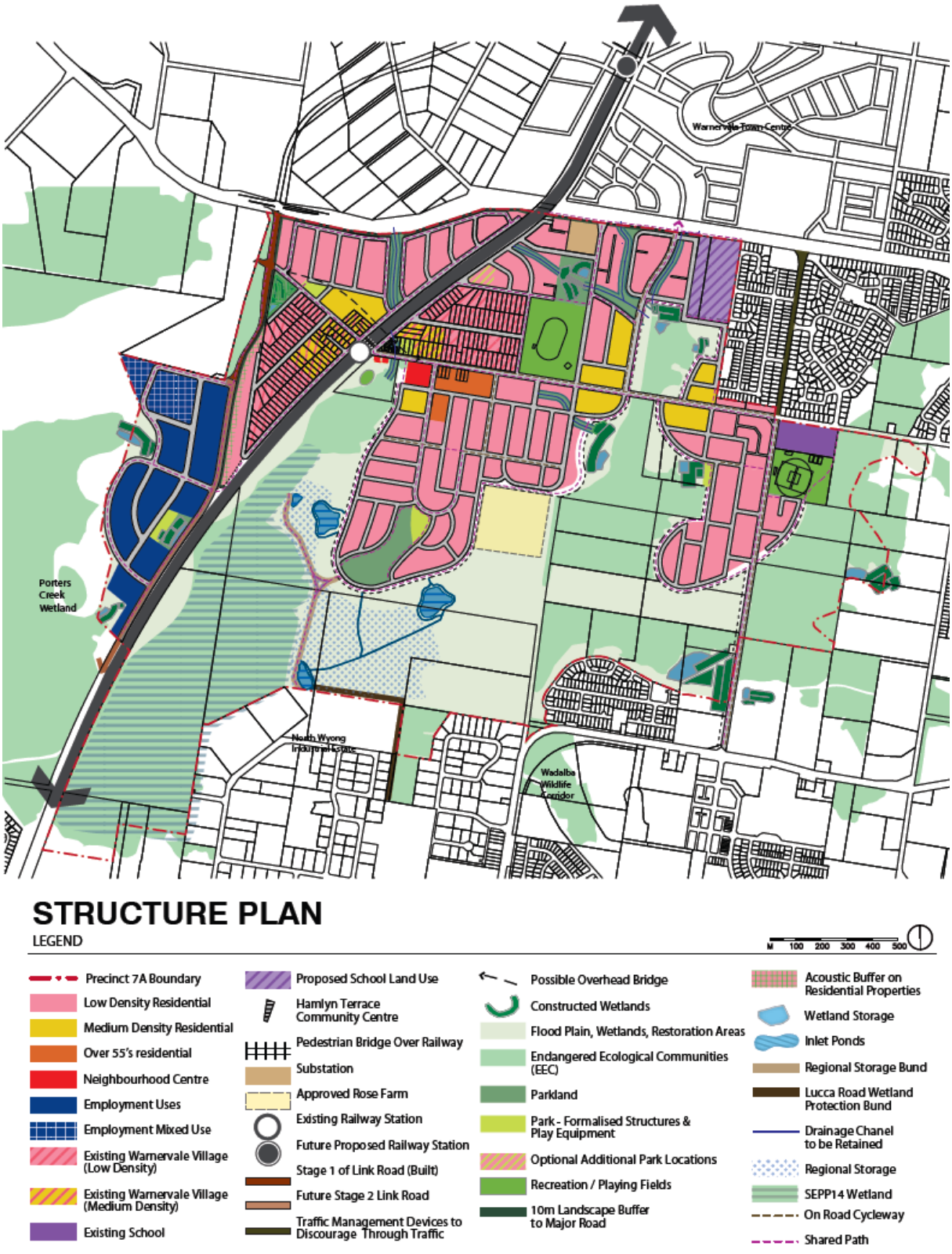

Figure 1 – Structure Plan

Land Use Mix

Consistent with proposed zone changes, the Structure Plan provides for the following land uses:

- Low density residential
- Medium density/aged housing
- Neighbourhood shopping facility
- 30 Ha business park on Council owned land which is well connected to the Link Road and close to the new Warnervale Town Centre.
- 7 Ha Mixed use precinct on Council owned land at the topographic high point to the north of the employment district and would contain smaller office uses and potentially limited upper level residentialaccomodation.
- Future school.
- Extensive areas of public green-space, wetlands and parks;
- Toegether with a range of existing uses to be retained.

A copy of the draft Structure Plan is provided in Figure 1 Structure Plan. The draft Structure Plan has been developed in consultation with relevant Council staff, Councillors, key stakeholders and the community representatives who expressed an interest in attending the Charette workshop on 29 November 2010.

The rezoning will provide development yields in line with Draft North Wyong Shire Structure Plan (DNWSSP). Expected dwelling targets are as follows:

- 1,350 detached dwellings (approx 500m2 lot size)
- 700 medium density,55+ dwellings, mixed use and infill style development in Warnervale Village (approx 300m2 lot size)

Based on the projected residential density targets (see Attachment 3) the rezoning is estimated to produce 2,050 residential lots. This equates to 5,300 additional residents in the study area, keeping in mind that he total population will be 5,900 in total (excluding an allowance for the existing population in the study area). An illustrative representation of the master plan concept is shown below.

Figure 2 - Illustrative Master Plan Concept

Major Design Principles for Structure Plan

The Master Plan includes Development Principles for Precinct 7A, which will inform the development of a DCP Amendment aimed at guiding the development of the Precinct. The following section provides a summary of the main design principles which are reflected in the Precinct 7A Structure plan:

Street Layout

- Establish a street hierarchy which maximises convenience, amenity and safety for vehicles, pedestrians and cyclists.
- Provide a legible, connected and permeable generally grid based local street network that is sympathetic to the topography and maximise views towards open space.
- Connect new streets into the existing street network where possible while minimising four way intersections on busy roads.
- Provide a safe street environment by ensuring adequate lighting, and using crime prevention through environmental design principles.

Neighbourhood Centre

- Provide an active neighbourhood centre to provide local convenience shops including typically a newsagent, bakery, take-away meals, video rentals, hairdresser and general store with ATM and public phone for example.
- Ensure adequate convenient parking is provided adjacent to encourage customers, but not dominating the feel of the place.

- Design shops and businesses to face the street with access from a widened paved footpath which links them all together.
- Retain historic 'Warnies' as a centre piece of the neighbourhood centre and build on this character with new buildings in a modern yet sympathetic manner.

Low & Medium Density Residential

- Locate medium density housing and Aged Housing in areas of maximum accessibility and/or amenity such as overlooking parkland or near the neighbourhood centre.
- Ensure housing has good public transport access.
- Promote environmentally sustainable housing products that remain affordable and appropriate to the Wyong market.
- Design houses that maximise solar access, natural ventilation and amenity as well as potential views.

Housing Diversity

- Provide a diverse range of housing types to appeal to different demographic groups including families, empty nesters, couples, singles, and older people.
- Incorporate detached low density housing on a range of lot sizes with setbacks appropriate to the lot type.
- Incorporate low scale medium density housing options including duplexes, courtyard houses, villas, town houses and 'big houses' but not residential flat buildings.

Employment Area

- Provide a new employment area for Warnervale with direct connections via Sparks Road to the Freeway, Warnervale Employment Zone and future Warnervale Town Centre.
- Develop an employment area which demonstrates sustainable development and incorporates the latest technological and servicing benefits to businesses and their customers.
- Provide a mixed use element in the employment precinct/area.

Open space, conservation and drainage network

- Define development limits by excluding development from flood prone land and avoiding Endangered Ecological communities and protecting the SEPP 14 Wetland area as well the natural water systems of the area.
- Incorporate significant infrastructure associated with Council's Porters Creek Stormwater Harvesting Scheme into the development.
- Integrate IWCM infrastructure into future conservation areas on floodplains and provide connections to Wadalba Wildlife Corridor to the south.
- Provide a diverse range of public open spaces connected by pedestrian/cycle ways and easily accessible to all residents, employees and visitors
- Provide for a range of protected green spaces which are generally not accessible to the public but can be viewed and looked over to provide amenity for residents and businesses including:
    - Flood plain, wetlands and restoration areas
    - Constructed wetlands
    - Endangered Ecological Communities (EEC)
    - Incorporate views to open space to terminate streets where possible.

- Locate new parks to retain significant existing vegetation and Aboriginal sites where possible.
- Retain existing significant (unprotected) trees where possible in wider street verges and larger setbacks if appropriate, especially along main connecting streets and boulevards, as well as adjacent to parks.
- Establish attractive and usable open space around constructed wetlands and storages which form part of Council's proposed stormwater management system.
- NOTE: The Structure Plan incorporates master planning principles for the precinct and provides a preferred development structure, development principles and built form guidelines. Relevant provisions from this document will be incorporated in a site specific DCP for the Precinct.

Sustainability

- The street grid orientated to achieve optimum solar access for a majority of lots;
- EEC's and SEPP 14 Coastal Wetland protected;
- Water Cycle Management Systems incorporated throughout Precinct 7A;
- Retention of significant existing trees where possible in parks and road verges;
- Built form controls that encourage good solar orientation, natural ventilation and sun shading in all new building;
- Design of new parklands to include native and locally occurring species;
- Provision of Water Sensitive Urban Design throughout the development.
- Aspects of the socially sustainable design for Precinct 7A include:
    - A walkable neighbourhood through a well connected and permeable street network;
    - A neighbourhood centre with local convenience retail, services and facilities;
    - A network of open spaces, cycle and walking paths to encourage healthy lifestyles; (which will also include a link to the North Wyong Industrial area)
    - Optimisation of access to public transport.
- Contribute to the financial sustainability of the project through the provision of diverse and affordable housing options, new employment opportunities and a financially sustainable neighbourhood centre.

Alternate Structure Plan

An alternate Structure Plan option has been developed to address the possibility of the existing Warnervale Railway Station being upgraded.

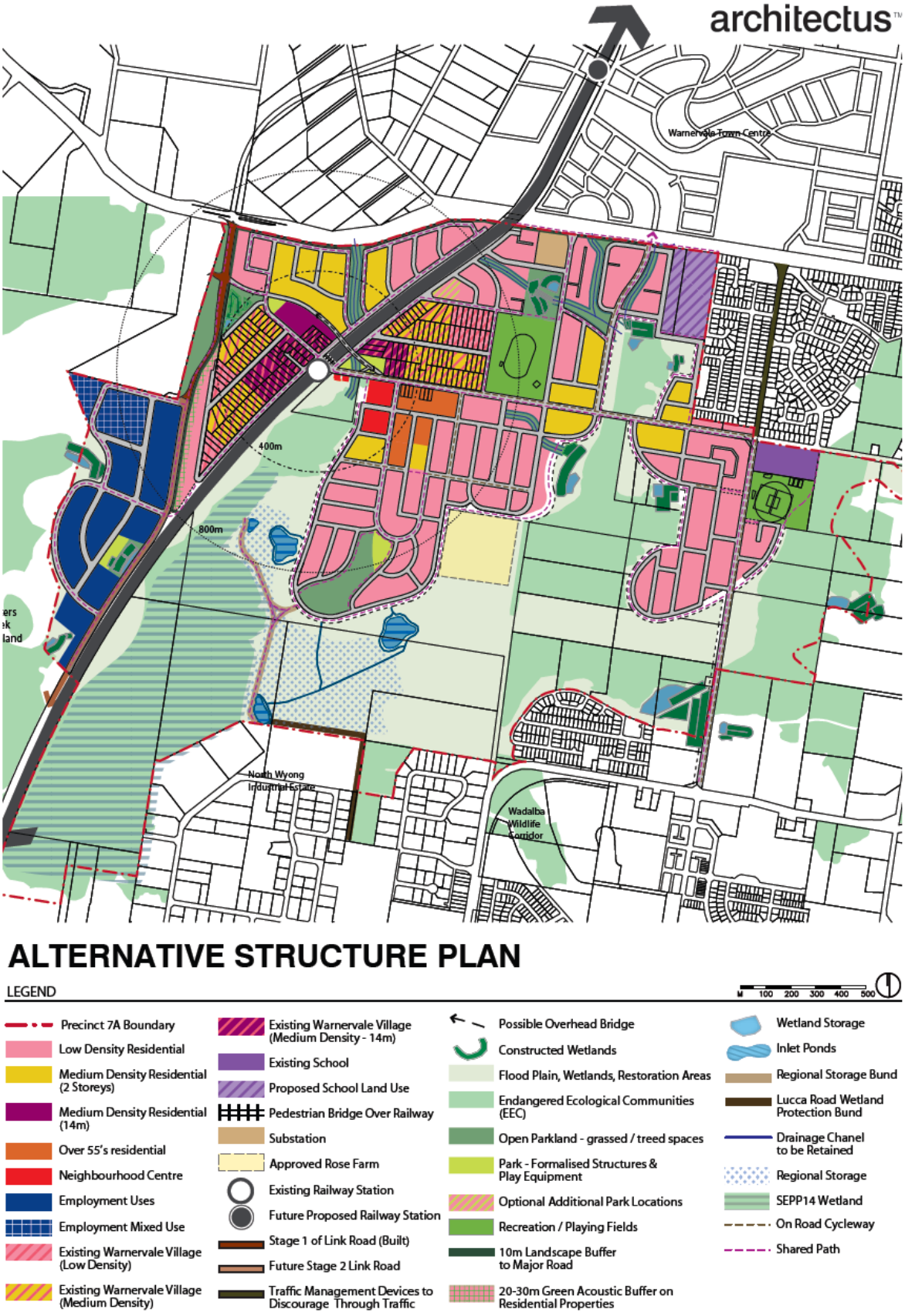

Figure 3 Alternate Structure Plan

A major land owner has made an unsolicited offer to the NSW State Government to upgrade the Warnervale Village Railway Station and provide additional commuter car parking. This offer is still being considered by the NSW State Government If this offer is accepted and the Warnervale Railway station is upgraded a more intensive development scenario could be pursued within those parts of the study area that are within walking distance of the railway station.

An alternate Structure Plan option has been developed which outlines how this option might look (see Figure 3 previously). It should be noted that this scenario would need to be supported by a new Planning Proposal as the offer to upgrade the Warnervale Railway Station has not yet been determined by the NSW State Government. If a decision is made to upgrade the existing railway station, a number of the technical reports underpinning the current Planning Proposal would need to be revised and a new rezoning proposal (Planning Proposal) would need to be prepared to implement the land use mix envisaged in this alternate option.

11 j) Contaminated Land

The Contaminated Land and Acid Sulfate Soils study identified past and present potentially contaminating activities within and surrounding the study area;

- Identified potential chemicals or contaminants of concern;
- Provided a preliminary assessment of site contamination; and
- Assessed the need for further investigations.

In summary, the findings of the study identified that

> *"the contamination risk across the site is generally low, although localised areas with elevated contamination potential, or areas of environmental concern exist across the site. A range of further investigations will be required to assess the actual degree of contamination present on site. That said, it is not anticipated that contamination will present a constraint to development and any areas of contamination identified, once remediated, will be suitable for the proposed land use"*

and

> *"with respect to the remaining site areas (not considered to be AEC) it is recommended the Development Control Plan (DCP) requires that each of the individual redevelopment areas be re-assessed (visual inspection and if necessary intrusive investigations) to update their contamination status. The re-assessment should be undertaken prior to development approval"*

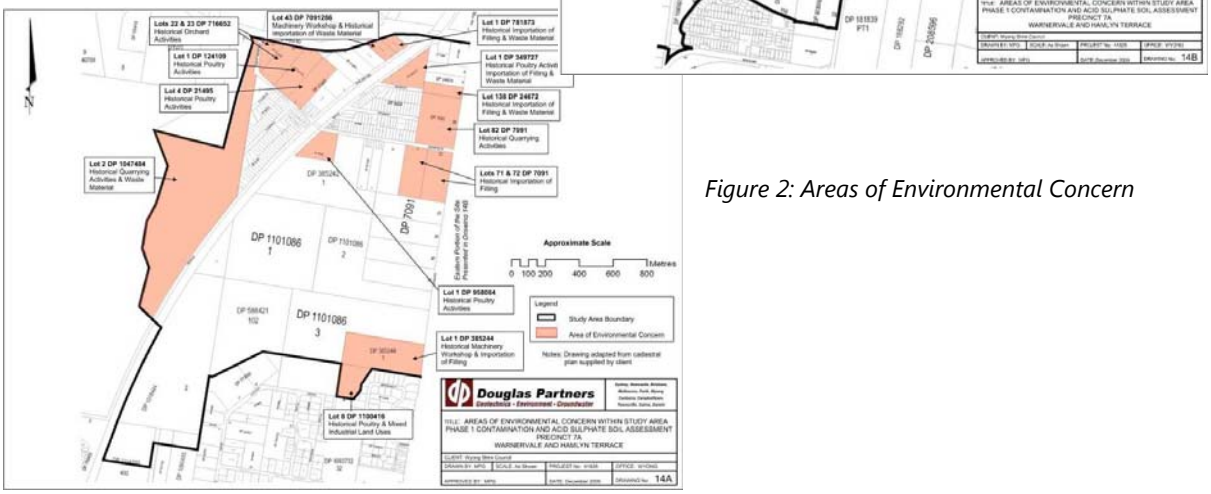

Figure 2: Areas of Environmental Concern

11 k) Acid Sulfate Soils

The acid sulfate soils assessment:

- Established whether acid sulfate soils are present on the site and if they are in such concentrations as to warrant the preparation of an acid sulfate soils management plan;
- Identified remediation and management options in light of the preliminary assessment and proposed land uses constructed wetlands and residential uses; and associated infrastructure works associated with IWCM
- Identified the need for further investigations.

In summary, the findings of the study identified that:

> *"that acid sulphate soils are not generally present within site and thus the soil could be excavated without the need to operate under an acid sulphate soil management plan"*

11 l) Aboriginal Archaeology & European Heritage

The objectives of these investigations were to:

- establish the presence or likely presence of any Aboriginal archaeological and cultural resources and any European cultural heritage items;
- In consultation with the local Aboriginal community and the Department of Environment and Climate Change, undertake an assessment of significance of any Aboriginal archaeological and cultural resources that are determined to be present within the study area;
- Undertake an assessment of significance of any European cultural heritage sites that are determined to be present within the study area in consultation with relevant interested parties;
- Provide recommendations to guide the development of a Local Environmental Study (LES), Local Environmental Plan (LEP) and Development Control Plans for conservation and/or management requirements in relation to any Aboriginal archaeological and cultural resources and any European cultural heritage items that are determined to be present within the study area.

In summary, the findings of these investigations have identified the following:

> *"Eighteen sites containing stone artefactual material were recorded during the investigation. Three other sites previously recorded in the survey area by other investigators were not relocated…the recommendations in general are that the artefactual material in any sites that cannot be avoided by future development should be salvaged…ASR recommends that no development should be approved at, or in the vicinity of the site locations before a Cultural Heritage Management Plan has been developed by a qualified archaeological consultant in consultation with Darkinjung LALC and Guringai for the further management of those sites and their contents"*
>
> and
>
> *"Schedule 1: Heritage Items of 'The Wyong Local Environment Plan 1991' records only one item within the study area, item 55, a "Shop/residence" on Warnervale Road, which it describes as being of Regional heritage significance…as a consequence of the current study no additional structure, places or relics of local, regional or national heritage significance were recorded in Precinct 7A"*