Contamination

North Penrith

Assessment Report

Summary

Objectives

The objectives of the assessment are to determine the suitability of the site for the proposed land uses and to recommend any further assessments and/or courses of action to be taken during the design and construction phases.

Method

The method of assessment was a review of:

- the Site Audit Reports and Site Audit Statements issued by the Site Auditor commissioned by the Department of Defence to certify that the site is suitable for residential use; and,

- the other reports listed in Section 6.

Conclusions

The Site Auditor has certified that the North Penrith site is suitable for the intended land uses, subject only to the three comments relating to the use of groundwater, flaking paint at Thornton Hall and the re-use of the soil stockpile within part Lot 1 in DP33754 (proposed future Lot 11).

Recommendations

Notwithstanding this certification, it is appropriate that further assessments be undertaken and measures be put in place to guide ongoing contamination assessments and any remediation during the design and construction phases.

Concept Plan

1. **Continuation of Site Auditor involvement.** Recognising there will be further assessments, importation of fill and the possibility of unexpected finds, Landcom will retain the services of the Site Auditor (Mr Graeme Nyland of Environ), the objective being to provide a series of Site Audit Statements for the proposed precincts/super lots.

2. **Unexploded Ordnance Protocol.** The Construction Environmental Management Plan (CEMP) is to include a site-specific Unexploded Ordnance Protocol (UOP).

   The UOP is to be implemented throughout the construction works under the responsibility of the Principal Contractor.

3. **Unexpected Finds Protocol.** The CEMP is to include a site-specific Unexpected Finds Protocol (UFP).

   The UFP is to be implemented throughout the construction works under the responsibility of the Principal Contractor.

4. **Contamination assessment after removal of existing concrete slabs.** After removal of the existing concrete slabs, a suitably qualified environmental engineer/scientist will inspect the exposed ground for indicators of contamination. Sampling and testing might be required.

5. **Remediation and validation pursuant to an unexpected find or contamination found after removal of concrete slab.** If remediation is required, a specific Remediation Action Plan (RAP) will be prepared. The remediation works will be carried out in accordance with the RAP. Validation of the remediated area by the environmental engineer/scientist will be carried out after completion of remediation works.

6. **Any ash/coal materials.** Any identified ash/coal materials will be tested to confirm the contamination status. The ash/coal materials with concentrations of analytes within the assessment criteria can be re-used on-site. To mitigate the potential for site occupiers to have aesthetic-based concerns and/ or because the materials may be unsuitable as a planting medium, ash/coal materials will not be placed near-surface in any location in the site.

7. **Further groundwater assessment if groundwater is to be extracted for use.** In the event groundwater extraction is envisaged for any purpose, then further groundwater assessment will be undertaken to verify the suitability of the groundwater for the specific use.

8. **Further groundwater assessment for possible contamination from an external source.** Further sampling, testing and assessment of the groundwater inside the northern site boundary, which is in the vicinity of the Mobil fuel storage and distribution depot, will be undertaken to confirm that the site is not impacted by any contamination inflow from the Mobil depot. The further assessment will be undertaken prior to lodgement of the Project Application for that part of the site.

9. **Beneficial re-use of crushed concrete and asphalt.** The crushed concrete and asphalt will be assessed according to “The Recovered aggregate exemption 2010” under the “Protection of the Environment Operation (Waste) Regulations 2005”, prior to re-use.

10. **Potential lead paint at Thornton Hall.** With reference to a comment by the Site Auditor in the Site Audit Statement, the design specification and construction approach for the refurbishment of Thornton Hall is to recognise the potential presence of lead paint attention. The CEMP is to describe the measures to be taken when carrying out work in and around Thornton Hall to safeguard construction workers and the environment.

11. **Potential to reclassify soil stockpile within Lot 2 in DP1020994.** The Virgin Excavated Natural Material (VENM) classification will be reassessed in the event of the following observations during construction activities:

    - foreign matter being found mixed with the soil;
    - soil staining and discoloration being identified within the stockpile;
    - odours emanating from the stockpile.

12. **Use of soil stockpile within part Lot 1 in DP33754 (proposed future Lot 11).** With reference to a comment by the Site Auditor in the Site Audit Statement, the soil in the stockpile should not be used on the surface of residential areas.

Stage 1 Project Application: There are no specific recommendations for the Stage 1 Project Application, however, Recommendations 1 to 6 inclusive for the Concept Plan each apply for that part of the site addressed by the Stage 1 Project Application.

To reconcile the other recommendations:

- Recommendation 7 for the Concept Plan is only relevant in the event groundwater extraction is contemplated. It is understood there are no current plans for extraction;
- Recommendation 8 for the Concept Plan relates to a part of the site that is outside the part of the site addressed by the Stage 1 Project Application. The further assessment will be undertaken prior to the lodgement of the Project Application for that part of the site;
- Recommendation 9 for the Concept Plan relates to potentially recyclable materials. It is understood that the concrete and asphalt materials will be ripped during Stage 1 construction and temporarily stockpiled within the site. If acceptable, the materials will be re-used at a later stage.
- Recommendation 10 for the Concept Plan relates to Thornton Hall and its immediate environs. The refurbishment of this building will be duly dealt with in a later Project Application;

- Recommendation 11 for the Concept Plan relates to a soil stockpile located outside the part of the site addressed by the Stage 1 Project Application; and,

- Recommendation 12 for the Concept Plan relates to a soil stockpile located outside the part of the site addressed by the Stage 1 Project Application.

North Penrith

Flora and Fauna Assessment report

Summary

Objectives

The aims of this report are to:

- Report on the results of survey performed for threatened ecological communities, populations and species within the study area;
- Identify if drainage lines are present and if 'controlled activity' approvals will be required for works within riparian zones;
- Identify potential ecological constraints to the proposed development;
- Provide recommendations on land use constraints for any significant ecological values identified, and for any stands of native vegetation to be retained advice on mitigating impacts, buffer, and management requirements;
- Assess the impact of the proposed works on threatened ecological communities, populations and species in accordance with the 'Draft Guidelines for Threatened Species Assessment (Part 3A)' (DEC and DPI 2005) and under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

Methods and findings

A flora and fauna assessment was undertaken through an initial desktop assessment, followed by field survey. One threatened ecological community was found onsite, Cumberland Plain Woodland. This community is listed as Critically Endangered under State and Commonwealth legislation. Flora and fauna species located on site were common to the Sydney Basin Bioregion, with no threatened species or populations recorded.

Consultation

Eco Logical Australia (Lucas McKinnon) undertook consultation with the Office of Hawkesbury Nepean, DECCW, pertaining to drainage lines under the *Water Management Act 2000*.

Landcom (Nicole Woodrow) undertook consultation with Environmental Protection and Regulation Division division of DECCW, on outcomes for the Cumberland Plain Woodland present at the Project Site.

Conclusions

- The flora and fauna assessment identified one threatened ecological community (TEC), Cumberland Plain Woodland, occurring at the Project Site;

- Cumberland Plain Woodland is listed under State and Commonwealth legislation, though due to the condition state of the remnant it does not meet the Commonwealth criteria to qualify as TEC;
- There will be some impacts to the Cumberland Plain Woodland remnants, though some will be incorporated into parkland (**Figure 10**);
- Impacts to this vegetation type were not considered to amount to a significant impact on the community using the DEC and DPI (2005) guidelines, consultation with DECCW supported this view;
- Drainage lines present on site were not considered to be riparian zones requiring 'controlled activity' approvals under the Water Management Act 2000, consultation with DECCW supported this view.

Recommendations

1. Landcom will prepare a Plan of Management for the Cumberland Plain Woodland within OS2. This Plan will include a suggested planting palette.
2. Landcom will create a Section 88B instrument within Block C3 to protect:
    - The Cumberland Plain Woodland identified for retention (**Figure 12**); and
    - Indigenous archaeological values.

Geotechnical & Groundwater

North Penrith

Assessment Report

Summary

Objectives

The objectives of the assessment are to ascertain the existing ground and groundwater conditions at the site, to determine the suitability of the site for the proposed land uses, and to recommend any further assessments and investigations, and/ or the courses of action to be taken during construction.

Method

The method of assessment was a review of reports of previous site investigations.

The findings were:

- the site is underlain by naturally occurring soils, with engineering properties favourable for residential, commercial and industrial construction;
- the soils at the site do not exhibit characteristics suggestive of significant dryland salinity. The erosion hazard is assessed as Moderate Risk due to the presence of erodible soils, requiring appropriate management controls;
- the salinity hazard of the soils at the site can be readily managed by designing and implementing a Soil and Water Salinity Management Plan;
- development of the site would require site works for construction of roads, placement of fill and construction of retention structures along the perimeter of the site.
- there is no risk of slope instability (risk assessed as Very Low);
- shallow and deep footings would both be feasible;
- the majority of the soils on the site may be re-used by means of excavation and filling (with additional assessment to determine any unsuitable material).

The geotechnical constraints that might be associated with the development are;

- presence of uncontrolled fill in some areas that might not be suitable;
- piling below depths of about 5m likely to encounter groundwater.

Conclusions

There are no known constraints that might impact on development and construction.

The site is suitable for residential and commercial development (low rise and medium rise) and light industrial development.

Recommendations

Concept Plan: The recommendations are:

1. **Soil and Water Salinity Management Plan.** The Construction Environmental Management Plan (CEMP) is to include a site-specific Soil and Water Salinity Management Plan. The Plan is to be implemented throughout the construction works under the responsibility of the Principal Contractor.

2. **Detailed geotechnical investigations to support the detailed design and construction.** Further targeted investigations will be required to confirm the detailed design, including ascertaining the suitability of soils for re-use on the site.

3. **Geotechnical assessment of imported fill material.** The CEMP is to include measures to ensure imported fill is suitable for the intended use on site.

Stage 1 Project Application: There are no specific recommendations for the Stage 1 Project Application. The recommendations for the Concept Plan apply for that part of the site addressed by the Stage 1 Project Application.

Housing Assessment Report

Summary

Objectives

The objectives of this report are to address the Director General's Requirements for the Concept Plan with regard to affordable housing; to set out how Landcom will meet requirements of the sale of the site to provide specified numbers of dwellings for older people, adaptable dwellings and affordable dwellings; and to describe how the proposed housing mix will contribute to the social sustainability of the development.

Methods

The report has been based upon desk-top research and discussions with Landcom development managers.

Findings and conclusions

Housing diversity

Based upon previous studies, there appears to be a need within Penrith to expand the range of housing types and sizes available to meet the needs of a changing and ageing population, given the current overwhelming predominance of detached family housing in the LGA. There is a need for a greater supply of smaller housing types, and for housing which is affordable for smaller households, including single person households, young people in group households, single parents and couples without children.

The housing mix proposed in the Concept Plan for the North Penrith site will include a range of dwelling forms and sizes that will meet the needs of a variety of household types. In this way it will add to housing diversity within Penrith, in terms of both dwelling type and tenure. Most of the dwellings will be in semi-detached or attached formats suitable for one or two person households, single parent families or other families with only one child. There will also be a small proportion of detached dwellings, suitable for families with children. This mix is important in order to provide housing diversity that will help create a balanced and socially sustainable community, rather than one that segregates families with children from other household types.

Affordable housing

Despite having lower headline property prices and rental costs than on average across metropolitan Sydney, low and moderate income residents in Penrith face continuing problems with housing affordability. There appears to be a need for a greater supply of housing suitable for smaller households, including single person households who are in greatest housing stress.

Landcom will address housing affordability issues and the housing needs of low and moderate income households in Penrith by:

- Providing a high proportion of small dwellings within the North Penrith development, as indicated in the Concept Plan, which will be affordable for purchase by moderate income households, in line with Landcom's Moderate Income Housing policy, and

- Delivering 44 dwellings as affordable rental properties, to be managed by a community housing provider, in line with commitments to the Commonwealth Government as part of the sale of the North Penrith site.

Housing for older people

A condition of the sale of the North Penrith site to Landcom by the Commonwealth Government is that Landcom make available 100 dwellings designed to meet the needs of older people, for which there is a considerable need within Penrith, in view of the ageing of the population. Landcom has had considerable experience in providing housing for older people in some of its other developments, where the delivery process has involved tendering to a specialist aged housing provider. The Concept Plan does not identify a specific site for the aged housing, nor has an aged housing provider been selected at this stage. Instead it is proposed that Landcom select a provider in the next stage of the planning process, either directly or through a joint venture delivery partner. The size and specific location of the site for aged housing will depend on the housing and care delivery model of the selected provider.

Adaptable housing

A further condition of the sale of the North Penrith site to Landcom by the Commonwealth Government is that Landcom make available at least 44 adaptable dwellings. It will be a condition of future delivery arrangements with a joint venture partner that a minimum of 44 dwellings are constructed as adaptable dwellings in accordance with Landcom's Universal Housing Design Guidelines.

ESD principles demonstrated in the project
The proposed mix of dwelling types will contribute to housing diversity in Penrith and encourage a balanced population that includes a diversity of age, life cycle, household and socio-economic groupings. In this way, housing diversity will contribute to the social sustainability of the development.

Recommendations

The report recommends that:

Housing diversity

1. Landcom will promote housing diversity in Penrith by including within the development a wide mix of dwelling types and sizes for a range of household types.

Affordable housing

2. Landcom will provide affordable housing for purchase in North Penrith in line with its Moderate Income Housing policy.

3. Landcom will help make available 44 affordable rental dwellings to be managed by a community housing organisation.

Housing for older people

4. Landcom will co-ordinate the delivery of 100 dwellings for older people by an appropriate organisation.

Adaptable housing

5. Landcom will co-ordinate the delivery of 44 dwellings as adaptable dwellings in accordance with Landcom's Universal Housing Design Guidelines.

Land Use and Economic Assessment

Assessment report

Summary

Objectives

The broad aims of the Land Use and Economic Assessment are summarised as follows.

- To ascertain the ability of the site to achieve employment and housing targets given:
    - Policy and strategy framework
    - Market conditions
    - Terms of the priority sale (recognising that the multi-user depot has been excised from the land available for development)
    - The competitive offer of the site.
- To interrogate the current Concept Plan for the North Penrith site and make recommendations in terms of:
    - land-use mix
    - Residential dwelling numbers, types and sizes
    - Commercial floorspace areas
    - Retail floorspace areas
    - Industrial/ employment land provisioning.
- To identify and assess potential staging and delivery options for the development.
- For each component of the development, to assess:
    - the economic impact (job generation and economic multiplier effect)
    - the impact on the relevant industry in the City Centre and North Penrith vicinity.

Method

The Land Use and Economic Assessment has been undertaken through execution of the following tasks:

- Site and context assessment
- Strategic land use assessment for broad industrial, commercial and retail uses
- Market Issues Paper
- Targeted consultation with project stakeholders
- Consultation with real estate agents, investors and developers
- Assessment of the Concept Plan

- Yield assessment
- Assessment of economic impact
- Staging recommendations

Conclusions

Evidence gathered in this assessment indicates that a mixed use precinct including light industrial, office, retail and residential uses could be supported at North Penrith.

The Concept Plan includes a range of dwelling types including medium density development. Medium density dwellings are not currently featured strongly in Penrith LGA's housing mix. To assess the underlying demand for medium and higher density housing in Penrith LGA we have used the SGS Housing Model. This indicates that there is an underlying demand for medium and higher density dwellings. The North Penrith site is well positioned to accommodate higher density options as it is within immediate proximity to rail and bus transport options, employment opportunities, retail and services.

Consistent with the Concept Plan, SGS recommends that the areas of the North Penrith site adjacent to the existing industrial area be zoned for local (population serving) industry such as trade supplies or domestic storage. This would provide a suitable buffer between the existing industrial area along Coreen Avenue and the planned residential area within the North Penrith site.

The recommendations put forward by SGS for commercial development on the site recognise the need for a style of development that complements rather than competes with the Penrith CBD. The recommendation for flexible design codes to allow purpose built offices is aimed attracting institutions such as the Sydney Catchment Authority, CSRIO or National Parks and Wildlife Services or service businesses with a regional catchment.

The Concept Plan includes provision of a 2,000 square metre supermarket. A supermarket of this size may, in the short term, trigger a turnover impact greater than the accepted industry standard at the nearby centres of Cambridge Gardens and Kingswood Park. However, it is likely to be supportable in the longer term (2026 onwards) given the anticipated increase in the population in the nearby area.

The total likely job yield for North Penrith for development in accordance with the Concept Plan is summarised by land use in the following table.

Table 1. North Penrith Job Yield

	floorspace	sqm per job	yield
Light Industrial	13,730	60	229
Commercial	9,300	25	372
Retail Other	1,200	30	40
Retail Supermarket	2,000	40	50
Residential	n/a	n/a	25
Health care aged care	n/a	n/a	70
Total	**n/a**	**n/a**	**786**

North Penrith Lands
Non-Indigenous Archaeology

Assessment report

Summary

Objectives

The aim of the non-indigenous archaeological assessment is to determine whether significant archaeological remains are likely to be present within the study area. This is done by considering the land-use history of the area and whether the identified usage is likely to have left any substantial archaeological resource. The potential resource is then subject to fleld inspection. Any potential archaeological remains can then be managed in light of impacts associated with future development.

Methods and findings

A detailed analysis of the nineteenth-century land-use history was undertaken to determine what kind of non-indigenous archaeological remains might be present within the study area. These areas were then subject to field inspection. This analysis indicated that the Thornton Hall and Combewood properties and their buildings and outbuildings constituted the main archaeological resource. Remains of these structures were found to have a level of heritage significance at a local level and to have the ability to inform about the development and use of the houses and the layout of the properties. Later nineteenth- and twentieth-century activities, such as those relating to the racecourse and the speedway, as well as the Army Engineering Depot, were likely to have left archaeological remains with little research value.

Conclusions

The main potential non-indigenous archaeological remains are likely to be the demolished sections of Thornton Hall and the demolished outbuildings to the south of Combewood. These remains are considered to have heritage significance at a local level.

Recommendations

The area to the rear of **Thornton Hall**, the site of the demolished bedroom and kitchen wings, should be included as elements of the house's curtilage. Archaeological remains in this area will need to be assessed as part of any future redevelopment of the building or property and impacts on the remains will require appropriate management recommendations.

Any proposed impacts to the south of **Combewood** should be preceded by a program of archaeological recording to be conducted prior to disturbance of this area.

Archaeological investigation and recording of archaeological remains within the areas of impact should be undertaken utilising current best practice methodologies and Heritage Council guidelines. These investigation programs would need to be guided by a **Research Design** and appropriate approvals as required by the statutory process. As the project is

proposed to be a Major Project and will be assessed under Part 3A of the *EP&A Act 1979*, there is no requirement for a separate approval under S139/140 of the *NSW Heritage Act 1977*.

Odour Impact

North Penrith

Assessment report

Summary

An odour assessment is required as part of the EA for a proposed residential and mixed use development of the North Penrith site, part of which is within the recommended 400m buffer zone of the Penrith Sewage Treatment Plant (Penrith STP).

The odour assessment indicates the potential for nuisance odour impacts, from the existing Penrith STP and from a proposed onsite sewage pumping station (SPS), would be minimal.

Objectives

The objectives of the odour impact assessment are to assess the potential encroachment of residential development on the recommended 400m buffer zone for the Penrith STP and assess the potential impact from the proposed SPS located in a relatively central position on the development site.

Methods and findings

A review of the most recent modelling assessment for Penrith STP was used to determine if there was any impact from the encroachment of the development site into the recommended 400m buffer zone. A screening modelling assessment for the proposed SPS was conducted for a worst case emissions scenario.

Consultation

Consultation with Sydney Water was undertaken to ensure odour impacts from the Penrith STP were adequately assessed.

Conclusions

The results presented for the recent modelling of odour from the Penrith STP indicate the odour impact extends no more than approximately 50m from the plant and, therefore, no impacts are expected on the development site. A screening modelling assessment for the proposed SPS indicates that, under a worst case emissions scenario, the potential for odour impact at the development site and in the Penrith Training Depot will be minimal.

Recommendations

Recommendation 1. It is recommended the final location of the SPS is selected and/or the immediate urban environs of the SPS so designed as to achieve a reasonable buffer zone from sensitive receptors viz, residential dwellings.

North Penrith

18/10/10

Regional Flooding Assessment

Summary

The North Penrith site is located immediately north of the Penrith railway station and is being redeveloped for around 1000 residences. The development will consist of a range of residential densities from detached to apartment type dwellings. The Concept Plan layout is presented in **Figure 1**.

This report has been prepared to support a Concept Plan and Stage 1 Project Application for the redevelopment. The Director General Requirements (DGRs) were issued on the 2nd July 2010.

Objectives

This report addresses points (7) and (8) under Section 6 in the DGR's headed *"Drainage, Stormwater and Groundwater management".* These requirements are:

> *(7) The EA shall provide an assessment of the full range of flood risks to people, property, infrastructure, and utilities from Nepean River and local flooding related to the proposal. This will be conducted in accordance with the NSW Government's Flood Prone Land Policy as set out in the Floodplain Development Manual 2005 and Section 117 Direction (4:3 Flood Prone Land and relevant Section 117 Planning Circulars).*
>
> *(8) The EA shall address development controls needed to reduce property damage to socially acceptable and sustainable levels and any flood evacuation infrastructure upgrades required for the proposed development, ensuring that flood evacuation of existing communities is not compromised by the proposed development.*

The objective of this assessment is to establish how the proposed development conforms to the NSW government Floodprone Land Policy, whether the proposed development can integrate into the SES regional evacuation strategy and how the development will manage the structural damage risk.

Methods and findings

Risk to Structural Damage

The Hawkesbury Nepean Floodplain Management Steering Committee formulated an assessment methodology for reviewing the acceptability of the risk to major structural damage from severe flooding events. The methodology is detailed in *"Managing Flood Risk Through Planning Opportunities"* (2006). This methodology was adopted and the flood risk was estimated in terms of exposure, hazard and vulnerability for the 100yr, 200yr, 500yr, 1000yr and the PMF flood events.

The findings were that the proposed development had a low to nil risk of major structural damage.

Risk to Personal Safety

The extent of flooding over the site was examined and it was evident that the site was on the edge of the floodplain with about 25% of its area above the Probable Maximum Flood (PMF). As such, there was a fail safe evacuation route to higher ground in the event of any flood.

The site is so located that there is ready access to The Northern Road which forms part of the SES regional flood evacuation plan for the Penrith area. An examination of the population and travel times in the local area of the site indicated that there was ample time for evacuation and the proposed development would not adversely impact on the evacuation of adjacent areas.

Flood Policy

The objectives of the Floodplain Development Manual and the Section 117 Direction on flooding are to minimize flood risk to damages and personal safety.

The risk to flood damages is minimized by adopting, as recommended in the Manual, a habitable floor at the flood planning level. The risk to personal safety is minimized by adopting a minimum finished ground level at the 100yr ARI flood level and ensuring that the development can be integrated into the SES regional flood evacuation strategy without adverse impact on the evacuation of other adjacent existing developments. The integration with this strategy has been demonstrated in **Section S2.2**.

The Section 117 Direction

The directive does not permit rezoning of land within flood planning areas from Special Use to Residential unless the inconsistency is of a minor significance (Clause 9 [b]). The proposed project rezoning is considered allowable under this directive because the potential impacts in terms of adverse effects on flooding in existing developments are of minor significance. The classification of minor significance is because:

- The area involved on the site is minor and the development would result in this flood affected planning area on the site being smaller;
- The minor flooding on the site is a backwater effect and as such, filling of this minor area would have no significant adverse impacts on flood behavior; and
- As the flooding up to flood planning levels is backwater flooding, there are no cumulative flooding impacts caused by the proposed development.

Conclusions

The conclusions with respect to regional flooding are that the development:

- Will be in accord with the government's Flood Prone Land Policy as it will minimize the risk for flood damages and risk to personal safety;
- Complies with the Section 117 Direction with respect to flooding as it represents an inconsistency of minor significance;
- The risks to major structural damage to property, infrastructure and utilities are within socially acceptable and sustainable levels;

- Can be integrated into the SES regional evacuation strategy without any adverse impact on the evacuation of adjacent areas or requiring significant government expenditure on infrastructure upgrades; and
- It has a fail safe evacuation route for vehicles and pedestrians within and adjacent to the site above the PMF levels.

Recommendations

The recommendations with respect to regional flooding for the development are:

- In remodeling the site to drain the site, the final ground surfaces should be at or above the regional 100yr ARI flood level of RL 25.4mAHD; and
- The minimum habitable floor level should be RL 25.9mAHD (100yr ARI flood level plus 500mm freeboard).

Social Planning Report

Summary

Objectives

The primary objective of this Social Planning Report is to address the Key Assessment Requirements for Open Space and Community Facilities within the Concept Plan for the North Penrith site, as specified by the NSW Department of Planning's Director-General's Requirements (DGRs), dated 2 July 2010. The DGRs for the Open Space and Community Facilities component include:

(1) A community profile and analysis of the needs of future residents to ensure that the nature and scale of proposed infrastructure accurately reflects the characteristics and likely needs of the intended population

(2) Details of the proposed open space and community facilities and the ongoing maintenance of open space and such facilities

(3) Details of any arrangements with Council for public use of such facilities.

Consideration of strategies to create a socially sustainable community at North Penrith addresses, in part, the DGR requirement for information to demonstrate how the development will commit to the principles of Ecologically Sustainable Development (ESD).

The Director General's Requirements for the Stage 1 Project Application for the North Penrith project contain no requirements relevant to the Social Planning Report. However, the Stage 1 Project Application includes the delivery of a community pavilion and some open space, and this report describes arrangements for the delivery of these facilities.

Methods and consultation

The social planning assessment has been prepared on the basis of desk-top research, review of the draft Concept Plan and consultation with staff of Penrith City Council, supplemented by consultation with other local agencies and service providers.

The assessment has involved consultation with:

- Community development, open space and strategic planning staff of Penrith City Council
- NSW Department of Education and Training
- Sydney West Area Health Service
- Local childcare services
- North Penrith Neighbourhood and Community Centre
- Catholic and independent schools in the area
- A range of non-government services within Penrith City Centre

Findings and conclusions

Key findings and conclusions of the assessment have included:

Given the proximity of the site to the Penrith CBD and established suburbs of Penrith, the future population will have ready access to a wide variety of existing community facilities, human services and areas of open space in adjoining areas. Most of these are regional or district level facilities and are considered able to absorb the very modest demand likely to be generated by the North Penrith development. Importantly, there is existing spare capacity in local schools and childcare centres.

The future population of the North Penrith development is projected to be around 1,800 people, and to comprise a mix of single people, couples without children (both younger and older people), single parent families and a small proportion of couple families with children. The social infrastructure needs of this population will include access to space at the local level for leisure, recreation and social activities, to primary schools and childcare centres and to neighbourhood retail and commercial services, and at the district and regional levels to health, education, sporting, cultural and entertainment facilities and some specialist support services for particular target groups.

The projected population will not be large enough to support new community facilities and human services for the North Penrith population alone. However to support Landcom and Council objectives to create new communities that are socially sustainable, it is proposed that the development will contain a small community facility comprising about 80 sqm of indoor meeting and activity space, an office for community services and associated amenities. This will be provided as part of a pavilion associated with the oval, together with an all abilities playground, water play area, general playground and barbecue and picnic facilities to provide a focal point for community interaction.

In addition, the development will contain 7.2 hectares of public open space, spread across 9 parks for passive recreation, an oval for active recreation and a village plaza. A network of walking and cycling paths will also address the recreation and physical activity needs of residents.

The open space and community facility will be designed and constructed by Landcom and provided as works in kind to Council to own and manage, as specified in a Statement of Commitments. The design and maintenance requirements of these facilities have been discussed with Penrith City Council. The community facility and open space will be available for public use.

ESD principles demonstrated in the project

Chapter 8 discusses strategies for building a socially sustainable community within the North Penrith Urban Area. These include:

- Encouraging housing diversity and choice, including homes that will enable ageing in place and some homes for moderate income households
- Providing a healthy, safe and accessible urban environment
- Ensuring access to resources and opportunities, such as employment and education, in the wider area
- Integrating socially, culturally and physically with neighbouring communities and ensuring access between new and existing areas

- Providing access to a range of community facilities and open space and contributing towards community infrastructure for the area
- Encouraging social interaction, community networks and an active community life
- Promoting community identity and a sense of belonging
- Providing opportunities for residents to participate in decision-making, and to influence the planning of their community
- Providing benefit to the existing community as well as the new.

Recommendations

The report recommends that:

1. Landcom will provide a community pavilion in accordance with the plans prepared by Tanner Architects, which form an attachment to the Stage 1 Project Application

2. Following its initial use as a Landcom sales and marketing suite, Landcom will convert the community pavilion into a publicly accessible community centre in accordance with the plans attached to the Stage 1 Project Application, and will dedicate it to Penrith City Council upon occupancy of 400 dwellings or at a time mutually agreed by both Landcom and Penrith City Council

3. Landcom will construct and embellish the land identified in the Concept Plan as public recreation in accordance with the plans at Appendix 4 prior to dedicating it to Penrith City Council

4. Landcom will provide resources to implement a community development program within North Penrith, to include a welcome kit, a community development worker and funds for community activities and programs

5. Landcom will implement a community consultation program to provide information about the development to adjacent neighbourhoods and to identify and address any residents' issues of concern.

EXECUTIVE SUMMARY

The North Penrith Defence Site has a rich, multi-layered history. There is evidence of Aboriginal occupation, while much closer to the present times, the site is associated with the settlement, growth and development of Penrith. It has important associations with the locally prominent Smith family, members of which occupied Thornton Hall from the 1870s until the 1940s. The grounds of Thornton Hall, which were known as Belmore Park, witnessed a diverse array of sporting activities ranging from cricket and rifle shooting to horse and speedway racing. They were also an important site for pioneering aviation activity in New South Wales. From the 1940s onwards the site was increasingly associated with military uses.

The significance of the site, buildings and other features remaining on the site, along with its social significance, has been recognised by heritage listings at a Commonwealth level (Register of the National Estate, Commonwealth Heritage List) and heritage listings by Penrith City Council. Individual listed items include Thornton Hall and Combewood (although this building is not a part of the site).

This Statement of Heritage Impact, prepared by Tanner Architects, responds to the Director General's Requirements for the subject site in accordance with Section 75F of the Environmental Planning and Assessment Act 1979 and in relation to Heritage, as follows:

The report includes the following components:

- A summary site history;
- Summary of heritage significance of the site and individual built components;
- Statutory considerations;
- Evaluation of the proposed Part 3A Concept Plan against the Director General's Requirements.

The report concludes that the proposed Part 3A Concept Plan for North Penrith demonstrates compliance with the Heritage Act 1977, and the Director General's Requirements for the Part 3A application including the heritage impact assessment guidelines published by the NSW Heritage Office and the heritage provisions of Penrith Local Environmental Plans. Implementation of the Concept Plan will result in the retention of heritage items and appropriate measures to conserve and enhance their heritage significance.

The Part 3A Concept Plan presents building type envelopes, landscaping and site works and promotes views to and from the heritage items that are generally appropriate from a heritage perspective for heritage items.

North Penrith

Drainage, Stormwater & Groundwater Management Report

Summary

This report outlines the stormwater management strategies for the North Penrith development and Stage 1. The term stormwater management is used to describe a series of stormwater related matters including:

- stormwater drainage;
- stormwater quantity;
- stormwater quality;
- flooding; and
- surface runoff / groundwater interaction.

Objectives

The report describes the proposed strategies for managing stormwater within the North Penrith development and Stage 1. The objectives of the stormwater management strategies are common between the North Penrith development and Stage1. The objectives are:

- to replicate the existing drainage regimes present at upstream and downstream boundaries of the site;
- to provide a stormwater drainage network that has the capacity to convey stormwater runoff generated for events up to and including the 5 year Average Recurrence Interval (*ARI*) storm;
- to provide a stormwater drainage network that directs stormwater runoff towards stormwater quantity and quality management infrastructure;
- to match post-development peak flow rates with pre-development peak flow rates for events up to the 100 year ARI storm;
- to reduce post-development average annual pollutant loads in accordance with Landcom's baseline targets through the incorporation of Water Sensitive Urban Design (*WSUD*) measures within the development;
- to identify dedicated overland flow paths for major rainfall events (*i.e., beyond the capacity of the drainage network*);

- to estimate peak water surface levels within dedicated overland flow paths; and
- to mitigate the impacts of the surface water management strategy on groundwater behaviour and characteristics.

The North Penrith development has received Director General's Requirements (*DGRs*) for the Concept Plan (*MP 10-0075*) and Project Application (*MP 10-0078*). The Concept Plan relates to the entire North Penrith development whilst the Project Application relates specifically to works being undertaken in Stage 1. The North Penrith Concept Plan layout and Stage 1 boundaries are shown on **Diagram 1** and **Diagram 2** respectively.

DGRs addressed as part of this report are nominated in **Table 1**.

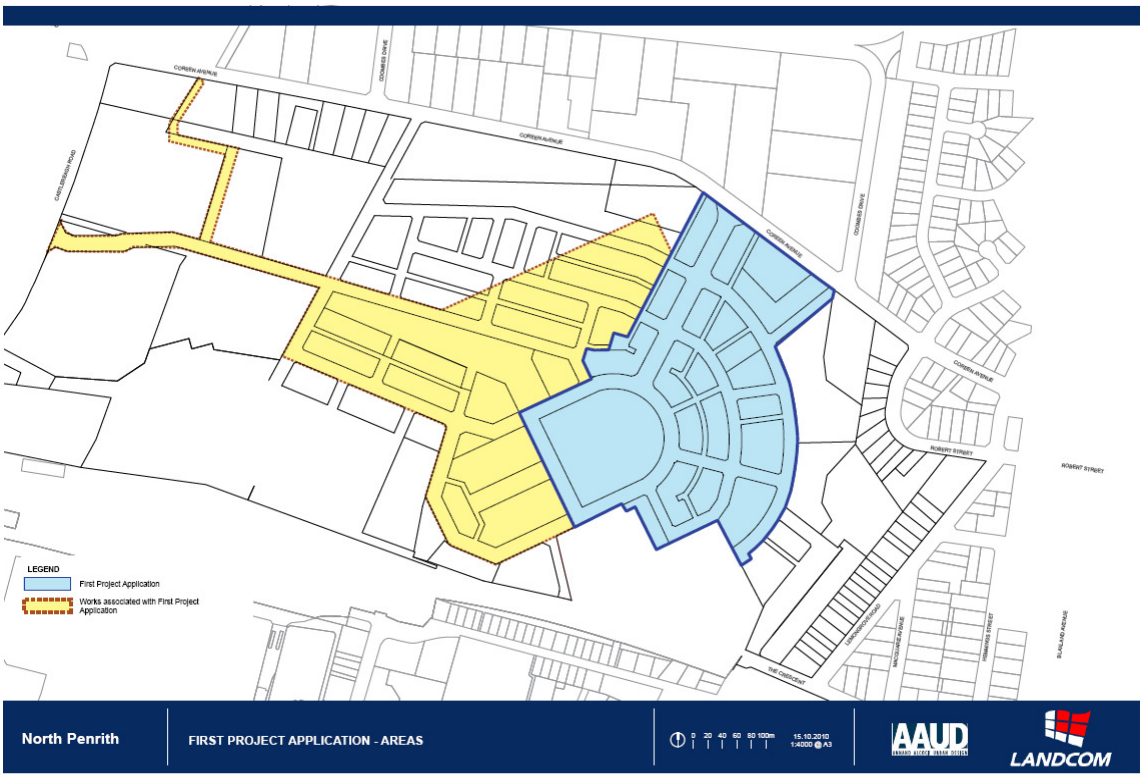
Table 1 DGRs addressed in this report

Director General's Requirements	Key Assessment Requirements Addressed	Description
Concept Plan (*MP 10-0075*)	6 (1)	The EA should provide details of and an assessment of impacts on any watercourses, wetlands and riparian land located on, and/or adjacent to the site. Details are to be provided as per the requirements of the NSW Office of Water's advice dated 28 June 2010.
	6 (2)	The EA should assess impacts on surface water. It should identify drainage, and stormwater management issues, including topography, on-site stormwater detention, water sensitive urban design measures, drainage infrastructure and water quality control measures.
	6 (3)	The EA shall address any impacts on groundwater resources including any potential degradation to the groundwater resource and any impacts on ground water dependant ecosystems. Where impacts are identified, provide contingency measures to remediate reduce or manage potential impacts. The EA needs to demonstrate that ground water is not connected to surface water.
	6 (4)	Provide details on existing water and groundwater licences under the Water Act 1912 and any proposed surface water and groundwater extraction.

Director General's Requirements	Key Assessment Requirements Addressed	Description
	6 (5)	Prepare a Concept Stormwater Management Plan that outlines general measures for stormwater and effluent management in relation to climate, topography, soil types and local geology and identify potential risk issues. Measures to be incorporated on site, include (but not limited to) on site stormwater detention, water sensitive urban design measures, the impact on the quality of surface water and groundwater. A notional schedule of costs and recurrent maintenance costs should be included.
	6 (6)	Proposed static water bodies on site should be designed to be of minimum cost to Council and the community once operational.
Project Application (*MP 10-0078*)	7 (1)	With reference to the Stormwater Management Plan submitted as part of the Concept Plan application, provide detail of measures to be implemented to manage and address impacts on drainage, stormwater and groundwater.

Diagram 1 North Penrith Concept Plan layout

Diagram 2 Stage 1 Project Application boundaries



Methods and findings

Methodology

The stormwater management strategies for the North Penrith development and Stage 1 were developed in parallel with the bulk earthworks strategy and to function within the constraints of the development layout.

Concept stormwater drainage networks were prepared for the North Penrith development and Stage 1. These networks were prepared to confirm the potential routing of stormwater runoff through the development and to assist in the preliminary design of the stormwater quantity and stormwater quality management infrastructure.

The industry standard modelling software package XP-RAFTS was used to model the hydrology of the site and to determine the required volume of storage to attenuate post-development flow rates back to pre-development flow rates.

The industry standard modelling software package MUSIC was used to estimate the concentrations of pollutants generated in the post-development scenario and the effectiveness of the proposed WSUD measures in reducing these loads.

Flooding assessments have been undertaken to consider the impacts of the regional and localised flooding on the proposed development. The '*North Penrith Regional Flooding Assessment*', WorleyParsons, October 2010 addresses regional flooding issues associated with the Nepean River. Localised flooding has been addressed within the North Penrith development and Stage 1 through the identification of major overland flow paths and the estimation of peak water surface levels for the 100 year ARI storm event.

To evaluate the potential for the North Penrith development and Stage 1 stormwater management strategies to impact upon the groundwater resources the '*Geotechnical & Groundwater North Penrith Assessment Report*', Geotechnique, October 2010 was reviewed.

Findings

Concept stormwater drainage networks

Concept stormwater drainage networks for the North Penrith development and Stage 1 are provided on **Figure 2** and **Figure 3** respectively.

Stormwater quantity

The North Penrith development requires the provision of approximately 11,000 m^3 of detention volume to attenuate post-development peak flow rates back to pre-development levels prior to discharging into existing drainage infrastructure. The volume of storage is provided above the constructed wetland and within the central canal.

Stage 1 requires approximately 4,000 m^3 of detention volume to attenuate post-development peak flow rates back to pre-development levels prior to discharging into existing drainage infrastructure. The volume of storage is provided within a temporary basin.

Stormwater quality

The North Penrith development incorporates a suite of WSUD measures to reduce the average annual pollutant loads for Total Suspended Solids (*TSS*), Total Phosphorus (*TP*) and Total Nitrogen (*TN*). Measures include rainwater tanks, bio-retention swales, gross pollutant traps, sedimentation basins and constructed wetlands. These WSUD measures are strategically located within the development to provide a treatment train approach to stormwater quality management. MUSIC modelling predicts the effectiveness of the treatment train in minimising the annual average reduction rates as:

- 88% for TSS;
- 68% for TP; and
- 46% for TN.

Stage 1 incorporates WSUD measures to reduce the average annual pollutant loads for TSS, TP, and TN. Measures include rainwater tanks, bio-retention swales, gross pollutant traps and a temporary sediment basin. These WSUD measures have been arranged into a treatment train and MUSIC estimates the following average annual reduction rates:

- 91% for TSS;
- 69% for TP; and
- 52% for TN.

The average annual reduction rates for the North Penrith development and Stage 1 both exceed the baseline targets nominated in '*Draft Water Sensitive Urban Design Book 1 Policy*', Landcom, May 2009.

Comparison of the proposed annual pollutant loads (*including treatment*) against the existing annual pollutant loads shows that the North Penrith development and Stage 1 reduce the volume of TSS (*by approximately 35%*), matches TP volumes and increases the volume of TN (*approximately 30%*) being discharged downstream of the site.

Flooding

The '*North Penrith Regional Flooding Assessment*', WorleyParsons, October 2010 nominates minimum road (*25.40 mAHD*) and minimum habitable floor levels (*25.90 mAHD*) for the North Penrith development.

Localised flooding has been addressed within the North Penrith development and Stage 1 to determine peak water surface levels for the 100 year ARI event within the constructed wetland, the central canal and the temporary basin. These water levels have been estimated based on the modelling work undertaken in XP-RAFTS and have been incorporated into the design of open spaces surrounding the water bodies.

Groundwater

Based on the '*Geotechnical & Groundwater North Penrith Assessment Report*', Geotechnique, October 2010 the existing groundwater table is found at depths exceeding 5.0 m. Based on

preliminary design of the constructed wetland and the central canal there will be no direct interaction between the stormwater management infrastructure and the existing groundwater resource.

Under proposed conditions infiltration will occur within pervious areas, bio-retention swales and the constructed wetland. Qualitative assessment indicates that extent of infiltration would be relatively consistent between the post-development and pre-development scenarios. Thus, no adverse impacts upon the existing groundwater resource are anticipated.

Consultation
During the development of the stormwater management strategies for the North Penrith development and Stage 1 Penrith City Council (*Council*) was consulted. Preliminary concepts were presented and comments received have been incorporated into this report.

Conclusions

The stormwater management strategies for the North Penrith development and Stage 1 will maintain the existing drainage regimes present at upstream and downstream boundaries of the site for events up to the 100 year ARI.

Concept stormwater drainage networks have been prepared for the North Penrith development and Stage 1 that route stormwater runoff via a pipe network and overland flow paths towards stormwater management infrastructure. Through the provision of detention volume the North Penrith development and Stage 1 can demonstrate that peak flow rates are matched for events up to and including the 100 year ARI event and that average annual pollutant loads are reduced to levels consistent with Landcom's baseline requirements.

Flooding within the site has been considered through the estimation of peak water surface levels in the central canal and constructed wetland. Regional flooding has been assessed in a separate report.

The proposed stormwater management strategies will have no adverse impacts on the existing groundwater resource.

ESD principles demonstrated in the project
Rainwater tanks will be provided on each residential lot to assist in meeting BASIX requirements. Rainwater tanks will retain stormwater runoff for re-use in toilet flushing and for outdoor irrigation. Preliminary water balance modelling indicates that a 3 kL tank would represent an optimal cost-benefit scenario.

Recommendations

The stormwater management strategies for the North Penrith development and Stage 1 have been developed based on preliminary assumptions. As detailed design progresses for the development and Stage 1 assumptions will need to validated and refined to ensure the objectives of the stormwater management strategy are met. Accordingly, the following will need to be undertaken during the detailed design phases of the North Penrith development and Stage 1:

1. validation of the concept drainage network based on the final proposed surface;
2. validation of proposed land uses (*i.e., roof areas, road areas, etc*);
3. detailed design of the drainage network and stormwater detention infrastructure using DRAINS software;
4. detailed design of hydraulic controls within the temporary basin, central canal and constructed wetland;
5. refinement of the Sediment and Erosion control plans to reflect the phased construction proposed by Landcom and the contractor;
6. detailed design of all overland flow paths;
7. detailed design of WSUD measures;
8. validation of the depth to groundwater along the alignment of the central canal and within the vicinity of the constructed wetland and temporary basin;
9. additional water balance modelling of the central canal and constructed wetland;
10. detailed 1-Dimensional modelling of major overland flow paths within the development to determine localised flood hazard;
11. detailed design of temporary diversion drains required during Stage 1; and
12. liaison with Commuter Car Park designers to enable the stormwater management strategy for the Commuter Car Park to be integrated into the North Penrith development stormwater management strategy.

North Penrith Development

Transport Mobility and Accessibility Plan (TMAP)

Summary

This report assesses the traffic and transport impacts as required by the Director General for the North Penrith project. This is in support of an application under Part 3A of the EP&A Act for a Concept Plan and Project Application.

Objectives

The objectives of this TMAP are to:

- manage the transport impacts of the North Penrith development on surrounding sites and transport networks
- suggest ways to reduce growth in overall Vehicle Kilometres Travelled forecast to be generated by development, both by cars and commercial vehicles
- help reduce reliance on the private car
- maximise the use of public transport, walking and cycling for new and current trips in the vicinity of the development.

This TMAP will also address planning requirements for a future bus corridor through the development, linking Coreen Avenue to interchange on the southern side of Penrith Station.

Methods and findings

The proposal for master planned, mixed use community at North Penrith aligns with the objectives of the 2010 State Plan, its Metropolitan Transport Plan and the Metropolitan Strategy. It is designed to maximise the advantages of a key site adjacent to a train station with frequent and express train services as a location for new jobs and residences. It is within walking distance of the existing facilities and services of the Penrith CBD and Penrith Interchange. Its mix of land uses is the best means to reducing the length of future trips and encouraging the use of more sustainable modes, such as walking and cycling, and reducing the demand for parking for local activities.

The Project would improve access for bus routes from the north to Penrith Station, and make provision for a grade-separated underpass under the Western Rail Line so future buses could directly serve both sides of the Station. Such a facility would not only encourage use of transit to and from this site, but support new bus services to other planned major developments.
The combined impact of these improvements will be a shift towards greater public transport use and growth and advancement without previous levels of traffic congestion on the road network.

After considering how to first improve the use of transit and active modes, the remaining traffic growth was distributed across the local road network. The surrounding road network has existing congestion points at the intersections of:

- Parker Street and the Great Western Highway
- Castlereagh Road/Great Western Highway and the nearby junction of Castlereagh Road and Jane Street.

The amount of traffic expected to be generated by other approved or planned major developments in the area is estimated to require extensive road upgrades to maintain network performance. Once these improvements are in place, the additional traffic generated by this Project could largely be accommodated within either the capacity of the existing road network, or within the capacity created by the road upgrades for other developments. The upgrades required to mitigate the impact of this Project without the other developments, is a small subset of those required for all potential developments.

An appropriate road hierarchy and street designs have been produced for the Project. The public domain of the site has been laid out to achieve maximum permeability for walking and cycling. Good direct footpaths have been designed, mindful of key destinations such as the station, local shops, open space and bus stops. The future bus streets have been planned to provide priority for transit routes and good local connections to future bus stop locations. Cycle routes from Coreen Avenue to Penrith Station have been planned for directness and safety through the site.

Parking rates proposed are lower than those in Penrith Council's Draft DCP 2008. This is a deliberate part of the policy to encourage alternatives to car travel, but is also in accord with design principles to reduce the need for parking. However, the planned commuter parking station is both supported by the design, while it is not intended to be used by the residents or visitors to the North Penrith development.

The Project has planned for the access needs of the retained Penrith Training Depot and the new multi-level commuter car park. The Army's occasional need for large and oversized vehicles to leave its site has been accommodated in the new street plan, with a full swept path requirement analysis of the route of these larger vehicles.

Smart travel initiatives, such as the production of Travel Access Guides and Workplace Travel Plans, and requiring commercial developments to provide cyclist facilities have been included to assist in achieving the reductions in car usage.

Consultation

In the preparing this TMAP, the RTA, Transport NSW, Penrith Council and RailCorp were consulted as stakeholders. Any issues they raised are documented and addressed in this report.

Conclusions

The Project has demonstrated that it intends to capitalise on its strategic location adjacent to Penrith CBD and Station to reduce future car use while encouraging and facilitating the use of public transport, walking and cycling alternatives. The transport provisions outlines in the Package of works (see Section 5) are sufficient to manage the transport impacts of the Project on transport network performance. Of all the planned major developments in Penrith LGA, this Project is the most likely to have a reduced scale of traffic impact (per dwelling/per square metre of commercial space) because of its location on the rail and bus networks, its planned internal movement system and its balance of uses so many activities can be carried out locally. It strengthens the Penrith

Town Centre, and adds value to the proposed multi-level commuter car park. It achieves new housing and business options within the Penrith CBD, while respecting the heritage values of the site.

Recommendations

In order to achieve the traffic objectives of the Project, and to manage the traffic growth and local amenity for surrounding areas, the following actions are recommended:

Road network improvements

1. Upgrade turning space for large vehicles at the existing intersection of Coreen Avenue and the commuter car park road.

2. Provide one-lane roundabout at the new intersection of Coreen Avenue and the site entrance.

3. Road network capacity improvements are required to accommodate the future traffic flows forecast across the road network with, or without, the North Penrith Project. Due to the uncertainty of the timing and final activities associated with other developments in the Penrith area, the road network upgrades are proposed for those with a more direct nexus to the Project. Based on discussions with Landcom, upgrades of the following intersections are proposed:

    - Coreen Avenue/new site entrance road
    - Coreen Avenue/Coombes Drive (eastern intersection)
    - Coreen Avenue & Commuter car park road.

Travel plans

4. This project transport report will set a framework for use of travel modes, parking demands and traffic generation that will apply to subsequent users of the site. Landcom, through conditions on its future sales and tenancy agreements, will produce Transport Access Guides for new residents and require commercial tenants to produce a Workplace Travel Plans for their employees and clients.

5. Development controls will require commercial premises to provide cyclist end-of-trip facilities in accordance with the Planning guidelines for walking and cycling (NSW Planning, December 2004).

Transport works in kind by proponent

6. The widened kerbside lanes along the public transport corridor to Coreen Avenue, and the interchange facilities in the plaza adjacent to the station to promote the use of transit for travel.

7. Land reserved for a bus underpass of the Western Rail Line to promote the future development of the CBD bus network.

8. Direct and safe cycle and pedestrian routes from Coreen Avenue to Penrith Station to promote active modes as access to transit and for travel to the local CBD.

9. A wide plaza and good pedestrian access from Penrith Station to the new commuter car park.

10. Landcom will provide an upgraded access road to the commuter car park.

Cost, timing, apportionment

The estimated cost of the proposed road network upgrades, the apportionment to the North Penrith project on the basis of traffic growth contribution, and the proposed timings are shown in Table 1.

Table 1 Road network upgrade and contribution package

Upgrade	Est. Cost	Timing
Intersection of Coreen Avenue & Coombes Drive	$25,000	On completion of Stage 2A
Intersection of Coreen Avenue & Site Boulevard	$770,000	On release of Stage 1A
Intersection of Coreen Avenue & Commuter car park road	$30,000	On occupation of the Supermarket
Total cost	$825,000	

The cost of producing and implementing the travel plan is estimated at approximately $150,000 based on the number of residents and employees.

The timing of the introduction of bus lanes or peak period clearways is likely to be beyond the timeframe addressed in this study and would be determined by Transport NSW in conjunction with the other stakeholders. The timing of the planned bus underpass of the Western Rail Line is dependent on the level of congestion on the arterial road network and how that impacts upon bus reliability and speeds. This is in turn dependent on the timing and scale of other developments, such as the North St Marys and Penrith Lakes projects. It is also important that the preferred movement plan for the Penrith Business Centre be accepted and the bus tunnel integrated into that scheme so that it delivers the most benefits for the whole transport network.

NORTH PENRITH

URBAN DESIGN JUSTIFICATION

Vision

The Vision for the North Penrith site is:

To create a "Cool" Transit Oriented Village with:

- strong placemaking
- dense shade in the public domain
- expressed water
- diverse housing for all segments of the market

Urban Design Principles

The major drivers for the Urban Design Concept are as follows:

Express the Rich Heritage of the Site

i.e. Conserve Thornton Hall, Combwood and curtilages, use the cricket oval and former speedway to generate the urban form, interpret through public domain and public art works.

Work with the Site

The site is very flat and consequently engineering works will be required for drainage and infrastructure. Use these works to generate site features.

Expressing the Water

Drainage/hydrological works should incorporate state of the art "Water Sensitive Urban Design" and these works should be used to create amenity and natural "air conditioning".

Transit Oriented Development

The site provides a major opportunity for creation of 'Transit Oriented Development' because of its proximity to Penrith Railway Station, bus interchange and Town Centre.

The site should connect strongly to the rail station and the Penrith CBD, and integrate with buses arriving from the north.

The site should be developed in a dense mixed-use manner to facilitate transit use, both for residents (out - commuters) and employment (in - commuters). The site should also aspire to a strong degree of self containment.

In this context dense housing forms should be sought along with diverse local employment types.

Placemaking

The Concept Plan focuses on "placemaking" i.e. creating a variety of interesting places and spaces from soft and green, to bold and urban, to be enjoyed by the local community and by visitors. These places provide the heart and soul of the community.

Connective, Walkable Community

The Concept Plan seeks to facilitate social engagement and community building by developing a highly connective and walkable public domain. The public domain in this context must be safe, attractive, well connected and climatically comfortable.

Future Proofing

The Concept Plan is based on a distorted grid system which creates very flexible blocks able to accommodate a wide variety of uses over time.

Thus, whilst blocks can be developed in a diverse manner with a wide variety of medium density dwellings, they can also be developed as mid-rise apartment buildings, mixed-use (commercial/retail/residential) or indeed as intensive commercial office buildings or urban educational or medical establishments.

Housing Density and Diversity

In a 'Transit Oriented" situation it is desirable to generate the highest densities possible. This, however, is controlled by the depth of the market for density product (apartments) and by the cost/price ratio. At the moment it is very difficult to build economically viable, multi-storey, apartment buildings in Penrith.

Thus, the project has pushed densities wherever possible and left room for increased apartment buildings if and when they become viable.

The Concept Plan also promotes a very wide variety of quite dense, but low rise, residential solutions which we believe will find ready acceptance in the market, based on location, amenity and affordability.

Retention of Existing Landscape

There are some excellent remnant species of Cumberland Woodland remaining on the site. Most of the significant species and groupings occur at the eastern edge of the site and around the oval. There are also some very large and mature trees located close to the railway station.

Attempts have been made to conserve significant remnant vegetation wherever possible whilst noting that engineering works (primarily depth of fill) will prohibit retention in some areas (e.g. around the station).

Connection with Station (and Penrith CBD)

The Village Centre is located immediately adjacent to the railway station in order to engage with residents and commuters who will be accessing the station by foot, bus or by car (commuters from the wider Penrith community).

The Village Centre engages with the station, the commuter carpark and with bus set downs via a Village or Transit Square. This Village Centre and Square will provide sheltered access to the station (and to the CBD) for commuters and locals and will be a vital hub for the local community.

The bridge connection across the railway from the Transit Square needs to engage strongly with land use and place on both the north and south sides of the railway line. This can be reflected in public space, landscape, public art and in the architectural form of buildings (and their use) which enclose these spaces.

North Penrith

Utilities Servicing report

Summary

This report outlines the proposed servicing strategies for the North Penrith development and Stage 1 of the North Penrith development. This report also details measures that would need to be undertaken to ensure existing services are maintained to the Penrith Training Depot.

A review of the background documentation and initial discussions with service authorities indicate that the North Penrith development site is well served by all utility services and it is not envisaged that existing servicing capacity will be a constraint to the viability of the proposed development.

The proposed servicing strategies for the North Penrith development and Stage 1 of the North Penrith development are illustrated on **Figure 2** and **Figure 3** respectively.

Objectives

Director General's Requirements (*DGR*s) for the North Penrith Defence Site (MP 10-0078) Concept Plan were issued on 2 July 2010. The Utilities Servicing Report addresses points (1) and (2), (3) & (4) under Section 13 in the DGR's headed *"*Utilities and infrastructure*"*. These requirements include:

(1) *"Prepare a utility and infrastructure servicing report and plan for the site that includes (but is not limited to):*

- *(a)* *Identification and assessment of the capacity of existing utility and infrastructure servicing the site;*
- *(b)* *Identification and assessment of all necessary augmentation works to service the site;*
- *(c)* *How infrastructure will be managed by each stage of the development.*

(2) *Identify the proposed sources of water supply for the development including any reliance on groundwater or local catchments*

(3) *Address water sustainability and efficiency principles including opportunities for waste water re-use within the development.*

(4) Identify projected recurrent costs for any elements of infrastructure likely to be managed by Council on an ongoing basis."

The objectives of this report are as follows:

- to describe the existing utility services located within the vicinity of the North Penrith site;
- to outline the proposed servicing strategy for the North Penrith development; and
- to outline the proposed servicing strategy for Stage 1 of the North Penrith development;
- to describe the timing of service delivery to the Penrith Commuter Car Park; and
- to nominate how the Penrith Training Depot can be serviced independently from the North Penrith development.

Methods and findings

The servicing strategies have been prepared based on a detailed review of background information at the site and initial discussions with service authorities. Feasibility application documentation and supply application documentation has been submitted to Sydney Water and Integral Energy respectively.

The key findings arising from the background information review and initial discussions with service authorities are:

- the North Penrith development will require a sewer pumping station;
- it is likely that moderate amplification of the existing sewer network will be required (*pending the results of the Sydney Water feasibility study*);
- the North Penrith development site has an abundance of water main infrastructure in its vicinity that has sufficient capacity to service the expected load demands;
- it is likely that four connection points will be made to existing water main infrastructure (*pending the results of the Sydney Water feasibility study*);
- the North Penrith development can be serviced by the Penrith Zone Substation located to the west of the development site;
- the North Penrith development will require three 11 kV feeders to meet the anticipated electrical load demands;
- the North Penrith development telecommunications system design will be compliant with the Federal Government's National Broadband Network (NBN) policy, the telecommunications infrastructure servicing each property at North Penrith will be a

fibre-optic based network provided and maintained by Telstra and/ or other telecommunications providers ('the Providers').

- the North Penrith development will require connections to be established off existing infrastructure located in Castlereagh Road and Coombes Drive;
- approximately 150 m of telecommunication lead in works will be required to fibre optic cable into the development;
- the development will not rely on the extraction groundwater or the collection of stormwater runoff from local catchments to service demand;
- in order to satisfy BASIX requirements, a 3kL rainwater tank will be provided upon each residential lot. Collected roof water will be re-used for toilet flushing and outdoor irrigation;
- the North Penrith development can be serviced by existing high pressure gas mains located nearby to the development;
- connections to high pressure gas mains will be required at Castlereagh Road and at Coombes Drive;
- approximately 150 m of gas main lead in works will be required to supply gas within the proposed development; and
- the proposed servicing strategy will not generate any recurrent costs for Council.

Consultation
In developing the servicing strategy WorleyParsons has consulted with:

- Integral Energy;
- Telstra;
- Jemena; and
- Landcom
- Penrith Council, and;
- Sydney Water Corporation.

Conclusions

There is an abundance of existing servicing infrastructure located around the North Penrith development site. Investigations and preliminary discussions with service authorities indicate that existing infrastructure has the capacity to service the anticipated loads generated by the development.

The proposed servicing strategies for the North Penrith development and Stage 1 of the North Penrith development are illustrated on **Figure 2** and **Figure 3** respectively.

The Penrith Commuter Car Park will be completed prior to any construction works occurring on the North Penrith development. As such, the Commuter Car Park will need to install temporary utility servicing arrangements. The provision of services to the Commuter Car Park via the North Penrith development will be outlined as part of the Stage 2 Project Application.

The Penrith Training Depot can maintain access to all existing services. However, an alternative connection point for high voltage electricity will be required. This connection could be made from The Crescent or via the North Penrith development.

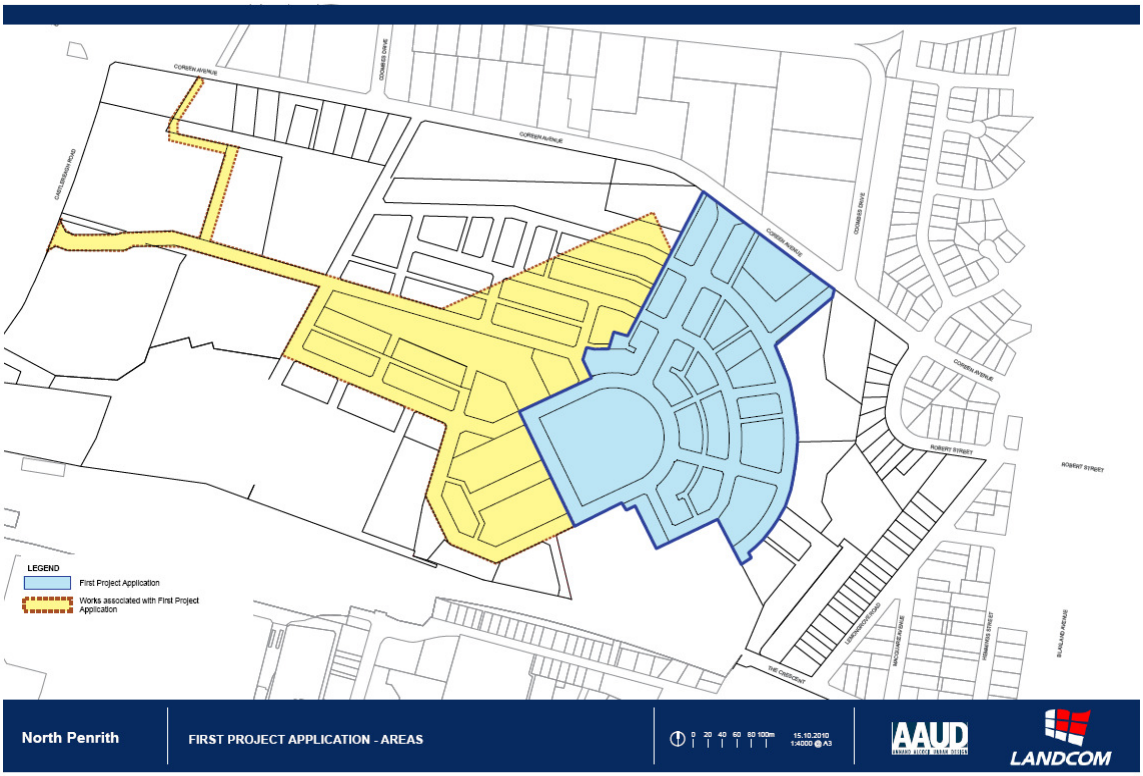
Recommendations

The site is nominated on the Metropolitan Development Program (*MDP*) for delivery in the medium term (2013/14 – 2017/18). The program nominates 850 dwellings. In response, '*Sydney Water's Growth Servicing Plan July 2010 to June 2015*', indicates that development can be serviced by connection to existing infrastructure, though some augmentation works may be required.

This report outlines a proposed servicing strategy for the North Penrith Concept Plan and for the Stage 1 Project Application. The proposed Concept Plan and Stage 1 are shown on **Diagram 1** and **Diagram 2** respectively. The proposed servicing strategies have been prepared based on detailed review of previous investigations and based upon preliminary discussions with service authorities and Landcom.

Diagram 1 North Penrith Concept Plan layout

Diagram 2 Stage 1 boundary



Although official correspondence from Sydney Water or Integral Energy has not been received, it is anticipated that the advice will generally be consistent with the advice provided previously in 2009 and 2002.

The servicing strategies for the North Penrith Concept Plan and Stage 1 Project Application will be subject to refinement during the detailed design process. The following will be required during detailed design:

- *Consultation with Sydney Water is required with regard to streamlining the Asset Creation Developer Process and for consent over the use of a proprietary sewage pumping station".* JWP 2010.

- Consultation with Sydney Water must be expediated to ensure that the approval pathway for the sewer pumping station is streamlined;

- discussions relating to the fibre optic network tendering process are required so as to have adequate time to consider the submissions that offer the most beneficial and cost effective telecommunications infrastructure package. This relates to the likes of initial capital investment for lead-in works versus cost of property reticulation works versus end user benefits. Early discussions with the Providers will also confirm infrastructure delivery can be scheduled in accordance with the overall development program.

- sewer modelling of the existing sewer network to determine the extent of any required amplification works;

- modelling of the existing potable water network to determine the extent of any required amplification works;

- discussions with Sydney Water to minimise the extent of lead in works for sewer and water services required as part of Stage 1;

- optimisation of rainwater tank sizes on each residential lot to satisfy BASIX requirements;

- discussions with Integral Energy to confirm the extent of lead in works and the proposed internal electrical network is satisfactory;

- discussions with Jemena to confirm the extent of the lead in works and the proposed internal gas network is satisfactory;

- confirmation of a shared trenching arrangement between Telstra, Integral Energy and Jemena;

- allowance for existing servicing arrangements to be maintained to the Penrith Training Depot;

- provision of utility services to meet the demands of the Community Pavilion;

- discussions with Penrith City Council to establish their intent to irrigate the oval with recycled water; and
- review of the proposed servicing strategy against the required drainage infrastructure to minimise clashes.