Sydney WATER

Preliminary Environmental Assessment

Water and wastewater servicing of the West Dapto Urban Release Area and Adjacent Growth Areas

November 2009

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Contents

List of Figures

List of Tables

Executive Summary

Introduction

This document includes a Project Description and Preliminary Environmental Assessment for the water and wastewater servicing of the West Dapto Urban Release Area and Adjacent Growth Areas (the Proposal) to be included with the Major Project Application form. The West Dapto Urban Release Area (WDURA) consists of the following Precincts:

- Kembla Grange
- Sheaffes/Wongawilli
- West Horsley
- Dapto Sub-regional Centre
- Horsley Industrial
- Cleveland
- Avondale
- Yallah/Marshall Mount
- East Horsley.

The following Precincts have been identified to date within the Adjacent Growth Areas:

- Tallawarra
- Huntley
- Calderwood
- Tullimbar Village
- Yellow Rock Healthcare Facility.

It is expected that additional Precincts will be nominated as development progresses within the Proposal area. Sydney Water's Proposal will be structured to accommodate all additional Precincts.

Sydney Water is responsible for planning for the provision of drinking water and wastewater for the Proposal area. Infrastructure components to be constructed as part of the Proposal include:

- drinking water trunk pipelines
- wastewater pipelines
- new water pumping stations and upgrades to existing water pumping stations
- new sewage pumping stations and upgrades to existing sewage pumping stations
- transfer of wastewater flows from the new growth areas to Wollongong or Shellharbour Sewage Treatment Plants for treatment and either reuse or ocean discharge
- potential amplification and/or upgrades to Wollongong and Shellharbour Sewage Treatment Plants
- at least one and potentially two new water reservoirs.

Key environmental issues

The preliminary environmental investigations presented in this report indicate that the construction of the infrastructure may have a significant impact on:

- terrestrial ecology
- Aboriginal heritage

These issues will require further detailed consideration and will be the focus of the Environmental Assessment (EA), under Part 3A of the *Environmental Planning and Assessment Act 1979*. It is expected that these issues will be addressed by the Director-General's environmental assessment requirements and the Minster's Condition's of Approval.

Other environmental issues

The preliminary environmental investigations presented in this report suggest that the following environmental issues are unlikely to have a significant impact on the environment, and should be readily managed through the preparation and implementation of standard work procedures and environmental mitigation measures:

- topography, geology and soils
- water quality, hydrology and groundwater
- aquatic and estuarine ecology
- air quality and odour
- greenhouse and climate change
- human health
- noise and vibration
- non-Aboriginal heritage
- visual amenity
- land use and services
- traffic and transport
- hazardous materials
- bushfire
- waste
- resource consumption
- ecologically sustainable development.

Sydney Water will prepare a draft Statement of Commitments to be included in the EA to describe how these issues will be managed throughout implementation of the Proposal.

Abbreviations

ASS	Acid Sulphate Soils
CP Act	Coastal Protection Act 1979
DECCW	Department of Environment, Climate Change and Water
DoP	Department of Planning
DUAP	Department of Urban Affairs and Planning
EA	Environmental Assessment
EEC	Ecologically Endangered Communities
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
FM Act	Fisheries Management Act
GCC	Growth Centres Commission
Ha	Hectare
IREP	Illawarra Regional Environmental Plan
IRS	Illawarra Regional Strategy
IUDP	Illawarra Urban Development Program
IWWS	Illawarra Wastewater Strategy
LEP	Local Environment Plan
LES	Local Environmental Study
LGA	Local Government Area
LIA	Lake Illawarra Authority
ML/d	Mega Litre per day
NPW Act	National Parks and Wildlife Act 1974
NSW	New South Wales
PAD	Potentially Archaeological Deposit
POEO	Protection of the Environment Operations Act 1997

SEPP	State Environmental Planning Policy
STP	Sewage Treatment Plant
TSC Act	Threatened Species Conservation Act 1995
WCC	Wollongong City Council
WDURA	West Dapto Urban Release Area
WFP	Water Filtration Plant
WSAA	Water Services Association of Australia

1. Introduction

1.1 Purpose of this report

This Preliminary Environmental Assessment has been prepared to accompany Sydney Water's Major Project Application for the provision of water and wastewater servicing of the West Dapto Urban Release Area and Adjacent Growth Areas (the Proposal).

The document includes the following information relevant to the Proposal:

- background and context
- planning approval provisions
- description of the components
- identification of environmental issues
- description of the assessment approach
- stakeholder and community consultation.

1.2 The proponent

Sydney Water is the proponent for the Proposal. Sydney Water is a statutory State owned corporation wholly owned by the New South Wales Government.

1.3 Proposal overview

The Proposal involves the provision of water and wastewater services to the West Dapto Urban Release Area (WDURA) and Adjacent Growth Areas up to the year 2050.

The area covered by the Proposal is generally bounded by Farmborough Heights in the north, Tullimbar Village in the south, Lake Illawarra to the east and Illawarra Escarpment to the west. Figure 1 shows the location of the WDURA and Adjacent Growth Areas in the Illawarra Region. It will contain the equivalent of about 35,000 dwellings to cater for growth up to 2050. Extensive new regional infrastructure is required for the development of the WDURA and Adjacent Growth Areas. This includes the provision of drinking water and wastewater services. Sydney Water has developed an integrated servicing strategy for WDURA and Adjacent Growth Areas, which consists of:

- provision of drinking water services through the extension of the existing Illawarra water system
- provision of wastewater services through the extension of the existing Wollongong and Shellharbour sewerage treatment systems
- non-drinking water supply through the installation of rainwater tanks by homeowners on each residential lot.

Figure 2 provides a general indication of the location of the proposed key water and wastewater services.

This Proposal only covers the provision of drinking water and wastewater services for WDURA and Adjacent Growth Areas (that is, it does not include other types of infrastructure or land development). These services include treatment, storage and bulk transport systems and do not include stormwater systems or reticulation networks. Infrastructure required to connect properties

to these services is also not included in the Proposal as this will be the responsibility of landowners and/or developers.

1.4 Proposal objectives

The objectives of the Proposal have been derived from Sydney Water's Integrated Servicing Strategy for the WDURA. The objectives are:

- ensuring a secure water supply
- protecting public health
- protecting catchment and river health
- providing affordable and efficient water and sewerage services
- providing resource and energy efficient water and sewerage services
- meeting the housing and employment needs of the Illawarra Region up to 2050
- supporting the orderly rollout of land release and infrastructure
- meeting Sydney Water's statutory and regulatory obligations.

Figure 1 Indicative location of the West Dapto Urban Release Area and Adjacent Growth Areas

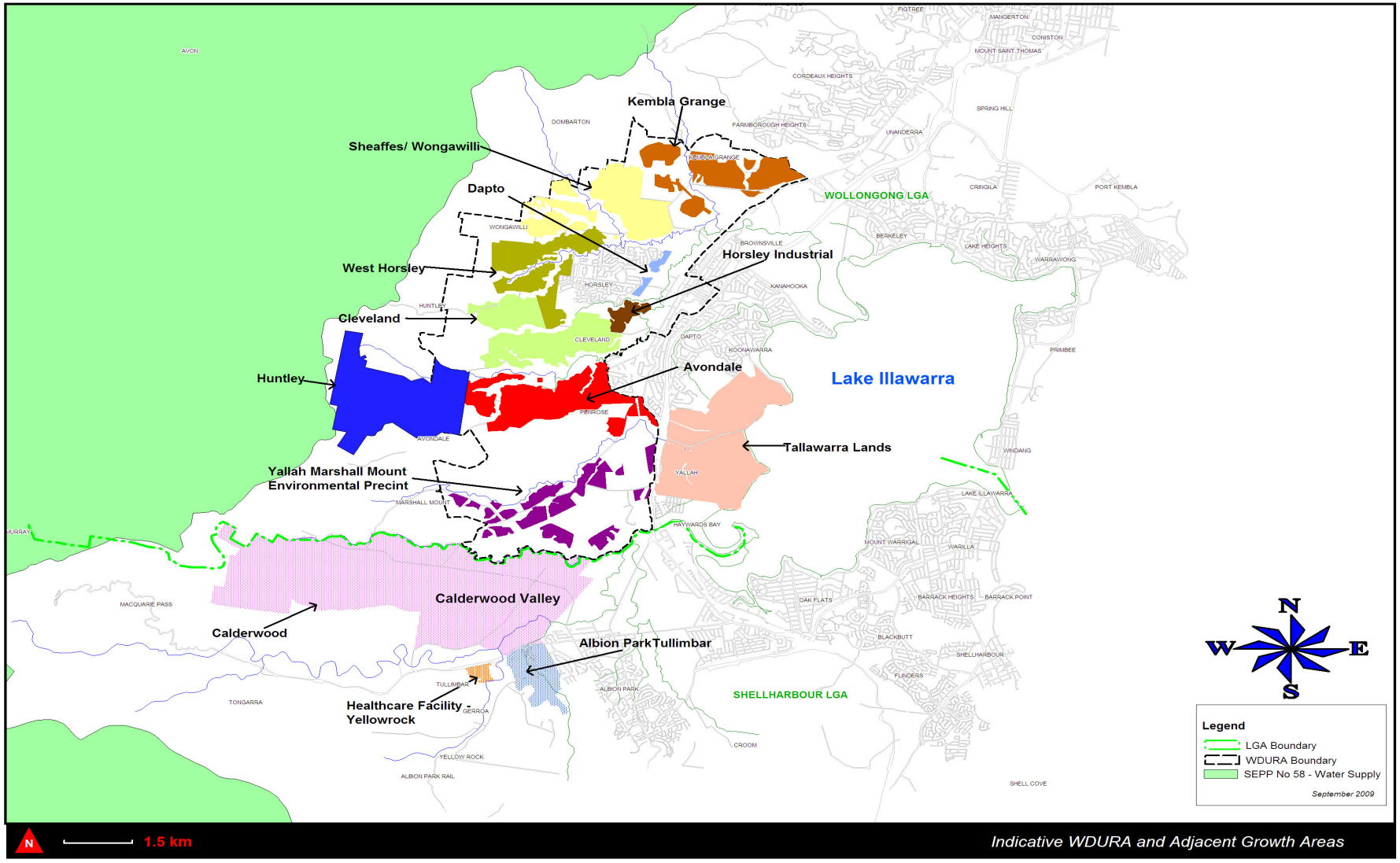
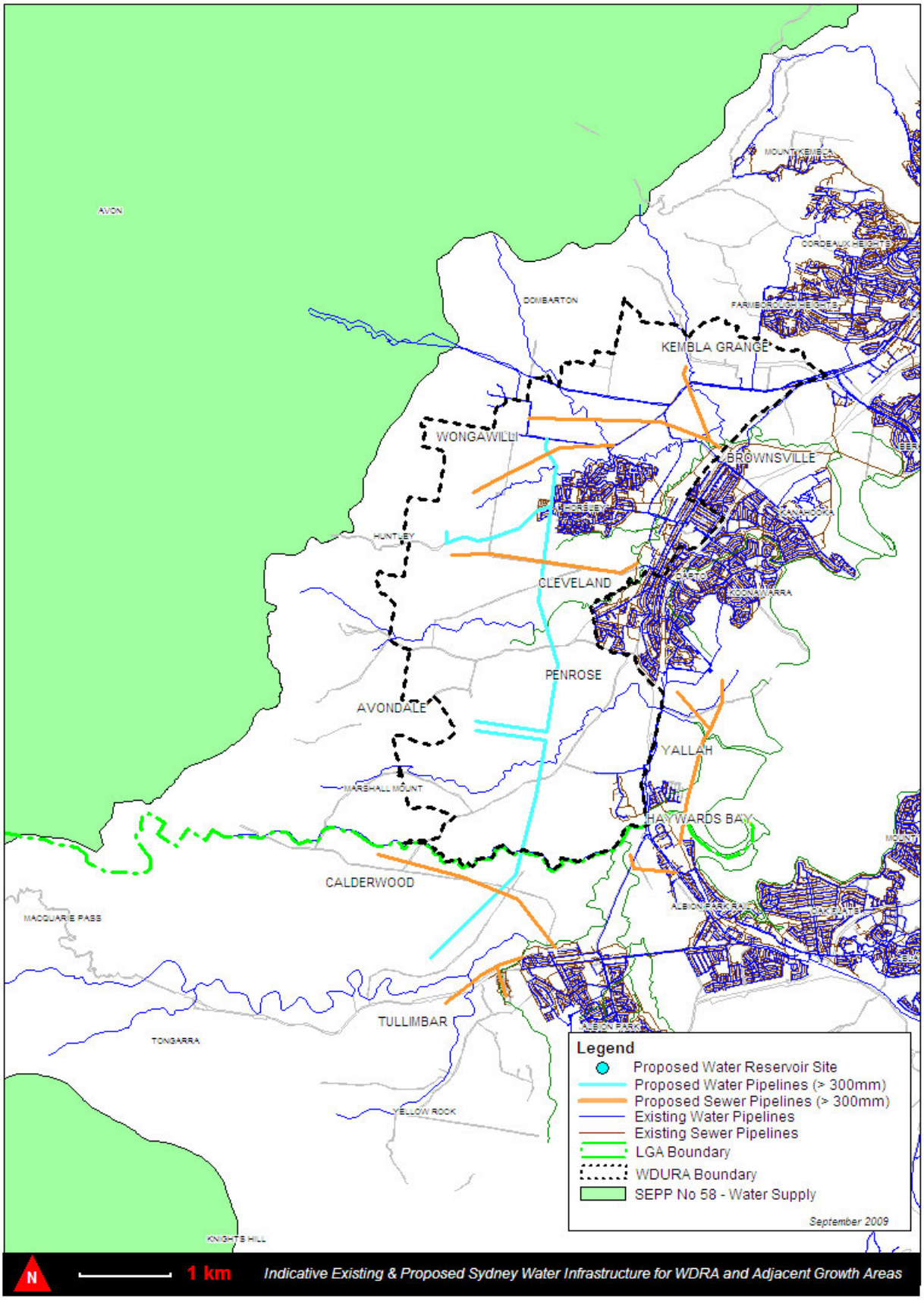


Figure 2 Indicative location of the water and wastewater infrastructure



Note: Figure only shows infrastructure within the new development areas. Amplifications and upgrades will be required for sections of existing infrastructure.

2. Proposal context

2.1 Urban planning context

2.1.1 Background

The Illawarra Region covers the local government areas of Wollongong. Shellharbour, and Kiama. The Region adjoins Sydney, the South Coast and the Southern Highlands, resulting in implications for linking employment, transport and settlement between neighbouring regions. In 2006 there were 281,000 people living in the Illawarra Region and the population is expected to increase by 47,000 over the next 25 years (Department of Planning 2007).

Development in the north of the Region is characterised by smaller communities overlooking the Pacific Ocean. Kiama and parts of Shellharbour in the south are characterised by urban landscapes and agricultural lands, which provide food production. The main opportunity for urban expansion is located in the middle of the Illawarra Region, around West Dapto, where the coastal plains broaden.

Development in the West Dapto area began over 20 years ago with the release of the suburb of Horsley. Due to high infrastructure costs and low housing demand further development did not proceed. In 2004 the then Department of Infrastructure Planning and Natural Resources announced that the Dapto Release Area would proceed. The Wollongong City Council (WCC) working with the Department of Planning (DoP) exhibited a draft Local Environment Plan (LEP) for the West Dapto Urban Release Area (WDURA) in 2007 to facilitate new residential development in this area.

2.1.2 Illawarra Regional Strategy 2006-31

The Illawarra Regional Strategy was prepared by the DOP as one of the regional strategies for areas of high growth in NSW. The strategy aims to ensure the projected housing and employment needs of the region over the next 25 years are adequately accommodated and appropriately located. This Regional Strategy also identifies and protects the Regions significant natural assets such as the Illawarra Escarpment, Lake Illawarra and the Minnamurra Estuary. The Strategy aims to ensure that careful planning of new development in the West Dapto area will recognise and protect natural vegetation corridors between the coast and the escarpment.

The Strategy identifies the WDURA as a priority new release area, proposing to accommodate approximately 20,000 dwellings and meet approximately 60 per cent of future residential demand in the Illawarra Region.

The Illawarra Regional Strategy includes the Illawarra Urban Development Program (IUDP). The IDUP was established in 1982 to coordinate planning, servicing and development of new urban area in Wollongong, Kiama and Shellharbour. The Calderwood area, to the south of West Dapto, was identified under the IUDP as a potential development area for up to 9,000 dwellings. Calderwood provides an opportunity for an additional new release adjacent to WDURA. The Proposal includes providing water and wastewater services to the Calderwood area as well Tullimbar Village to the south of Calderwood and Tallawarra to the east of WDURA (refer to Figure 1).

The development areas have been divided into a number of Precincts to facilitate the staged release of development. A list of the Precincts and the expected number of dwellings to be accommodated is provided in the Table 1. The land in Kembla Grange and Sheaffes/Wongawilli Precincts is being rezoned now, and Development Applications are being prepared for Wongawilli

by developers with development likely to commence in 2011/12. The remaining Precincts will be developed and released over time depending on development rates and demand.

Table 1 New development Precincts

New Development Precincts		Estimated Dwellings
West Dapto Urban Release Area (WDURA)	Kembla Grange	1,100*
	Sheaffes/Wongawilli	4,600
	West Horsley	4,200
	Dapto Sub-regional Centre	1,200
	Horsley Industrial	240*
	Cleveland	3,700
	Avondale	3,250
	Yallah / Marshall Mount	1,100
	East Horsley	880*
Adjacent Growth Areas	Tallawarra	2,400*
	Calderwood	9,000
	Tullimbar Village	2,200
	Yellow Rock Healthcare Facility	390*

*Employment lands converted to an equivalent number of dwellings

2.1.3 Growth Centres Commission

In late 2008 the Growth Centres Commission (GCC) was merged into the DoP to better facilitate the supply of land for urban development in NSW. The role of the DoP is to co-ordinate the planning and infrastructure for the Growth Centres, whilst working with State agencies, local councils, industry and the community.

In 2008 the GCC undertook a review of the key aspects of the development of the WDURA (GCC 2008). The review concluded that the staged development of WDURA can and should proceed, as it will assist in meeting the housing and employment needs of the Illawarra Region up to 2050. Since the GCC review, the area for staged development has been extended to include the Adjacent Growth Areas, identified in Table 1.

2.2 Water and wastewater services context

2.2.1 Metropolitan Water Plan

The NSW Government's *2006 Metropolitan Water Plan* outlines strategies to balance demand for water with a sustainable supply. Based on an adaptive management approach, the Plan outlines a diverse suite of options to meet Sydney's long-term water needs while minimising the costs to the community and the environment.

Sydney Water has developed an integrated servicing strategy for WDURA in accordance with the objectives of the Water Plan. The Strategy adopts a sustainable approach to the implementation and management of services for water and wastewater both for now and in the future.

Sydney Water's Integrated Servicing Strategy

Sydney Water has developed a plan for the provision of water and wastewater services to the WDURA and the Adjacent Growth Areas up to the year 2050. An Integrated Servicing Strategy was prepared in order to provide safe, reliable and sustainable water and wastewater services for the WDURA. The preferred strategy was chosen following a sustainability planning process used throughout Sydney Water to ensure preferred options are environmentally, financially, technically and socially sustainable. A sustainable decision is one that weighs up all relevant social, environmental, economic and technical considerations in a manner that is understood and accepted by the key stakeholders. The decision making process in Sydney Water was adapted from the *Sustainability Framework* commissioned by Water Services Association of Australia (WSAA) which is the peak representative body of the Australian urban water industry. The process includes steps for engaging external stakeholders (including local councils, community and business groups), setting objectives, developing options and appropriate quantitative and qualitative criteria, assigning weightings to those criteria and using them to evaluate options and carry out sensitivity analysis.

The process of identifying and choosing a preferred servicing strategy was undertaken in two stages. The first stage was to establish a long list of options that could service the expected needs for residential, industrial and commercial uses to the equivalent of approximately 35,000 dwellings. The long list of options was evaluated and ranked against the following criteria and the eight highest scoring options were added to a "short list" for further assessment:

- maximise drinking water conservation
- minimise wet weather discharges to Lake Illawarra
- minimise cost
- minimise energy consumption
- minimise impacts to the community
- maximise community acceptance
- maximise flexibility to development staging.

Further development was then undertaken on the short-listed options in order to provide enough information for assessment in the second stage. The short-listed options were again assessed and ranked against the above objectives. The assessment and ranking of the short-listed options included consultation with representatives from the Department of Planning, Department of Water and Energy, Department of Environment and Climate Change, NSW Health, and the local councils (Wollongong and Shellharbour).

After consideration of all the criteria the preferred integrated servicing strategy chosen for WDURA was:

- provision of drinking water services through the extension of the existing Illawarra water system
- provision of wastewater services through the extension of the existing Wollongong and Shellharbour sewerage treatment systems
- non-drinking water supply through the installation of rainwater tanks by homeowners on each residential lot.

Preliminary calculations indicate that the existing sewage treatment plants (STPs) and water filtration plants (WFPs) currently servicing the area have sufficient uncommitted spare capacity to cater for additional growth. These calculations will be confirmed during the development of the Concept Plan. However, major extensions to the existing drinking water and wastewater network of pipelines will be required to cater for the proposed growth in the WDURA and Adjacent Growth Areas.

Drinking water

The drinking water strategy comprises extending the existing network from the Kembla Grange Water Filtration Plant. Drinking water reservoirs currently exist at Dapto, Wongawilli and Albion Park. The infrastructure required to expand the network to cater for the new development in the WDURA will include as a minimum:

- trunk pipelines
- water pumping stations
- support assets (for example, water quality monitoring stations)
- at least one (potentially two) reservoir/s in the vicinity of Avondale.

There will also be a need to amplify sections of the existing network to increase service capacity between the WFP and the new development areas. These works will be identified during the detailed planning phase for each Precinct.

Wastewater

Wastewater from existing development in the area is transported and treated at either Wollongong or Shellharbour STPs. The following infrastructure has been identified as the minimum components required for expanding the wastewater systems to cater for the new development:

- trunk sewer pipelines (both gravity pipelines and rising mains)
- sewage pumping stations
- storage structures
- support assets (for example, wet weather overflow points).

There will also be a need to amplify sections of the existing sewerage networks to increase carrying capacity of the pipelines between the STPs and the new development areas. These works will be identified during detailed planning for each Precinct.

3. Planning and legislative framework

3.1 Planning approval

Under Section 75B(1) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the Minister for Planning can order that a proposed development is a project to which Part 3A of the EP&A Act applies. On 7 September 2009, the Minister for Planning issued an order that the Proposal should be assessed and determined under Part 3A of the EP&A Act due to its State and regional environmental planning significance.

The importance of the Proposal is described in the Department of Planning's *Illawarra Regional Strategy* (2007), which identifies West Dapto as the priority new release area for the Region. In addition, the *West Dapto Release Area Review Planning and Infrastructure Report* (Growth Centres Commission 2008) has identified infrastructure servicing is the key to the successful development of the area.

Under Section 75M(1) of the EP&A Act, the Minister for Planning can authorise or require a proponent to submit a concept plan for a Part 3A project. On 3 November 2009, the Minister for Planning authorised the submission of a concept plan for the provision of water and wastewater services for the WDURA and Adjacent Growth Areas.

Sydney Water intends to submit a Concept Plan for the entire Proposal area. The Part 3A application also seeks Project Approval to service the early release Precincts. Notwithstanding, Sydney Water reserves the right to use the provisions of the *State Environmental Planning Policy (Infrastructure) 2007* and/or Part 5 of the EP&A Act, and to act as the proponent and consent authority with appropriate environmental assessment, for any interim or urgent network infrastructure required to meet development timeframes for land releases in WDURA (i.e. if a developer would like to proceed under a Commercial Agreement, prior to the delivery of programmed infrastructure proposed under this Part 3A application).

3.2 Environmental planning instruments

Under sections 75J(3) and 75O(3) of the EP&A Act, the Minister may take into account provisions of environmental planning instruments that apply when deciding whether or not to approve a project or concept plan. Accordingly, relevant State environmental planning policies, regional environmental plans and local environmental plans are addressed in Sections 3.2.1 to 3.2.2 below. Sydney Water would further address the relevance of these instruments in the EA if required by the DoP.

3.2.1 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

This policy (Infrastructure SEPP) applies to all areas and components of the Proposal. Under Clauses 106 and 125 of the Infrastructure SEPP, proposed water and wastewater related services are generally permissible without consent. Certain aspects of the works, particularly related to investigations and testing, would be considered exempt under the provision of the Infrastructure SEPP. Sydney Water is seeking to exclude these elements from the Major Project Application.

State Environmental Planning Policy (Major Projects) 2005

This policy (Major Projects SEPP) identifies development to which Part 3A of the EP&A Act applies. Schedules 1-6 of the policy list various sites and types of development for which approval

under Part 3A is required. The Proposal does not fall into any categories in Schedules 1-6 and accordingly this policy does not apply to the Proposal. Section 3.1 of this report describes why the Proposal is subject to Part 3A.

State Environmental Planning Policy 14 – Coastal Wetlands

The Coastal Wetlands policy aims to ensure that coastal wetlands are preserved and protected in the environmental and economic interest of the State. Its objectives include;

- protecting valuable wetlands
- ensuring that a wide range of benefits of wetlands continue
- enabling cumulative effects of existing and proposed developments to be assessed
- encouraging developers to find alternatives to disturbing wetlands.

This SEPP provides guidance for consent authorities in terms of issues to consider if there is potential for a listed wetland to be affected by a proposal. Lake Illawarra is listed under SEPP 14 as a coastal wetland. However, Part 6 of the SEPP provides that consent is not required if the project has been declared under Part 3A of the EP&A Act.

State Environmental Planning Policy 71 – Coastal Protection

This Policy (Coastal Protection SEPP) has been made to ensure development in the NSW coastal zone is appropriate and suitably located, that there is a consistent and strategic approach to coastal planning and management, and there is a clear development assessment framework for the coastal zone.

Parts of the Proposal area are located within the mapped Coastal Zone and Lake Illawarra is listed under Schedule 1 of the Policy as a Coastal Lake. Clause 8 of the Coastal Protection SEPP lists matters to be considered by a consent authority when considering a development application within the coastal zone. These matters do not apply to the Proposal if it is assessed under Part 3A of the EP&A Act.

State Environmental Planning Policy Rural Lands 2008

The policy (Rural Lands Policy) aims to facilitate the orderly and economic use and development of rural lands for rural and related purposes. It was introduced in order to provide a state-wide framework in managing agriculture and the proposed planning of rural lands to provide opportunities for rural lifestyle, settlement and housing in rural communities.

Within the Proposal area this policy only applies to those parts that are within the Shellharbour local government area. Clause 10 of the Rural Lands Policy lists matters to be considered by a consent authority when considering a development application for rural land. These matters do not apply to the Proposal if it is assessed under Part 3A of the EP&A Act

Illawarra Regional Environmental Plan No 1

The Illawarra Regional Environmental Plan No 1 (IREP No.1) covers the five local government areas of Wollongong, Shellharbour, Kiama, Shoalhaven and Wingecarribee and from 1 July 2009 is deemed to be a SEPP. IREP No 1 provides a framework to ensure that the Government and public authorities take into account the interests of the Region when exercising their functions. This is achieved by providing a number of guiding principles for matters considered important to the Region. The Principles considered relevant to this Proposal are related to the following matters:

- land supporting rainforest vegetation species
- wildlife corridors
- energy
- underground utility services
- the escarpment
- coastal lands, wetlands and other water bodies
- environmental heritage.

These interests and the principles stated in IREP No 1 will be considered during the environmental assessment.

3.2.2 Local Environmental Plans

LEPs potentially relevant to the Proposal include:

- Draft Wollongong Local Environmental Plan (West Dapto) 2007
- Wollongong Local Environmental Plan 1990
- Draft Wollongong Local Environmental Plan 2009
- Shellharbour Local Environment Plan 2000
- Shellharbour Rural Local Environmental Plan 2004.

3.3 Other NSW environmental legislation

The relevance to the Proposal of key NSW environmental legislation is discussed in Sections 3.3.1 to 3.3.6 below.

3.3.1 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) was developed to protect and manage the fisheries of NSW for the benefit of present and future generations. The FM Act applies to all waters within the limits of NSW, except where Commonwealth legislation applies. Provisions of the FM Act potentially relevant to the Proposal include:

- Part 7A which addresses threatened species conservation associated with species listed in Schedules 4, 4A and 5 of the Act. Section 220ZF provides that an approval under Part 3A of the EP&A Act provides a defence against harm to threatened species, provided the harm is essential for carrying out the development
- section 219 relates to permits for blocking fish passage. However, permits under this clause are not required for projects approved under Part 3A of the EP&A Act
- two habitat protection plans have been developed under the FM Act and Sydney Water must consider the provisions of these plans to the extent they are relevant to the Proposal. Fish Habitat Protection Plan No. 1 (General) relates to dredging and reclamation, fish passage, protection of marine vegetation and snags.

3.3.2 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) provides for the conservation of NSW natural and built heritage, including through the establishment of a State Heritage Register. Under the Heritage Act, certain works on relics (section 139) or items on the State Heritage Register (Part 4) require a permit from the Heritage Council. However, such permits are not required for projects approved under Part 3A of the EP&A Act.

3.3.3 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the protection, preservation and management of Aboriginal relics in NSW. Under the NPW Act, permits are required for the destruction of any known Aboriginal archaeological sites (section 90) and for the excavation of potential archaeological deposits (section 87). However, such permits are not required for projects approved under Part 3A of the EP&A Act.

The Act also provides for the management of National Park land. Any components of the Proposal passing through National Park land would need to consider the provisions of relevant plans of management for that land.

3.3.4 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) regulates pollution and includes provisions for issuing environment protection licences. Sydney Water may require environment protection licences for construction and/or variations for the operation of the wastewater systems. Under Part 3A of the EP&A Act, an environment protection licence can not be refused if it is necessary for carrying out an approved project and must be substantially consistent with the Pt 3A approval.

3.3.5 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides for the protection of critical habitat and threatened species, populations, ecological communities and their habitats in NSW (with the exception of fish and marine plants).

It is an offence to damage critical habitat and/or cause harm to a threatened species, population or endangered ecological community, except if the action constituting the offence was:

- authorised by a licence issued under the TSC Act or NPW Act
- carried out in accordance with an approval or consent granted under Part 3A of the EP&A Act.

The Act also contains provisions for the Minister for Climate Change, Environment and Water to grant biodiversity certification to environmental planning instruments if satisfied they would bring an overall improvement or maintenance in biodiversity values. The practical effect of biodiversity certification is that projects that are subject to Part 4 or Part 5 of the EP&A Act under the certified environmental planning instrument are taken not to significantly affect any threatened species, population, ecological community or its habitat. To date no Biodiversity Certification Orders have been applied to any environmental planning instruments in the Illawarra Region.

The EP&A Act also includes provisions for incorporating threatened species assessment into the planning approval process (the assessment of significance under section 5A), but these provisions do not apply to projects being assessed under Part 3A of the EP&A Act.

3.3.6 Coastal Protection Act 1979

The *Coastal Protection Act 1979* (CP Act) provides for the protection of the coastal environment of the State for the benefit of both present and future generations. One of the key objectives of the CP Act is to protect, enhance, maintain and restore the environment of the coastal region, its associated ecosystems, ecological processes and biological diversity, and its water quality. To this end section 38 of the CP Act requires a public authority to obtain the concurrence of the Minister for Climate Change, the Environment and Water prior to carrying out any development in the coastal zone. However, section 75U(1)(a) of the EP&A Act states that the concurrence of the Minister is not required for a project approved under Part 3 of the EP&A Act.

3.4 Commonwealth legislation

The main relevant Commonwealth legislation is the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Under the EPBC Act, approval is required from the Commonwealth Minister for the Environment, Heritage and the Arts for any action likely to have a significant impact on a matter of national environmental significance. Matters of national environmental significance are:

- World Heritage properties
- National Heritage places
- wetlands of international importance
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- nuclear actions.

Commonwealth land is also protected under the EPBC Act.

Based on preliminary investigations, the Proposal has the potential to impact on listed threatened species and ecological communities. It is unlikely that other matters of national environmental significance or Commonwealth land would be impacted. If required, Sydney Water will refer the Proposal to the Minister for the Environment, Heritage and the Arts to determine if the Proposal is a controlled action.

4. Proposal description

4.1 Proposal components

The Proposal comprises the construction, operation and maintenance of water and wastewater infrastructure for the WDURA and Adjacent Growth Areas, including:

- drinking water trunk pipelines
- wastewater pipelines
- new water pumping stations and upgrades to existing water pumping stations
- new sewage pumping stations and upgrades to existing sewage pumping stations
- transfer of wastewater flows from the new growth areas to Wollongong or Shellharbour Sewage Treatment Plants for treatment and either reuse or ocean discharge
- potential amplification and/or upgrades to Wollongong and Shellharbour Sewage Treatment Plants
- at least one and potentially two new water reservoirs.

Figure 2 shows the indicative location of the proposed infrastructure. Sydney Water has not yet determined the exact locations of pipelines, pumping stations and reservoir(s). Planning and design of the infrastructure will take into account the environmental constraints and opportunities when determining final locations.

Some aspects of the Proposal relate to water and wastewater infrastructure that is located outside the defined WDURA and Adjacent Growth Areas, eg, the wastewater transfer systems and associated STPs.

4.2 Water Infrastructure

4.2.1 Pipelines

Approximately 25kms of trunk pipelines (pipelines ≥300mm diameter) will be installed as part of the Proposal. These pipelines will generally be installed below ground but will include some surface features or facilities such as aqueducts (over creeks if required) and valve or scour chambers. Further detail regarding pipeline construction is provided in Section 5.3.

4.2.2 Pumping Stations

As the water system is extended new water pumping stations will be required to deliver water to the new households. The size or footprint of the pumping stations will depend on the size of the facility. In general, water pumping stations require sites with an area of approximately 160m^2. Water pumping stations involve above ground infrastructure. A photo of a typical water pumping station is included in Figure 3 . The photo is indicative only and does not represent the exact size or design of drinking water pumping stations for this Proposal. As a result of the increase in demand some areas may require boosting of water pressure in the supply pipelines. In such instances, upgrading of an existing water pumping station will be required.

Figure 3 Typical water pumping station

4.2.3 Reservoirs

The Proposal will require the construction of at least one and potentially two water storage reservoirs to service the WDURA and Adjacent Growth Areas. The final footprint size of such reservoirs will depend on the size and type of the facility required. The Proposal will most likely require the construction of a surface reservoir(s). Reservoirs of this nature generally require an area of approximately two to four hectares each. If possible, reservoirs will be located on existing Sydney Water sites. Photos of typical surface reservoirs are included in Figure 4 and Figure 5 . These figures should be considered indicative only and do not represent the exact size or design of reservoirs for this Proposal.

4.3 Wastewater Infrastructure

4.3.1 Pipelines

The Proposal includes the construction of trunk pipelines for transferring wastewater to either Wollongong or Shellharbour STPs. The approximate total length of wastewater trunk pipelines (pipelines ≥300mm diameter) for the Proposal is estimated at approximately 35kms.

As in the case of water pipelines, wastewater pipelines will generally be installed below ground and include similar surface features or facilities such as aqueducts (over creeks if required), valve and/or scour chambers as well as sewer access chambers and vent shafts.

Figure 4 Typical surface reservoir

Figure 5 Residential development below Albion Park Reservoir

4.3.2 Pumping Stations

The Proposal includes the construction of new pumping stations along the new wastewater pipelines. It is anticipated that upgrades of some of the pumping stations within the existing Wollongong and Shellharbour wastewater systems will be required. This will be determined during detailed planning.

In general, the majority of the wastewater pumping station components are located below ground. However, aboveground structures may be required, such as small buildings, access chambers and control kiosks. Figure 6 and Figure 7 show indicative examples of wastewater pumping stations.

4.3.3 Sewage Treatment Plants

A preliminary assessment shows that both Wollongong and Shellharbour STPs have sufficient uncommitted spare capacity to treat and discharge the wastewater flows from the early release areas. It is proposed to split the wastewater flows from the WDURA and Adjacent Growth Areas approximately along the Wollongong, Shellharbour local government area (LGA) boundary, transferring approximately 10ML/d to Wollongong STP and 3ML/d to Shellharbour STP. On this basis, current load projections indicate flows at Wollongong STP will be approximately 57 ML/d in 2031 and would reach STP process capacity in about 25 years (ie, approximately 2034). Similarly, Shellharbour flow will be 18 ML/d in 2031 and would reach STP capacity in about 41 years, (ie, approximately 2050). Planning and design of any required process capacity and/or capability upgrades, will take place prior to these time horizons. Sydney Water will employ treatment process technology consistent with industry best practice at the time of design.

4.4 Description of land

Descriptions of the land affected by the Proposal will be provided in the EA. Land affected will be in public and private ownership and will be located within both the Wollongong and Shellharbour LGAs. Figure 2 shows the indicative location of the proposed infrastructure in relation to the Wollongong and Shellharbour LGA boundary.

Figure 6 Typical small wastewater pumping station

Figure 7 Typical mid-sized wastewater pumping station

5. Proposal phases

5.1 Proposal staging

The Department of Planning, in consultation with relevant local councils, agencies and developers, will ultimately determine the staging of development within the WDURA and Adjacent Growth Areas. Early release areas are currently being rezoned and development is expected to commence in late 2011/12. The Proposal and the associated provision of water and wastewater services will, to the greatest extent possible, accord with the ultimate staging of development.

Early release areas may require interim servicing arrangements prior to the roll out of the major trunk infrastructure. Interim servicing may include tankering of early wastewater flows or minor extension of the existing systems.

As discussed in section 3.1, Sydney Water is seeking initial Concept Plan Approval for the overall Proposal and Project Approval for components of the Proposal required to service the release Precincts. Subsequent Project Approval(s) will be sought for components of the Proposal that relate to areas released at a later date and/or existing system upgrade requirements that are confirmed at a later date. Project Approval will facilitate construction, operation and maintenance of the required infrastructure and existing system upgrades.

Sydney Water is currently undertaking concept planning for the Proposal as a whole and detailed planning for the specific water and wastewater infrastructure required for the early release areas. The planning process will deliver preferred scheme plans that will provide the basis for the environmental assessment and stakeholder consultation for the Concept Plan and Project Approvals. Concept planning and the resultant scheme plans will also enable progression of detailed design and procurement of pre-construction and construction services. Detailed construction timeframes cannot be determined at this stage.

5.2 Pre-construction activities

Before construction commences, additional route and location feasibility studies may need to be undertaken. Pre-construction activities may include geotechnical and contamination surveys, identification of the location of existing underground services and other minor surveys and tasks required to optimise and finalise pipeline alignments, design and constructability. These pre-construction studies are required to help refine the Proposal and are therefore not part of the Proposal in terms of the planning approval process. Environmental management and assessment will be undertaken for these activities as appropriate in line with established Sydney Water procedures. Property maintenance of sites may also be required (eg, fencing and vegetation management).

5.3 Construction phase

5.3.1 Water infrastructure

The majority of water pipelines are to be installed in road reserves. Some sections will need to be installed in public reserves and private land.

Trenching will be the main construction technique for installing pipelines. Boring or tunnelling will also be used where appropriate to minimise disturbance in locations where there are particular environmental, safety, access or surface feature issues (eg, creek crossings).

Water pipes are generally between 300 millimetres and 1200 millimetres in diameter. Smaller diameter pipes may also be considered and assessed in the context of the Proposal. Trenches for water pipelines will generally be up to about 1.7 metres wide and 1.5 metres deep, with a construction footprint width of approximately 6 to 10 metres. Lay-down and staging areas may also be required.

Hydraulic efficiency requires that water reservoirs be constructed at high points in the landscape. Water from the reservoirs is transported through pipelines under gravity. A water reservoir will generally require a site with an area of two to four hectares and construction will utilise most of this space, subject to site constraints.

If required, water pumping station sites will need approximately 160 square metres, all of which will be utilised during construction.

Construction of reservoirs and pumping stations will include the following key activities:

- site preparation and excavation
- construction of buildings, mechanical and electrical controls, electrical kiosks, etc
- ancillary construction works such as roads, fencing, etc
- commissioning in accordance with standard commissioning procedures
- landscaping and restoration.

Typical construction equipment includes excavators, compactors, rock-breakers, saw cutters, welding equipment, delivery and concrete trucks, powered hand tools, generators, boring, micro-tunnelling or directional drilling rigs, and cranes.

5.3.2 Wastewater infrastructure

Many of the wastewater pipelines will be constructed in low-lying areas and in the vicinity of waterways. Due to the design requirements of gravity wastewater systems, locating wastewater pipelines away from waterways is not always feasible.

Wastewater trunk pipelines are generally between 300 millimetres and 1800 millimetres in diameter. Smaller diameter pipes may also be considered and assessed in the context of the Proposal. Trenches for wastewater pipelines will generally have a similar width and construction footprint to water pipelines (1.7 metres and 6 to 10 metres respectively). However, some sections of wastewater pipelines may require deeper installation (5 metres or more) due to the need to maintain gravity flow in the pipeline. In such instances, the trench width and construction footprint will increase.

The construction of wastewater pumping stations will include the following key activities:

- site preparation and excavation
- construction of buildings, chemical storages, tanks and treatment process units, etc
- ancillary construction works such as roads, fencing, etc
- commissioning in accordance with standard commissioning procedures
- landscaping and restoration.

Typical construction equipment will include excavators, compactors, rock breakers, saw cutters, welding equipment, delivery and concrete trucks, powered hand tools, generators, micro-tunnelling or directional drilling rigs, and cranes.

Upgrade of some of the pumping stations within the existing Wollongong and Shellharbour wastewater systems is anticipated. Upgrade works are likely to comprise both underground and above ground works and involve a limited number of the activities and construction equipment listed above.

5.3.3 Wastewater treatment

Transfer of wastewater flows from the WDURA and Adjacent Growth Areas to both Wollongong and Shellharbour STPs may require staged upgrade of STP process capacity and/or capability. If required, related construction activity is likely to involve a combination of the pumping station construction activities and construction equipment listed above.

5.4 Operation phase

All infrastructure will be designed, built and operated in accordance with Sydney Water's and associated regulatory standards. In addition, all infrastructure will be routinely inspected, maintained and repaired as necessary to maintain design performance throughout its operating life. Pumping stations and reservoirs will be controlled remotely and have built in redundancies to minimise the risk of discharges to the environment at any stage during operation.

6. Assessment approach

6.1 Identification of key issues for environmental assessment

Sydney Water undertook an environmental risk analysis of the Proposal to assist in identifying matters for key consideration. A multidisciplinary approach was taken, drawing on key internal stakeholders and Sydney Water environmental management staff involved in the Proposal.

The risk analysis process followed several steps. These were:

- identification of components of the surrounding environment that may be impacted by the Proposal
- broad definition of those components of the Proposal that would be interacting with the environment, specifically pipelines, pumping stations, reservoirs and treatment plants
- identification of activities during construction and operation that may affect the environment
- identification of potential environmental impacts as a result of the proposed activities.

A qualitative ranking of consequence and likelihood was undertaken, and the risk considered in light of proposed control measures. The assessment issues have been identified based on the outcomes of the risk analysis and categorisation of the identified risks into the three categories as shown in Table 2.

Table 2 Assessment categories

Category	Assessment level
1 – Key Assessment Issues	Issues that fall into this category are: • likely to be important for decision making • large and/or potentially controversial • involve sensitive environments in specific areas • have a high level of uncertainty about the outcomes. These issues will need a full analysis (potentially including comprehensive baseline assessment) to determine the extent of impact and necessary management measures.
2 – Other issues requiring further analysis	Issues that fall into this category are those with some level of uncertainty about outcomes. Further analysis is required to determine the extent of impact and appropriate management measures.
3 – Other issues requiring limited analysis	Issues that fall into this category have highly predictable impacts and are easily and reliably managed within acceptable levels. These issues will not need a full analysis but may involve limited analysis to select relevant standard management measures.

Table 3 summarises how the environmental issues have been split into each of the three assessment categories. Ecology and Aboriginal heritage have been categorised in Category 1 and are considered the key environmental assessment issues.

The level of assessment in the EA will also depend on whether Project approval is being sought concurrently for a particular component. Section 6.2 provides a summary of Sydney Water's approach to the level of assessment to be undertaken.

Table 3 Categorisation of environmental issues

Aspect	Issue	Category			Comment
		1	2	3	
Ecology	Impacts on terrestrial flora and fauna during construction (including threatened species)				Relevant to all components of the Proposal
	Impacts on terrestrial flora and fauna during operation (including threatened species)				Relevant to all components of the Proposal
	Impacts on aquatic flora and fauna during construction (including threatened species)				Relevant to all components of the Proposal
	Impacts on aquatic flora and fauna during operation (including threatened species) as a result of discharges to waterways				Relevant to wastewater pumping stations and treatment plants
	Spread of noxious weeds during construction and operation				Relevant to all components of the Proposal
Heritage	Construction impacts on Aboriginal heritage				Relevant to all components of the Proposal particularly wastewater pipelines.
	Operational impacts on Aboriginal heritage				Relevant to all components of the Proposal
	Construction impacts on non-Aboriginal heritage				Relevant to all components of the Proposal
	Operational impacts on non-Aboriginal heritage				Relevant to all components of the Proposal
Air quality	Dust and fume emissions during construction				Relevant to all components of the Proposal
	Odour emissions during operation				Relevant to wastewater infrastructure, particularly wastewater pumping stations
	Generation of greenhouse gases (construction and operation)				Relevant to all components of the Proposal
Resource consumption	Consumption of energy and resources (construction and operation)				Relevant to all components of the Proposal
Waste	Waste generation (construction and operation)				Relevant to all components of the Proposal
Topography, geology and soils	Soil erosion during construction and operation				Relevant to all components of the Proposal
	Acid sulfate soil management during construction				Relevant to some pipelines and pumping stations
Hydrology and drainage	Groundwater management during construction				Relevant to all components of the Proposal
	Temporary creek diversion during construction				Relevant to pipelines and pumping stations

Aspect	Issue	Category			Comment
		1	2	3	
	Increased operational flows to creeks				Relevant to wastewater pumping stations
Water quality	Sedimentation into waterways during construction				Relevant to all components of the Proposal
	Increased wastewater flows to waterways in wet weather				Relevant to wastewater pumping stations
	Groundwater discharge into waterways during construction				Relevant to all components of the Proposal
Visual	Construction impacts on visual amenity				Relevant to all components of the Proposal
	Operational impacts on visual amenity				Relevant to all components of the Proposal except below ground infrastructure
Noise and vibration	Construction noise and vibration				Relevant to all components of the Proposal
	Operational noise and vibration				Relevant to all components of the Proposal
Traffic and access	Construction traffic impacts				Relevant to all components of the Proposal
	Operational traffic impacts (road and rail)				Relevant to all components of the Proposal
Land use and services	Changes in land use during operation				Relevant to all components of the Proposal
	Impact on existing or proposed infrastructure (water supply channel, electricity, telecommunication, gas)				Relevant to all components of the Proposal
Storage of hazardous materials	Spill of hazardous materials during construction and operation				Relevant to all components of the Proposal
Human health impacts	Human health impacts during operation				Only relevant to wastewater pumping stations.
	Human health impacts during construction				Relevant to all components of the Proposal
Bushfire	Bushfire risk during construction and operation				Relevant to all components of the Proposal

6.2 Level of assessment

Sydney Water is seeking Concept Plan Approval for the whole Proposal. Sydney Water is also seeking concurrent Project Approval for selected components of the Proposal related to the early release Precincts. The different levels of assessment proposed in the EA for the Concept Plan and Project Approval components are summarised in Table 4. In general, a more detailed assessment will be done for the Project level than the Concept Plan level.

Table 4 Assessment approach for environmental issues

Issues category	Concept Plan assessment scope	Project level assessment scope
1	Desktop assessment Field assessment focused in areas of high sensitivity (if considered necessary based on desktop assessment findings)	Comprehensive assessment including stakeholder consultation, field assessment and/or modelling
2	Desktop assessment	Desktop assessment Field assessment focused in areas of high sensitivity (if considered necessary based on desktop assessment findings)
3	Desktop assessment to identify high level management measures	Desktop assessment to identify specific management measures

7. Preliminary environmental assessment of key issues

This section summarises the existing environment and its values. It also addresses key environmental issues in relation to the Proposal and outlines the scope of future assessment for the EA. Based on Sydney Water's preliminary environmental risk analysis, the key environmental issues are considered to be:

- Ecology – terrestrial
- Aboriginal heritage.

This section covers areas potentially affected by the Proposal, both inside and outside the WDURA and Adjacent Growth Areas, including Wollongong and Shellharbour STPs.

The Proposal area consists of three primary landforms; the foothills, the coastal plain and the coast. The main habitat types are forest, woodland, grassland, shrub land, wetland, riparian, estuarine and near shore ocean habitats. The Proposal area is characterised by rural and rural/residential land use, grazing land, open space and environmental conservation areas.

7.1 Ecology – terrestrial

7.1.1 Existing environment

The ecological attributes of the Proposal area have been, and continue to be, substantially effected by the predominant rural residential land-use. The land has been extensively cleared of native vegetation, particularly on the lower hill slopes and plains. Introduced plants and animals compete with remnant native vegetation and fauna populations.

Remnant vegetation typically occurs in relatively small, isolated fragments in riparian corridors and around Lake Illawarra. In 2004, native vegetation comprised a approximately 430Ha, or nearly 5% of the total area for WDURA (MG Planning 2006). Based on a visual analysis of the land in the Adjacent Growth Areas Proposal area, it would appear a similar proportion of native vegetation remains.

Ecological surveys have been undertaken as part of the planning for the draft Wollongong LEP for the West Dapto Urban Release Area (Wollongong City Council 2007) and for the Tallawarra (Willana Associates 2006).

Terrestrial Flora

The condition and habitat values of the remnant vegetation are likely to be low to moderate (Wollongong City Council 2007). The majority of the remnant vegetation is made up of Lowland Woollybutt-Melaleuca Forest and Coastal Grassy Red Gum Forest.

Table 5 lists the vegetation communities recorded in the area affected by the Proposal (Wollongong City Council 2007). The Table also identifies which vegetation communities are listed as Endangered Ecological Community (EEC) under the NSW TSC Act.

Table 5 Vegetation communities recorded in the Proposal Area

Vegetation Community	Endangered Ecological Community Listing (TSC Act 1995)
Alluvial Swamp Mahogany Forest	Swamp Sclerophyll Forest on Coastal Floodplains – Southern Rivers
Coachwood Warm Temperate Rainforest	
Coastal Grassy Red Gum Forest	Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion
Coastal Swamp Oak Forest	Swamp Oak Floodplain Forest – Southern Rivers
Estuarine Alluvial Wetland	Sydney Coastal Estuary Swamp Forest Complex
Estuarine Lagoons and Channels	
Floodplain Wetland	Freshwater Wetlands on Coastal Floodplains in the NSW North Coast, Sydney Basin and South East Corner bioregions
Lowland Dry-Subtropical Rainforest	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion
Lowland Woollybutt-Melaleuca Forest	Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion
Moist Coastal White Box Forest	
Riparian River Oak Forest	
Saltmarsh	Coastal Saltmarsh of the Sydney Basin Bioregion
Seagrass Meadows and Estuarine Flats	

The River-Flat Forest on Coastal Floodplains – Southern Rivers community, although not recorded in the WDURA and Adjacent Growth Areas, is also listed under the TSC Act and is known to exist in the Illawarra Region. Therefore it may potentially exist within the Proposal area.

Under the EPBC Act, Turpentine-Ironbark Forest in the Sydney Basin and the Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (listed as Littoral Rainforest under the TSC Act) are listed as Critical or Critically Endangered communities and also potentially exist within the Proposal area.

Searches of the EPBC Act Online Database and the DECCW Atlas of New South Wales Wildlife Database identified that approximately 30 threatened flora species or populations potentially occur in the Proposal area.

Two endangered populations and one endangered species have been recorded. They are:

- *Chorizema parviflora* – population
- *Lespedeza juncea subsp. sericea* – population
- *Perostylis gibbosa* – species.

The endangered *Cynanchum elegans* has also been recorded in the Illawarra Region and could occur in wetter forests and deep gullies within the area covered by the Proposal.

The level of weed infestation within the assessment area is considered severe in some areas.

Terrestrial Fauna

The diversity of vegetation types supports a high diversity of fauna. Habitats include woodlands and grasslands, riparian corridors and farm dams and the interface between them. Birds were the most common fauna recorded with approximately 90 species recorded in the Proposal area. A large number of amphibians, marsupials and reptiles have also been recorded in the Proposal area.

Threatened species previously recorded (Wollongong City Council 2007) include:

- *Litoria aurea* – the Green and Gold Bell Frog
- *Tyto novaehollandiae* – the Masked Owl
- *Tyto* tenebricosa – the Sooty Owl
- *Ninox strenua* – the Powerful Owl
- *Neophema pulchella* – the Turquoise Parrot
- *Pteropus poliocephalus* – the Grey-headed Flying Fox.

A number of introduced animals are known to exist in the area.

7.1.2 Preliminary assessment

Sydney Water considers terrestrial ecology to be a key assessment issue due to the nature and extent of the ecological attributes of the area covered by the Proposal (particularly the number of communities or species occurring that are listed under the TSC Act) and the likelihood of the proposal impacting upon these communities and/or species during construction. Wastewater pipelines will potentially be constructed along and across creeklines that are commonly associated with remnant native vegetation communities and/or native flora and fauna populations.

Operational impacts from water and wastewater services are likely to be minimal and largely related to access for routine maintenance activities.

7.1.3 Scope of assessment in EA

Sydney Water will undertake an ecological assessment as part of the EA to identify potential impacts and appropriate mitigation measures. This will include:

- a desktop analysis of the ecological values of the Proposal area. This analysis will form the basis of the assessment undertaken for the Concept Plan components, potentially supported by targeted field assessment in areas of high sensitivity where infrastructure locations can be well defined
- a more detailed assessment (including possible field studies) will be undertaken in accordance with DECCW's threatened species assessment guidelines for the components Sydney Water is seeking Proposal Approval.

7.2 Aboriginal heritage

7.2.1 Existing environment

The Project area lies within the boundaries of the Illawarra Local Aboriginal Land Council and the Korewal Elouera Jerrungarugh Tribal Elders Council. The area is also of interest to the Wodi Wodi Elders Council and the Wadi Wadi Coomaditchie Aboriginal Corporation.

Evidence of Aboriginal occupation in the WDURA is presented in the West Dapto Release Area Draft Local Environmental Study (MG Planning 2006). From the 66 open camp sites and isolated finds within the LES study area, a total of 669 artefacts have been recorded. The majority of artefacts have been recorded in subsurface contexts, with 480 subsurface artefacts recovered from 52 site locations. The remaining 189 artefacts were recorded within 20 surface site locations. Seven scarred trees *(*considered rare) have also been identified in the hilltop contexts of the LES study area.

Previous studies have identified potential archaeological deposits (PADs), where artefacts and other cultural materials are likely to occur. PADs are based on land use, landform, natural resources, levels of disturbance and predictive modelling. Most landforms in the Proposal area have some potential to contain archaeological materials. A PAD has been identified north of Cleveland Road on private land.

7.2.2 Preliminary assessment

Given the nature of the Proposal's components, and the number of known archaeological sites, there is some potential for the Proposal to have a significant impact on Aboriginal heritage.

Water pipelines will generally be laid along roadways where impacts are considered less likely to occur. Wastewater pipelines will generally be laid along creek lines where impacts are considered more likely to occur. The site for new reservoir(s) will be located on high points in the landscape and may also impact on Aboriginal heritage.

Sydney Water considers that the Proposal may have a significant impact on Aboriginal heritage and therefore considers it a key assessment issue.

7.2.3 Scope of assessment in EA

Sydney Water will undertake an Aboriginal heritage assessment as part of the EA, to identify potential impacts and management measures to minimise them. This will include:

- a desktop sensitivity analysis of the Aboriginal heritage values of the Project area. This sensitivity analysis will form the basis of the assessment undertaken for the Concept Plan components, potentially supported by targeted field assessment in areas of high sensitivity where infrastructure locations can be defined
- a more detailed assessment by a qualified archaeologist of the components of the Proposal for which Project Approval will be sought, including field assessment and consultation with relevant Aboriginal groups.

8. Preliminary environmental assessment of other issues

This section summarises the existing environment, other potential impacts of the Proposal and proposed assessment scope in relation to issues other than key assessment issues. These issues include:

- topography, geology and soils
- water quality, hydrology and groundwater
- ecology – aquatic and estuarine
- air quality and odour
- greenhouse gas and climate change
- human health
- noise and vibration
- non-Aboriginal heritage
- visual amenity
- land use and services
- traffic and transport
- hazardous materials
- bushfire
- waste
- resource consumption
- ecologically sustainable development.

The above issues will be taken into account during the concept plan design process and the detailed planning for the components requiring Project Approval. During these processes Sydney Water will aim to avoid impacts related to these issues. Where this is not possible Sydney Water will aim to minimise impacts where practicable by the implementation of appropriate management measures.

8.1 Topography, geology and soils

8.1.1 Existing environment

The topography of the WDURA and Adjacent Growth Areas can be broadly described in terms of the Illawarra Escarpment foothills, ridges and valleys in the west, grading to gently undulating slopes and plains that fringe Lake Illawarra and the coast in the east. Development is proposed for the lower foothills and coastal plain components. There are few steep or very steep slopes (>18 deg) within the Proposal area. Landslips are considered possible on the mid-slopes but are unlikely within the Proposal area (HLA-Envirosciences 2005).

The geology of the Proposal area varies with elevation and from location to location. At higher elevations, older volcanic sandstones of the Shoalhaven Group (Budgong Sandstone) dominate. In 2005, HLA-Envirosciences reported that the Budgong Sandstone unit is particularly hard and resistant to excavation. Outcrops of basaltic latite occur at higher elevations within the Budgong Sandstone unit (eg, elevated areas north of Mount Marshall Creek). The lower elevations are

dominated by comparatively young Quaternary aged alluvium, gravel, beach and dune sand. The flatter coastal plain is characterised by alluvium.

The soils of the WDURA and Adjacent Growth Areas similarly vary with elevation, location, geology and slope. Soils of the upper elevations on the western side of the new development areas may have formed from colluvium associated with the Illawarra Escarpment. In such cases, the topsoil layers are often sandy and are either shallow or have sandy clay subsoil. Mid elevation or mid-slope soils similarly reflect the geology (predominantly sandstone and/or latite) and are often characterized by shallow soils on crests of hills, gradational soils on slopes and duplex and/or podzolic soils on the lower slopes. Soils in the more low-lying areas are more depositional in origin and are characterized by sandy, alluvial loams.

Soil and/or landscape limitations (fertility, erodibility, mass movement hazard, waterlogging, groundwater depth, rock outcropping, etc) vary with location, geology, soil type and elevation.

Acid Sulphate Soil (ASS) risk mapping suggests that there are some areas with a 'high probability (between 1 and 3 metres below the ground surface)' of ASS occurring within the Proposal area. In general, the 'high probability' areas occur within the 1:100 year flood boundary closer to Lake Illawarra. Most of the Proposal area includes areas with 'low probability of ASS occurring (greater than 3 m below the ground surface)'.

The Elouera coal mine in Wongawilli is currently operating within the Proposal area. No areas of mine subsidence have been identified, and the Proposal area is not within a Mine Subsidence area. As such, it is considered there is a low risk of subsidence.

8.1.2 Preliminary assessment

Construction activities will result in the exposure of soils, which in turn creates the potential for erosion and sedimentation during rainfall events. The Proposal is likely to involve the construction of wastewater pipelines along or across creek lines. Construction activities also have the potential to result in disturbance to ASS.

Given that standard management measures can be implemented to minimise erosion, sedimentation and ASS impacts, Sydney Water considers it unlikely that the Proposal will have a significant impact on these issues.

8.1.3 Scope of assessment in EA

Sydney Water will undertake a topography, geology and soils assessment as part of the EA to identify potential impacts and associated mitigation and management measures. The assessment will include:

- characterisation of the existing topography, geology and soils in the Proposal area as it relates to the proposed infrastructure
- consideration of risk from acid sulphate soils and soil and/or landscape limitations.

8.2 Water quality, hydrology and groundwater

8.2.1 Existing environment

The Proposal area is situated in the Lake Illawarra catchment, which has an area of 270 square kilometres. Lake Illawarra is a broad, shallow saline lagoon with an area of 33 square kilometres and a maximum depth of 3.7 metres. One quarter of the lake is less than 1.2 metres deep (URS 2004).

Lake Illawarra and its associated creeks and tributaries have been degraded as a result of changes to their hydrology, geomorphology and ecology. URS (2004) notes that the water quality within the area is considered to be poor, with high levels of pollutants such as nutrients, total suspended solids and faecal coliforms. The poor water quality of Lake Illawarra is considered to be a result of urban and industrial pollution and poor tidal flushing.

The main sub-catchments of the Lake Illawarra catchment are Mullet Creek, Duck Creek, Marshall Mount Creek and Macquarie Rivulet catchments, all of which may be affected to varying degrees by the Proposal. Mullet Creek has the largest sub-catchment with an area of 7,400 hectares. It discharges into the northern end of Lake Illawarra at Koong-Burry Bay.

Based on local topography and geology, groundwater is generally found at depths greater than 3m below ground surface and flow towards nearby fluvial systems subsequently draining to Lake Illawarra. Two main aquifer systems have been identified and groundwater quality was considered to be reasonable (HLA-Envirosciences 2005).

Due to the nature of the local topography, geology, soils and climate, the creeks that flow through the Proposal area to Lake Illawarra are generally small and perennial. Historically a number of large floods have affected the area with the 1984 flood the highest on record. Flood risks are associated with the Mullet Creek floodplain and low-lying areas around Duck Creek and Marshall Mount Creek (HLA-Envirosciences 2005).

The wastewater systems, and associated STPs, that will be utilised to transfer, treat and discharge wastewater from the Proposal area, are licensed under the POEO Act. The system licences specify that future wet weather overflow performance must not exceed 43 overflows in any ten-year period for the Wollongong sewerage system and 48 overflows in any ten-year for the Shellharbour sewerage system. The licences similarly limit Sydney Water's discharges to the marine environment at Wollongong, Port Kembla and Shellharbour STPs in terms of pollutant concentrations pollutant loads and volume.

In 2006 Sydney Water completed the implementation of the Illawarra Wastewater Strategy (IWWS), substantially improving the way Sydney Water utilises and manages wastewater in the Illawarra Region. It resulted in 20 ML per day of recycled water being produced for industrial purposes. The IWWS also substantially improved the operational performance of Sydney Water's ocean outfalls in the Illawarra Region, reducing their operational impact on the marine environment. The associated marine monitoring program recorded improvements in both marine water quality and beach bathing water quality at strategic locations.

8.2.2 Preliminary assessment

Construction of the proposal has the potential to impact water quality and hydrology as a result of:

- increased erosion and sedimentation from cleared construction work areas
- discharge of contaminated or dirty water from construction sites
- temporary creek diversions where pipelines are adjacent to or cross creek-lines.

Groundwater quality may be impacted by construction in areas where groundwater levels are shallow, for example adjacent to creek and drainage lines, or in low-lying areas after rainfall.

Discharges from proposed water and wastewater systems have the potential to impact on creek water quality and hydrology in locations currently not impacted by Sydney Water systems.

Transfer of wastewater from the new Precincts to Wollongong or Shellharbour STPs may affect discharges from Sydney Water's existing wastewater systems. This may in turn result in impacts on Lake Illawarra and near shore ocean environments.

The proposed infrastructure is being planned and designed to conform with existing operational performance standards and/or improved operational performance objectives (eg, utilisation of low infiltration sewers in all new developments). Consequently Sydney Water considers it unlikely that

either the construction or operation of the Proposal will have a significant impact on water quality, hydrology and groundwater.

8.2.3 Scope of assessment in EA

Sydney Water will identify risks to water quality, hydrology and drainage (including flooding) from construction of the Proposal. Management measures will be developed to minimise potential impacts both on the environment and Sydney Water's infrastructure. In addition, Sydney Water will undertake a water quality and hydrology assessment as part of the EA in relation to operating the Proposal, to identify potential impacts and appropriate measures to minimise these impacts. This will include:

- characterisation of existing data to establish the water quality and hydrological condition of relevant waterways
- assessment of the Proposal's potential impacts on water quality and hydrology during operation. This will include consideration of issues such as the effects of wet weather discharges and the associated water quality implications for Lake Illawarra
- consideration of any process upgrade requirements at Wollongong and/or Shellharbour STPs in terms of potential impacts on the marine environment.

8.3 Ecology – aquatic and estuarine

8.3.1 Existing environment

The aquatic and estuarine environments in the Proposal area range from near natural freshwater streams and ecologically productive seagrass beds to degraded farm channels and lake foreshores choked with algae. As such, the aquatic and estuarine ecology of the Proposal area is diverse and variable in its character and constituent flora and fauna species.

The predominantly semi-rural land-use has generally modified and degraded local creek or riparian systems that drain to Lake Illawarra. Tidal exchange delivers salt water to the lake, creating a diverse estuarine habitat in and around the Lake entrance and in the Lake itself. The Lake is listed under the Coastal Wetlands SEPP and under Schedule 1 of Coastal Protection SEPP in order to protect its conservation values.

Estuarine environments are typically diverse and ecologically productive. In spite of foreshore clearing and development, Lake Illawarra is no exception to this general rule. The Lake's aquatic habitat range includes swamp forests, ephemeral streams, freshwater and salt marshes, shallow bays, mudflats and creek deltas, mangroves, open water, subtidal and intertidal rocky reefs and foreshores and seagrass beds. However, much of the native vegetation is found in small fragmented pockets.

Table 5 lists the vegetation communities that have been recorded in the Proposal area. Eight of these vegetation communities exist around Lake Illawarra and five of these are listed as EEC under the TSC Act. The most common remnant vegetation communities are:

- Seagrass Meadows and Estuarine Flats
- Floodplain Wetlands
- Estuarine Lagoons and Channels
- Estuarine Alluvial Wetlands
- Saltmarsh.

The aquatic fauna of Lake Illawarra is diverse. The lake is rich in plankton and benthic (bottom dwelling) fauna, which supports an array of shellfish and fish species. The Lake is an important

recreational fishing resource for the Illawarra Region. Numerous migratory wetland bird species have been recorded on and around Lake Illawarra. Other native vertebrates including frogs, skinks, echidna and various mammals have also been recorded.

8.3.2 Preliminary assessment

Construction of the proposal has the potential to impact on the aquatic and estuarine ecology as a result of:

- increased erosion and sedimentation from cleared construction work areas
- discharge of contaminated or dirty water from construction sites
- temporary creek diversions where pipelines are adjacent to or cross creek-lines.

Operational discharges from the extension of water and wastewater systems have the potential to impact on the aquatic ecology of creeks in locations currently not impacted by Sydney Water systems.

Transfer of wastewater from the Proposal area to Wollongong or Shellharbour STPs may affect operational discharges from the existing systems. This may in turn impact Lake Illawarra and near shore ocean environments.

The proposed infrastructure is being planned and designed to conform with the existing operational performance standards and/or improved operational performance objectives (eg, utilisation of low infiltration sewers in all new developments). Consequently Sydney Water considers it unlikely that either the construction or operation of the Proposal would have a significant impact on the aquatic and estuarine ecology.

8.3.3 Scope of assessment in EA

Sydney Water will identify potential risks to the aquatic and estuarine ecology due to the construction of the Proposal. Management measures will be developed to minimise potential impacts on the environment. Sydney Water will undertake an assessment of the aquatic and estuarine ecology as part of the EA, to identify potential impacts and appropriate management measures. This will include:

- a desk top analysis of the aquatic and estuarine ecology in the Proposal area
- assessment of the potential impacts on the aquatic and estuarine ecology during the operation of the Proposal, including consideration of issues such as the affects of wet weather discharges
- consideration of any process upgrades required at Wollongong and/or Shellharbour STPs and the potential impacts on the marine environment.

8.4 Air quality and odour

8.4.1 Existing environment

Wollongong City Council's *State of the Environment Report* (2008) indicates that air quality across Wollongong is highly variable but in recent years standards have rarely been exceeded at its regional monitoring stations.

The main sources of air pollution in the region are industrial activities, particularly from the Port Kembla area, high levels of motor vehicle usage, hazard reduction burning, general domestic pollution and 'natural' particulates such as pollen and dust.

Odours in the Proposal area can be considered typical of those encountered in a rural/residential environment located on the edge of an industrial area. The *West Dapto Release Area Draft Local Environmental Study* (MG Planning 2006) notes that the pollutants affecting the WDURA are predominately produced outside the area and transported in via the prevailing winds.

Sydney Water currently has limited odour-producing infrastructure in the Proposal area. The main source of odour from Sydney Water's operations is from wastewater infrastructure, eg odour treatment units, vent shafts and sewage pumping stations, wastewater pipelines and at the Wollongong and Shellharbour STPs.

Odour impacts associated with both STPs are being addressed through a recent upgrade at Shellharbour STP and upgrades underway at Wollongong STP.

8.4.2 Preliminary assessment

The construction activities most likely to impact air quality are those that generate dust. These activities include excavation, spoil stockpiles, vehicle movements and demolition activities, particularly during dry and windy conditions. Vehicle and machinery exhaust emissions could also impact air quality during construction.

Additional odour and other gaseous emissions from the STPs or existing infrastructure during construction are considered unlikely as Sydney Water services will continue as normal throughout the construction period.

Given that standard management measures can be implemented to minimise air quality impacts during construction, Sydney Water considers it unlikely that the Proposal would have a significant impact on air quality.

Given the extent of future development in the WDURA and Adjacent Growth Areas, it is important to assess the operational odour impact as a result of the Proposal on surrounding residents and businesses. Precinct planning is also critical to ensure land uses adjacent to the sewage pumping stations are compatible in order to minimise odour impacts.

Sydney Water considers that the Proposal is unlikely to have a significant impact on the existing odour environment.

8.4.3 Scope of assessment in EA

Sydney Water will undertake air quality assessment as part of the EA. This will include:

- identifying construction activities likely to impact air quality and developing appropriate measures to minimise these impacts
- modelling potential operational odour impacts in relation to the two existing STPs and developing appropriate mitigation measures
- identifying potential operational odour impacts in relation to the new infrastructure and developing appropriate mitigation measures.

8.5 Greenhouse and climate change

8.5.1 Existing environment

The operation of water and wastewater treatment and transport systems is energy intensive and, as a result, Sydney Water is a significant user of energy in NSW. Sydney Water has a range of measures in place to minimise impacts of its energy use including reducing demand, energy efficiency, renewable energy and offsets.

Sydney Water has assessed the risks of climate change on its operations and infrastructure and some of these risks are applicable to the Proposal.

8.5.2 Preliminary assessment

Direct sources of greenhouse gas emissions as a result of the Proposal include fuel combustion (from transport and machinery) and fugitive emissions (from wastewater treatment). The main indirect source of greenhouse gas emissions is electricity consumption. The proposed expansion of Sydney Water's water and wastewater systems means that Sydney Water's energy consumption will increase, particularly electricity. Sydney Water will need to consider how it will minimise and/or offset this increase. Operational impacts are likely to be greater than construction impacts, given the Proposal will operate over decades.

There is a range of potential climate change impacts that present some risk to the Proposal. These will be discussed further in the EA but include increased potential for damage to Sydney Water's infrastructure from severe storms, flooding and bushfires.

Under the requirements of the Carbon Pollution Reduction Scheme to be implemented in 2011, Sydney Water is required to identify and report on carbon emissions. Sydney Water is also committed to the application of carbon abatement strategies and future greenhouse gas emissions will be identified and evaluated in this context.

8.5.3 Scope of assessment in EA

Sydney Water will undertake a greenhouse and climate change assessment that:

- describes the types and approximate scale of greenhouse gas emissions associated with the Proposal and options for managing them
- identifies climate change risks with the potential to impact on the Proposal.

Given the extended period over which the Proposal will operate, the assessment will give some consideration to construction impacts but will focus on operational impacts.

8.6 Human health

8.6.1 Existing environment

Sydney Water manages human health issues to relevant standards in its delivery of drinking water, wastewater and recycled water services throughout greater Sydney. These same standards would be met for services provided to the WDURA and Adjacent Growth Areas.

8.6.2 Preliminary assessment

Given that Sydney Water will follow relevant water quality guidelines to protect human health, it is considered unlikely that the Proposal would have a significant impact on human health.

8.6.3 Scope of assessment in EA

Sydney Water will consider risks to human health during the EA and design phase of the Proposal and will include appropriate management measures where required.

8.7 Noise and vibration

8.7.1 Existing environment

The noise environment in the Proposal area is dominated by a number of noise sources ranging from arterial and local roads, the Illawarra Rail Line, Illawarra Regional Airport, and the West Kembla Grange Industrial Area.

Land use in the Proposal area is predominantly rural or semi-rural residential, with some commercial and industrial areas. Once the WDURA and Adjacent Growth Areas are developed, it will be dominated by residential land use. Commercial and industrial areas will also expand. Some areas will be retained for conservation and open space uses.

Existing noise receivers may be affected by noise during the construction and operation of the proposed infrastructure. Residential areas, recreational areas, educational centres, nursing homes and commercial premises may be affected. Appropriate measures to minimise these impacts will need to be considered during the asset planning and environmental assessment of the Proposal.

8.7.2 Preliminary assessment

During construction vehicles transporting personnel and materials to and around the construction sites will generate noise as will the operation of construction equipment, such as excavators, cranes, boring rigs, compressors and generators. It is expected that the noise will be no greater than other construction activities associated with development in the Proposal area. Vibration has the potential to impact residents and buildings close to construction work due to activities involving tunnelling, rock breakers, compactors and other similar equipment.

Due to the progressive nature of pipeline construction, adjacent sensitive receivers will only be affected for short durations. Construction activities at the pumping stations, reservoir and sewage treatment plants would be of longer duration in the one location and impacts would depend on the proximity of sensitive receivers.

Operational noise and vibration will be generated from treatment processes and pumping stations. This will be attenuated by appropriate noise and vibration control and design measures.

Given that standard management measures can be implemented to minimise noise and vibration impacts during both construction and operation, Sydney Water considers it unlikely that the Proposal would have a significant impact as a result of noise and vibration.

8.7.3 Scope of assessment in EA

Sydney Water will undertake a noise and vibration assessment as part of the EA, to identify potential impacts and appropriate management measures. This will include:

- characterisation of the ambient noise and vibration environment, including consideration of the changing level of development in the WDURA and Adjacent Growth Areas
- assessment of the Proposal's potential noise and vibration impacts during construction and operation.

8.8 Non-Aboriginal heritage

8.8.1 Existing environment

An assessment of non-Aboriginal heritage values in the area will largely relate to development that occurred as a result of large 100 acre land grants dating back to the early 1800s.

Much of the early settlement was focused on timber clearing and mixed farming leaving a significant imprint of the cultural landscape, as well as mining and industrial pursuits in the form of the Dapto Smelting Works and the Wongawilli Colliery and Village. Urban development has largely resulted from completion of the railway. Residential development has been focussed on the Dapto centre, with the original large estates in the West Dapto area gradually being subdivided for small-scale farm operations. The landscape is scattered with evidence of its former uses in the form of homesteads, dairy buildings and other landscape features (HLA-Envirosciences 2006).

Within the WDURA and Adjacent Growth Areas there are heritage items listed on local, state and national registers. There are no listed World Heritage sites.

8.8.2 Preliminary assessment

The Proposal is unlikely to directly disturb any non-Aboriginal heritage items or places because the majority of infrastructure will be located, where possible, in existing disturbed areas of minimal heritage significance. Vibration generated by construction machinery may have an impact on heritage buildings and structures if those items are located in close proximity to work sites.

Pipelines will require maintenance during the operation of the Proposal but it is expected there will be limited interaction with non-Aboriginal heritage items.

It is likely that the non-Aboriginal heritage items can be avoided during construction. Accordingly Sydney Water considers it unlikely that the Proposal would have a significant impact on any non-Aboriginal heritage.

8.8.3 Scope of assessment in EA

Sydney Water will undertake a non-Aboriginal heritage assessment as part of the EA, to identify potential impacts and appropriate management measures. This will include:

- characterisation of non-Aboriginal heritage in the Proposal area
- assessment of the Proposal's potential to impact on non-Aboriginal heritage items during construction and operation.

It is anticipated this would be a desktop assessment, with field investigations only undertaken if infrastructure is proposed on or immediately adjacent to a heritage site, or in the vicinity, of a non-Aboriginal heritage item.

8.9 Visual amenity

8.9.1 Existing environment

The area affected by the Proposal comprises a number of different landform features including the Illawarra Escarpment, undulating foothills, alluvial coastal plains and a number of water bodies such as Mullet and Duck Creeks and Lake Illawarra (MG Planning 2006). The dominant visual features are the escarpment and expanses of cleared, grassed land and remnant vegetation. The area also includes residential, industrial and rural/residential land uses, villages, market gardens and other intensive agriculture.

Due to the nature of the overall urban development that will take place in the WDURA and Adjacent Growth Areas over time, the visual context in which the Proposal will be located will be different to the existing environment.

8.9.2 Preliminary assessment

Impacts on visual amenity during construction will be temporary. Accordingly, the visual assessment will focus on operational impacts.

Pipelines will have limited visual impact, as they will be located underground. Some surface components associated with the pipelines will be visible (for example, access manholes and ventilation shafts).

Views of the pumping stations would likely be limited to adjacent properties or high points in the landscape. Locating the pumping stations at low points in the landscape and implementing visual screening will assist in limiting views.

Reservoirs are generally more visible, as they are located at high points in the landscape. The visibility of the reservoir(s) would be limited by vegetative screening (refer to Figure 5). The visual impact of the reservoir(s) is expected to be largely local. However, depending on its location, the reservoirs may also impact on regional views.

Given the changing nature of the visual landscape as development progresses and the design measures that can be implemented to reduce the visual impact, Sydney Water considers it unlikely that the Proposal would have a significant impact on the visual environment. It is noted that any new reservoir(s) would be noticeable but it is considered that the visual impact would not to be significant.

8.9.3 Scope of assessment in EA

Sydney Water will undertake an assessment of the visual amenity as part of the EA, to identify potential impacts and appropriate management measures. This will include:

- characterisation of the existing visual environment in the Proposal area and how this will change as development progresses
- assessment of the operational impact of the reservoir and pumping stations on the visual amenity of the Proposal area, including consideration of local and regional views.

8.10 Land use and services

8.10.1 Existing environment

The Proposal area is primarily non-urban and includes a mix of residential, rural residential, industrial, commercial and agricultural land uses. There has been a decline over recent years in

farming activities in the area in anticipation of the future urban development. There is also a number of existing services already located within the WDURA and Adjacent Growth Areas including drinking water, sewerage, electricity, gas and telecommunications that will require extensions/upgrades/replacement as development occurs.

The overall urban development that is planned for the WDURA and Adjacent Growth Areas will impact existing land uses. The proposed land use will be predominantly residential, but industrial and commercial uses will expand. Some areas of conservation and open space will be retained. Sydney Water's Proposal will facilitate the changes to land use in accordance with the DoP's strategy.

8.10.2 Preliminary assessment

The proposed pipelines, where possible, will be located in road reserves. Where pipelines cannot be located in road reserves, it may be necessary to acquire easements that cross private land (for example, wastewater pipelines along creeklines).

Construction and operation of the reservoir(s) and pumping stations would create a permanent change in land use for those sites. In selecting the sites Sydney Water will consider the existing and proposed land uses in the surrounding area. Sites not owned by Sydney Water will need to be acquired either before or after construction.

Operation of the Proposal is not expected to have a significant impact on the existing land use. The creation of easements for the pipelines would only result in minor constraints to future and existing land uses. Occasional maintenance of the pipelines may cause limited, short-term constraints on land uses.

Given that the Proposal is required to facilitate land use planning for new development and existing services would be avoided as much as possible in the design phase, Sydney Water considers it unlikely that the Proposal would have a significant impact on land use or services.

8.10.3 Scope of assessment in EA

Sydney Water will consider the consistency of the Proposal with existing and proposed lands uses and services in the Proposal area and will identify appropriate management measures to minimise any potential impacts.

8.11 Traffic and transport

8.11.1 Existing environment

The major road network feeding into the WDURA and Adjacent Growth Areas is dominated by the north-south linkages provided by the F6 Southern Freeway and the Princes Highway, which provides the principle links to those suburbs bypassed by the F6 Freeway.

Road access is constrained by both the rail line (located to the east of the Proposal area) and the floodplain of Mullet Creek, restricting access to West Dapto, Darkes, Bong Bong, Cleveland, Avondale, Huntley and Yallah Roads. These roads provide access to the west, linking the escarpment and surrounding rural areas to the Princes Highway. Northcliffe Drive, Kanahooka Road, Fowlers Road and Emmerson Road provide links through to the established suburbs of Dapto (MG Planning 2006).

As development proceeds, traffic volumes will increase and the road networks to and within the Proposal area will expand to cater for the increased population and demand.

8.11.2 Preliminary assessment

The construction of infrastructure has the potential to cause localised traffic delays and diversions. This is due to additional vehicle movements to and from the construction sites, the short-term closure of sections of road to allow the safe installation of pipelines within existing road easements, and restricted or modified access to adjacent properties.

The operation of the Proposal will involve only minor traffic movements, associated with activities including maintenance, materials delivery and staff travel.

Given that standard management measures can be implemented to minimise traffic and transport impacts, Sydney Water considers it unlikely that the Proposal would have a significant impact on traffic and transport.

8.11.3 Scope of assessment in EA

Sydney Water will identify roads and railways potentially impacted by the Proposal and identify appropriate management measures to minimise any potential impacts.

8.12 Hazardous materials

8.12.1 Existing environment

Fuel and chemicals are stored and used at Wollongong and Shellharbour STPs. Many of the chemicals used in wastewater treatment are Class 8 Dangerous Goods (for example, ferric chloride) and are categorised as corrosive. Due to their low to negligible levels of toxicity, flammability or explosiveness, these substances pose little risk to the surrounding urban development. However, they do have a potential to cause damage to the environment and infrastructure.

8.12.2 Preliminary assessment

It is anticipated that during construction minimal quantities of hazardous materials, such as chemicals and fuels, would be transported to and/or stored and used on-site.

Given that standard management measures can be implemented for transporting, storing, and handling hazardous materials, Sydney Water considers it unlikely that the impact from hazardous materials would be significant.

8.12.3 Scope of assessment in EA

Sydney Water will identify proposed hazardous materials to be used during construction and operation and will identify appropriate management measures to minimise any potential impacts. If relevant, a preliminary hazard analysis would be conducted for components requiring Project Approval.

8.13 Bushfire

8.13.1 Existing environment

Wollongong City Council has mapped bushfire prone lands throughout the WDURA and its surrounds. Bushfire hazard is a combination of factors relating to topography and vegetation. It is

anticipated that due to the large amount of clearing within the Proposal area, the current level of bushfire hazard is moderate.

Bushfire prone lands are concentrated in larger areas of bushland along the southern, western and northern boundaries of the Proposal area. Portions of the following Precincts have been mapped as containing bushfire prone land:

- Kembla Grange
- Sheaffes/Wongawilli
- West Horsley
- Cleveland
- Avondale
- Yallah Marshall Mount
- Tallawarra
- Calderwood.

8.13.2 Preliminary assessment

Construction and operation of infrastructure close to existing vegetated areas creates a potential bushfire hazard, mostly associated with undertaking hot works. In addition, there is the potential for infrastructure to be impacted by bushfire if it is located in bushfire prone areas.

Given that standard management measures can be implemented for minimising bushfire hazard, Sydney Water considers it unlikely that the Proposal would have a significant impact on the bushfire hazard of the area.

8.13.3 Scope of assessment in EA

Sydney Water will identify bushfire prone areas and potential bushfire hazards associated with the Proposal and will identify appropriate management measures to minimise any potential impacts.

8.14 Waste

8.14.1 Existing environment

Sydney Water generates a range of waste products during construction and operation of its infrastructure and has measures in place to minimise the amount of waste that is disposed.

8.14.2 Preliminary assessment

Wastes generated by the Proposal would be typical of those generated by the construction and operation of Sydney Water's existing infrastructure. During construction, wastes would include excess soil, vegetation waste, construction waste, wastewater from dewatering of trenches and waste drilling fluid. During operation, wastes would include screenings and biosolids from sewage treatment plants and debris from cleaning of infrastructure.

Given that standard management measures can be implemented to minimise wastes, Sydney Water considers it unlikely that the Proposal's impacts from generating wastes would be significant.

8.14.3 Scope of assessment in EA

Sydney Water will identify waste streams likely to be generated during construction and operation of the Proposal and will identify appropriate management measures to minimise any potential impacts.

8.15 Resource consumption

8.15.1 Existing environment

Sydney Water consumes a range of resources during the construction and operation of its infrastructure and has measures in place for optimising resource use, including through its Environment Plan 2008-2013.

8.15.2 Preliminary assessment

Resources required during the construction phase will include pipelines, pumps, concrete, steel and fuel. During operation ongoing resources will include chemicals, electricity and replacement parts.

Given that standard management measures can be implemented to minimise resource consumption, Sydney Water considers it unlikely that impacts resulting from the use of resources during the construction and operation of the Proposal would be significant.

8.15.3 Scope of assessment in EA

Sydney Water will identify the types of resources likely to be consumed and will identify appropriate management measures to minimise resource consumption.

8.16 Ecologically sustainable development

8.16.1 Existing environment

Sydney Water's Ecologically Sustainable Development (ESD) Policy states that Sydney Water will ensure its corporate direction is consistent with the Australian Government's goal for ESD and will apply the four principles of ESD, namely:

- the precautionary principle
- intergenerational equity
- conservation of biological diversity and ecological integrity
- improved valuation, pricing and incentive mechanisms.

8.16.2 Preliminary assessment

The objectives of the Proposal listed in Section 1.4 are consistent with ESD principles.

8.16.3 Scope of assessment in EA

A detailed consideration of the consistency of the Proposal with ESD principles will be included in the EA.

9. Stakeholder and community consultation

Sydney Water will develop and implement a Community and Stakeholder Relations Plan, which will identify a range of activities and tools that will assist in keeping key stakeholders involved and informed throughout the Proposal.

Key external stakeholders fall into three main groups including government, Aboriginal and community stakeholders.

9.1 Government stakeholders

Sydney Water has identified key government stakeholders that may be required to provide information, support, and guidance during the environmental assessment process for the Proposal. These include but are not limited to:

- Department of Planning
- Shellharbour Council
- Wollongong City Council
- Department of Environment, Climate Change and Water
- Lake Illawarra Authority
- Southern Rivers Catchment Management Authority
- Integral Energy
- Transport Infrastructure Development Corporation
- Rail Corp
- Roads and Traffic Authority
- Department of Health
- Department of Primary Industries
- Commonwealth Department of the Environment, Water, Heritage and the Arts.
- State Government Members of Parliament (electorates of Wollongong and Shellharbour)
- Federal Government Members of Parliament (electorates of Throsby and Illawarra).

9.2 Aboriginal stakeholders

An initial review of the relevant Aboriginal groups has been undertaken to determine the likely groups that may be interested in the Proposal. It is anticipated that the following Aboriginal stakeholder groups may have an interest in the Proposal:

- Illawarra Local Aboriginal Land Council
- Wodi Wodi Elders Council
- Korewal Elouera Jerrungarugh Tribal Elders Council
- Wadi Wadi Coomaditchie Aboriginal Corporation.

Consultation with these groups will be undertaken during the EA generally in accordance with the principles of the *Interim Aboriginal Community Consultation Requirements for Applicants* (2004) prepared by DECCW. Any group not currently listed but identified during further investigations will be included in the above list.

9.3 Community stakeholders

As an integral part of the environmental assessment process, a Community and Stakeholder Relations Plan will be developed. This Plan will detail the required approach to ensure the broader local community is kept informed about the Proposal through meetings, newsletters, advertisements and letters. Once the Major Project Application is lodged, and the EA finalised, the Department of Planning will invite the public to make submissions on the Proposal. Community issues and concerns will be addressed in a Preferred Project Report following the public exhibition of the EA.

Community groups identified so far include:

- concerned residents of East Dapto
- Illawarra Escarpment Coalition
- Healthy Cities Illawarra Inc
- South Dapto Rural Residents Group
- South Coast Conservation Society
- Wongawilli Progress Association
- Reed Park Users Group.

9.4 Consultation undertaken to date

Sydney Water consulted with the following key stakeholders during the development of its integrated servicing strategy for the WDURA:

- Wollongong City Council
- Shellharbour City Council
- Department of Planning (Growth Centres)
- Lake Illawarra Authority
- Southern Rivers Catchment Management Authority
- Department of Health
- Department of Environment and Climate Change
- Integral Energy.

The workshops and associated outcomes were an integral part of Sydney Water's Integrated Servicing Strategy development, option identification, options short-listing and preferred option selection. A broad range of issues, opportunities and constraints were identified in a series of stakeholder workshops. Stakeholders were asked to weigh option evaluation criteria. The criteria adopted from this process (in order of diminishing importance) are listed below:

- minimise discharge to waterways and ocean
- minimise cost
- maximise water conservation
- community/Stakeholder acceptability
- minimise energy consumption
- flexibility to accommodate changes in growth.

In general terms, the workshop participants were supportive of the preferred servicing option that includes the use of rainwater tanks for non-drinking water, and extending the existing systems for drinking water and wastewater services. It is considered that the community generally has a preference for rainwater tanks over a dual reticulation recycled water systems and the local councils have confirmed that they are supportive of rainwater tanks.

10. References

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