

Part E

Section 15 - Lloyd Urban Release Area

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About the Lloyd Urban Release Area & Urban Salinity

This section of the WWDCP applies to the Lloyd Urban Release Area (Lloyd). Lloyd is identified as an urban release area under clause 6.3 of the WWLEP 2010. Refer to Figure 2.

Urban or man-made developments are now well understood to upset the natural equilibrium between **recharge** and **discharge** of the groundwater table. In general terms the catchment landscape can be broken up into two key areas. Those areas that are higher or hillier are the **recharge zones**, this is where water infiltrates the soil surface and seeps into the groundwater. The lower areas are the **discharge zones**, this is where the recharge water will cause the water table to rise closer to the ground surface or seep from the ground.

When the volume of recharge water is at the natural rate and balanced with the capacity and characteristics of the underlying aquifers salinity is not a problem. However if the recharge increases and exceeds natural rates and capacity of the aquifer the ground water level rises, salts already in the groundwater or stored in the soil profile are brought close enough to the soil surface to cause toxic effects on vegetation and degradation of built structures, this is referred to as urban salinity.

The Lloyd development is located in the upper reaches of its associated catchment and has been identified as a recharge area. To reduce the risk of increased salinity problems to the urban developments in the discharge areas a number of mitigation strategies and controls have been developed. These strategies and controls aim to reduce the rate of recharge water entering the aquifers from within the Lloyd area.

Wagga Wagga was one of Australia's first cities to identify urban salinity as a serious problem to the regional economy and environment. Salinity was first noticed in Wagga Wagga in the late 1970s, but the real and potential impact of the problem was understood only in the late 1980s. It is predicted that significant damage to at least 7,500 properties might occur by the year 2020 if the causes of the problem are not addressed. <http://www.wagga.nsw.gov.au/www/html/4099-urban-salinity.asp>.

Common impacts of salinity on urban development include:

- Decreased life span of some bricks and concrete structures and increased road failure;
- Waterlogging of soil and decreased water quality; and
- Lawns and plants die. In salinity "hot spots", bare salt scalds develop and very little grows.

Recharge Area (Lloyd)

- Too much water seeping into the ground
- Barriers to ground waterflow

• Water table rise

Discharge Area

- Damage to infrastructure such as roads and service pipes
- Reduced plant growth
- Salt damage to bricks and mortar

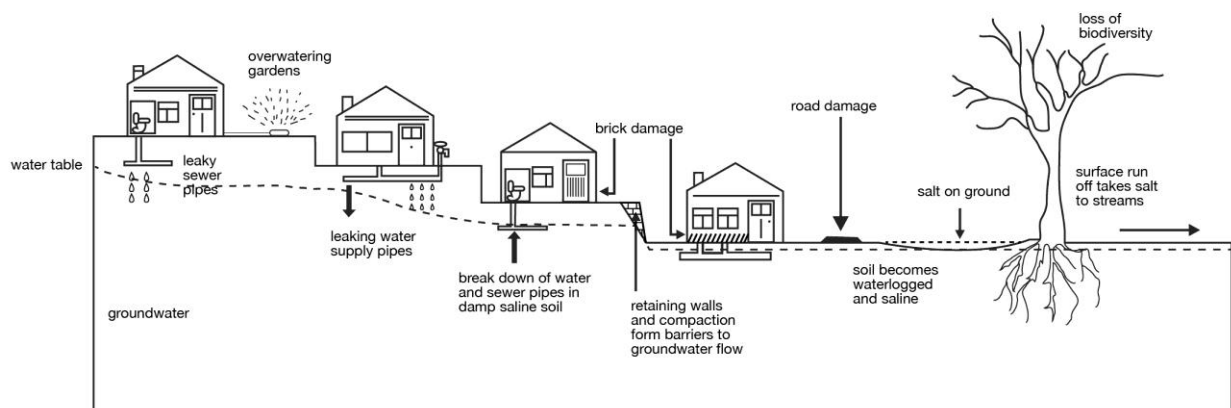


Figure 1 – Example of urban salinity cause and effect

Lloyd groundwater recharge area

Over the last two decades certain areas of Calvary Hospital Precinct have been identified as at risk from rising groundwater levels, containing high levels of natural salts. The Wagga Wagga Salinity Steering Committee required assurance that urban development at Lloyd would not exacerbate existing salinity issues downstream of the suburb, including Glenfield, Turvey Park and Calvary Hospital Precinct.

The development footprint of the Lloyd release area is situated within a catchment previously identified as a potential groundwater recharge site by the former NSW Department of Environment, Climate Change and Water (DECCW), now the Office of Environment and Heritage.

This Section of the DCP includes provisions resulting from intensive investigation undertaken to determine the risk to urban salinity associated with the proposed residential development of Lloyd, that is the Salinity Risk and Mitigation Assessment: Lloyd Subdivision Wagga Wagga NSW and Summary of Recommendations: Lloyd Salinity Risk Assessment and Recommendations - prepared between 2008 and 2010 by E.A Systems Pty Ltd. Wagga Wagga NSW (the Salinity Studies).

Monitoring and reassessment must continue during the course of the development of the Lloyd urban release area. All assessment to be undertaken by qualified persons using the model and values developed in the study.

Managing public recreation areas

Public recreation and environmental conservation areas are to be designed and managed to mitigate against salinity and reduce groundwater recharge in accordance with the "Recommendations for public recreation areas" contained in section 9.4.9 of *Salinity Risk and Mitigation Assessment, Lloyd Subdivision, Wagga Wagga, NSW, July 2009*.

Designs for public areas are to be reviewed by a suitably qualified person with the objective of reducing groundwater recharge and minimising irrigation areas. At the time of preparation of this DCP the Stage 1 and 2 areas did not require active sporting ovals.

Potential outcomes of the Lloyd release area Stage 1 and 2 reassessment (positive) - actual recharge less than modelled

The following controls will apply in the event that the predicted levels of recharge are found to have been substantially over-estimated – having regard to actual ground water and salinity levels within each sub-catchment following continued monitoring.

A greater land area in the relevant sub-catchments could be considered for residential development. The area is to be commensurate in area to that initially allocated as "offset" or as shown in yellow in the EA Systems Stage 2 plan but excluding the area shown in yellow on the EA Systems Stage 3 plan.

The ratio of impervious to pervious surfaces may be decreased, balanced by an increase in lot sizes. Restrictions on irrigation may also be reconsidered.

Land set aside as "recharge offset" areas can only be considered for development after positive monitoring outcomes are confirmed from development in Stages 1 and 2.

In the event that the predicted recharge is found to be an under-estimate a commensurate area of undeveloped land (from within the "blue" area of the Stage 2 masterplan) is to be withheld from development in stages 3 and 4.

Negative recharge result - actual recharge exceeds modelling to a small extent

In the best case scenario, where the EA Systems predicted recharge is found to be a low under-estimate, or where minimal adverse groundwater and/or salinity levels are apparent, a land area commensurate to the excess recharge result is to be withheld from the remaining development area in Stages 1 and 2, and land identified as recharge offset area in Stages 3 and 4 may not be released.

Actual recharge exceeds modelling to a large extent (worst case)

Remaining Lloyd release area Stage 1 and 2 development and all Stage 3 and 4 development will not proceed unless the excess recharge source has been determined and methods of amelioration have been developed and approved.

The Salinity Studies

The Salinity Risk and Mitigation Assessment study has formed the basis of development controls that apply in Lloyd. The objectives of the salinity investigation were to:

- Determine if groundwater recharge under the proposed residential development could feasibly be less than under current agricultural land use at Lloyd; and
- Determine the conditions (development controls) upon which recharge below current levels could be achieved and recommend a process for development which enabled the mitigation of any risk.

An intensive soil survey was conducted, from which groundwater recharge rates were predicted for each of the various land uses proposed (existing agriculture, passive park, woodland, residential lots (large and small) and irrigated recreation uses). Recharge rates were applied to potential subdivision layouts to enable comparison between predicted pre and post development groundwater recharge.

The study predicted that with appropriate design of the subdivisional areas, including the imposition of an **80:20 rule (80% of the subdivisional area to be impervious to water infiltration)** residential development could be achieved with groundwater recharge rates less than or equal to the current agricultural state (recharge compliance). The study noted a preference for smaller lot sizes, for example 600m² in area, which would more easily comply with the 80:20 rule due to less pervious (grassed) area for the same building area.

Note: The residential impervious areas in the study were based on the footprint of the house and frontage including roadways, driveways, courtyards and footpaths.

On this basis urban salinity in Wagga Wagga is not expected to be exacerbated as a result of the development of Lloyd, provided that a number of recommendations are incorporated into the appropriate planning instruments. These recommendations are detailed in full in E.A. Systems "Summary of Recommendations" document and form an integral basis of the controls in this DCP section.

Staged release of Stages 3 and 4 predicated on successful control of recharge

The areas depicted as Stages 1 and 2 in the EA Systems Salinity Study (see Appendices 1A and 1B) show that between 50%- 75% of the land area is deemed to be safe for initial development with respect to avoiding downstream urban salinity impacts. Stages one and two of the proposed four stage land release areas have been zoned *R1 General Residential* under the WWLEP 2010, for initial release. However Stages 3 and 4 remain zoned *RU1 Primary Production* under the LEP – acting as an urban holding zone until the reassessment process proves that recharge has been successfully controlled.

Piezometers have been placed at selected locations within the release area to monitor groundwater and salinity levels. If, at the completion of Stage 1 and 2 developments the groundwater monitoring reveals no adverse groundwater heights and/or salinity levels, it is likely that Stages 3 and 4 of land release can proceed to be rezoned. It is therefore vitally important to the future development of Lloyd that the 80:20 rule be enforced by the residents, adopted as an encompassing philosophy by developers and Council.

Land ownership in the Lloyd release area

The Lloyd release area is in the ownership of four main parties.

Separate Neighbourhood plans have been developed for Lloyd west, encompassing lands owned by the private sector. The Neighbourhood Plans show the road and lot layout, open space and drainage, and land set aside for future staged development, pending the ongoing monitoring of groundwater and salinity levels in the lower parts of the release area.

To demonstrate that the release area plans have been developed through liaison by the land owners, Appendix 2 provides a road and lot layout plan with zoning underlay for the whole of the release area.

The release area plan shows the currently planned major road and open space connections within the area designated in Figure 2. Appendices 3 and 4 provide the Neighbourhood and other plans for the developers.

Biocertification of the Lloyd release area

The upper slopes and hillsides area of Lloyd contain remnant stands of endangered box gum woodland. These areas have been zoned *E2 Environmental Conservation* under the WWLEP 2010 and have been or are proposed to be dedicated by the developer to the Council for public conservation purposes. The Lloyd urban release area is within the Biodiversity Certification (biocertified) area auspiced by the NSW Government, which ensures that the developer will not have to carry out further flora and fauna studies on the remaining *R1 General Residential* or *RU1 Primary Production* zoned land.

Development Principles for Lloyd

From the above background information, it is logical that the principles for future development within Lloyd are as follows:

- P1 The subdivision layout should recognise the environmental attributes of the site, including the biocertified area and groundwater recharge areas, balanced against the well-drained undulating landform with views over the central urban area of Wagga Wagga.
- P2 Developments should not exacerbate the potential for increased salinity within Wagga Wagga, to be achieved by maximising impervious surfaces through building footprints, smaller lot sizes, and less lawn irrigation area.

Background reports and studies

This Section is based on the following reports and studies:

- o Lloyd Local Environmental Study (Willana June 2002)
- o Lloyd Aboriginal Study 2005
- o Lloyd Neighbourhood Rail Noise and Vibration Assessment (Bassett Acoustics 2006)
- o Assessment of Significance (Eco Logical 2006)
- o Salinity risk reassessment process and criteria for the Lloyd residential subdivision (EA Systems 2010)
- o Recharge calculations and spread sheet by EnviroAg Australia Pty Ltd (2010)

Note: All applications are also required to comply with the requirements of Part A of the WWDCP 2010. In particular, applications are to be consistent with the Guiding Principles at Section 1.5 within Part A.

Introduction

Explanatory Note/s:

Structure of this Section

This Section of the DCP is divided into 10 sub-sections.

1. Introduction, including the urban salinity issue, the background to the Lloyd release area, the Lloyd development principles and land to which the DCP section applies.

2. Lodging a Development Application provides information on submitting a Development Application.

3. Features of the Area outlines the major features of the site, including the importance of the local topography and landscape character and an overview of the desired distribution of land uses within the urban release area.

4. Infrastructure Planning contains the controls for infrastructure servicing and staging of development.

5. Environmental Conservation, Biodiversity and Natural Resource Management contains the controls for environmental conservation, biodiversity and natural resource management. This includes controls for development in the biocertified area, salinity and bushfire management.

6. Bushfire management considers the placement of building envelopes near to E2 zones where planting and regeneration will occur.

7. Aboriginal and cultural heritage provides controls for Aboriginal Heritage within the Release Area.

8. Acoustic environment provides setbacks to the Great Southern Rail Line.

9. Wiradjuri walking track provides details and a map of the location of the track through the Release Area.

10. Residential and large lot residential Development contains the controls for residential development (R1 zoned land) and large lot residential development (zoned R5) within Lloyd.

15.1 Where this Section applies

This Section applies to the R1, RU1, E2, RE1 and E2 zoned land in the Lloyd Urban Release Area as shown in Figure 2 of this Section.

Note that only the R1 zoned Stages 1 and 2 of the Release Area are currently permissible for development.

Release of any further stages in land zoned RU1 will be dependent on the outcome of the salinity reassessment process.

Explanatory Note/s:

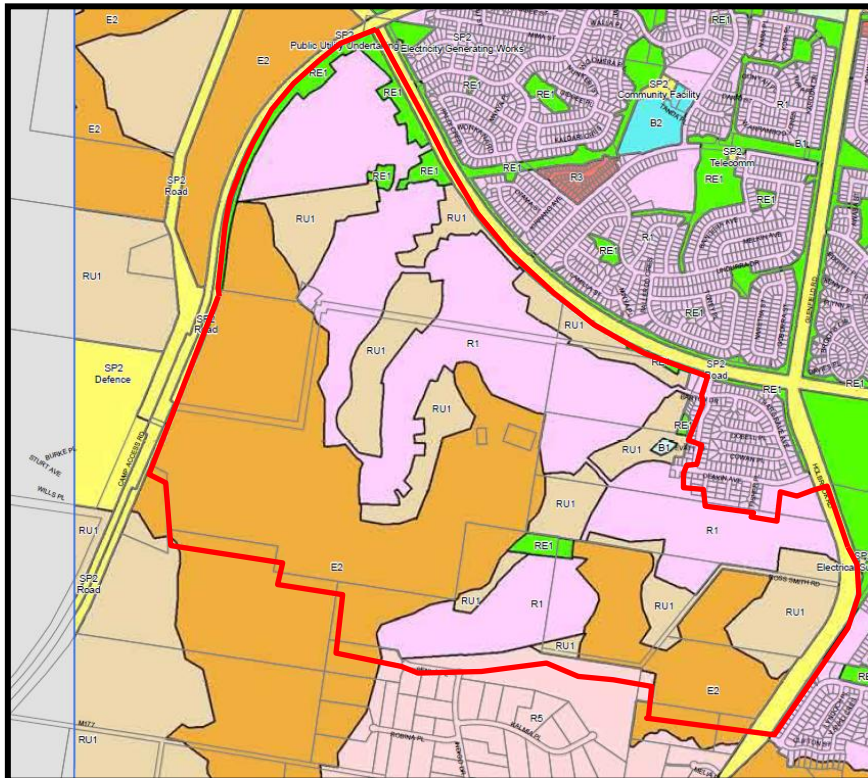


Figure 2 - Lloyd Urban Release Area

Lodging a Development Application

Development Applications are to be generally in accordance with the provisions of this Section, including the plans in Appendices 2, 3 and 4 and the general provisions of Part A of the DCP.

However, in relation to the known challenges of residential development in Lloyd Urban Release Area, of particular note is the requirement to provide calculations of impervious land cover to show compliance with the 80:20 rule are to be carried out on a sub-catchment basis as required within the Summary of Recommendations by EA Systems Pty Ltd.

Calculations should be carried out using the template spread sheet provided by the Council – previously prepared as part of the Salinity Studies. All water infiltration calculations to meet the 80:20 rule are to be carried out on a sub-catchment basis as required within the Summary of Recommendations by EA Systems Pty Ltd.

Land at Lloyd is one of the Urban Release areas that have received Biocertification under the WWLEP 2010. This means that any development requiring consent under Part 4 of the EPA Act or any activity under Part 5 of the EPA Act not requiring consent, is taken to be a development or an activity that is unlikely to significantly affect threatened species, populations, ecological communities or their habitats and can be determined without requirement for further biodiversity assessment.

Features of the release area

The natural topography and environmental characteristics within Lloyd are important and will influence future development in the area. This section provides an overview of these characteristics and features.

15.2 Topography and landscape character

Lloyd's hilltops and ridges provide extensive views over the City and countryside. The site's elevation, the moderate slopes to high ridge tops and absence of obstructions such as dense vegetation or built structures, result in the majority of the site having access to significant views.

Hilltops offer regional views to the north east and west that include the City; the surrounding countryside and hillsides to the north of Wagga Wagga. Views of moderate to high significance are obtained looking south from these hilltops and take in the ridges, valley and hilltops of the site itself. Views of a high significance are gained looking out of the site from the eastern ridges and hilltops.

Views from the northern midslope which rises from Red Hill Road (approximately 50 - 100m below the ridge) are of a moderate significance and take in the city. The midslopes beneath the eastern ridges and hills offer moderate views of local landforms over the railway line to the west.

Much of the central valley has only local views of the ridges and hilltops within the site, but offers an opportunity to create a unique local visual catchment. These local views are of "moderate significance".

The lower land along the northern boundary has minimal views of significance. The northern-most land may currently overlook the Red Hill Road Corridor, but would easily lose views with the imposition of structures or landscaping. There are opportunities to create vistas down

Explanatory Note/s:

streets on these lower slopes. This should be encouraged by a predominantly north-south street layout in future plans and subdivision for the undulating land in the north.

Explanatory Note/s:

Objectives

- O1 Protect the landscape character.
- O2 Encourage subdivision and development to create vistas on the lower slopes where possible.

Controls

- C1 Use subdivision design and layout to create vistas where possible and maximise views out from Lloyd, especially on the lower slopes and northern sections of the area, through a predominantly north-south street layout.
- C2 Ensure through the Neighbourhood Plan process that development does not intrude into exposed upper hillsides and ridgeline areas.
- C3 Roads and pathways should run predominantly along the contours of the land and should be responsive to the constraints of steeper land.

15.3 Infrastructure Planning

15.3.1 Servicing

This section provides details of servicing requirements (electricity, gas, water, sewer and communications) and staging of development.

Planning for the delivery of services to new developments is essential for new urban areas. Servicing plans must consider topographical constraints to achieve appropriate complementary subdivision design.

Objective

- O1 Ensure the efficient and cost effective provision of services.

Controls

- C1 Subdivision can only be considered where there are appropriate arrangements for servicing (electricity, gas, water, sewer and communications). The developer will be responsible for providing reticulated mains sewer supply to allotments, including associated pump stations, to the satisfaction of Council. Sewer reticulation plans are included in Appendices 3 and 4 of this DCP.
- C2 Concept sewer design plans for each stage of subdivision must be submitted with the development application for that stage.
- C3 Development is not permitted over the utility corridor that accommodates the water supply main.
- C4 All Sewerage and Drainage provision should be installed in accordance with Appendix A of Part 2 "Service Areas" of the City of Wagga Wagga Development Servicing Plan for Sewerage 2007.
- C5 The developer will provide reticulated water supply to all allotments in accordance with the requirements of the service authority.
- C6 Reticulated water supply is restricted to below the 280 metre AHD contour.

Explanatory Note/s:

- C7 The developer will be responsible for extending water supply trunk mains to enable service of areas between the 235 and 280 metre AHD contours.
- C8 The developer requires approval from Riverina Water to ensure development proceeds in an orderly fashion that allows connection to existing water infrastructure.
- C9 The developer will be responsible for providing electricity to all lots in the subdivision to the satisfaction of Essential Energy.
- C10 The developer will be responsible for providing telephone and broadband internet connections for all allotments to the satisfaction of the service provider.

15.3.2 Stormwater and Drainage

Development within Lloyd requires an appropriate stormwater management system aimed at avoiding recharge of the groundwater system, due to the known recharge sensitivities of the location. This will require salinity sensitive urban design.

Objectives

- O1 Provide stormwater retention facilities to ensure that post development flows do not exceed pre-development flows, for both quantity and quality, for storm events up to the 1 in 100 year level.
- O2 Discharge water in a manner that will not impinge on adjoining catchments and ensures public safety.
- O3 Provide well designed drainage corridors to allow ease of maintenance and to ensure stormwater system will not impinge on other functions of the open space network.
- O4 Ensure that stormwater resulting from the development does not cause groundwater recharge for adjoining residential neighbourhoods.
- O5 Stormwater systems associated with Lloyd Urban release Area should be assessed with regard to their capacity to handle such discharge and the Lloyd stormwater system should be designed accordingly.

Controls

- C1 Stormwater drainage must be provided throughout the development in accordance with Council's *Engineering Guidelines for Subdivisions and Developments*. Detailed calculations on stormwater management will be required at the subdivision application stage by sub-catchment. Overall drainage catchments are shown within Appendices 3 and 4 of this DCP. A total Stormwater Catchment Management Plan for the site is to be submitted with the development application for the first stage of subdivision. The Management Plan must detail stormwater drainage routes and infrastructure that will be required for the development of precincts 1 and 2. The Stormwater Catchment Management Plan is to be approved by Council, after consultation with NSW Department of Lands, prior to approval for any subdivision.

		Explanatory Note/s:
C2	Drainage lines and stormwater event areas will be managed through piped drainage, drainage reserves and retention basins, to ensure avoidance of groundwater recharge. Drainage should be incorporated into all infrastructure design including: - Roads - Pathways and - Retaining walls	
C3	Develop and submit a drainage strategy for each sub- catchment within the Urban Release Area which will include but not be limited to: - Overload flow paths - Possible application for trickle flow - Identify sites for stormwater retention - Limit developed discharge from each catchment for storm events up to and including the 1:100 event.	
C4	Areas identified for stormwater and drainage are to be dedicated as drainage reserve and not open space.	
C5	Stormwater systems associated with Lloyd Urban Release Areas should be assessed with regard to their capacity to handle such discharge and the Lloyd stormwater system should be designed accordingly.	
C6	All stormwater systems are to be designed to accommodate a minimum 80:20 impervious to pervious ratio across the entire developed area. Ample buffer capacity should be provided for appropriate storm intensities.	
C7	All drainage channels and detention basins must be suitably impermeable to prevent recharge to ground water.	
C8	A Development Servicing Plan will be prepared by Council, prior to the subdivision application stage that includes provision for stormwater management. Subdivision application plans are to be consistent with the DSP.	
C9	Subsoil drainage installed in road reserves must intercept shallow ground water as per salinity guidelines.	
C10	The road verge is to be impervious to aid in minimising infiltration.	
C11	Detention basins shall be engineered to ensure there is no infiltration to the ground water.	

15.4 Land release and subdivision staging

The staging of development within Lloyd is determined by the need to manage potential salinity impacts.

C1	Development at Lloyd has been designed to be considered/released in four (4) stages as follows:	
	Stage One: Lower slopes excluding land directly adjacent to Red Hill Road and other sites predisposed to mounding and breakout of groundwater (50% of the 80:20 development area) (refer Appendix 1).	This is R1 zoned land.
	Stage Two: Medium slopes excluding land predisposed to mounding and breakout of groundwater.	This is R1 zoned land.

	Explanatory Note/s:
Stage Three: Medium to upper slopes to the extent predicted feasible by a re-assessment of actual water use values and groundwater recharge at the completion of Stage Two.	Currently RU1 zoned land.
Stage Four: Lower, medium and upper slopes adjacent to Red Hill Road to the extent predicted feasible by a re-assessment of actual water use values and groundwater recharge at the completion of Stage Two.	Currently RU1 zoned land.
C2 All revegetation proposed for the Lloyd area is to commence prior to or on commencement of the first stage of development.	
C3 Prior to rezoning of Stages Three and Four of the Lloyd urban release area, the lot layout concept must be reviewed and amended in line with the results of ongoing groundwater monitoring.	
However, the rezoning of Stages Three and Four of the Lloyd urban release area will not occur until the 75% review of the development of Stages One and Two, confirms that such development can proceed without adverse salinity impact to downstream catchments. The plan at Appendix 2 shows the R1 zoned land comprising Stages 1 and 2, with the Stages 3 and 4 land shown within the RU1 zoning.	
15.5 Environmental Conservation, Biodiversity and Natural Resource Management	
This section contains the provisions to protect and manage biodiversity and environmental conservation goals as well as to manage natural resources, landscapes and riparian areas within the Lloyd Urban Release area. The controls support the established Biocertification of the Lloyd Urban Release Area.	
Details of the established Biocertification for Lloyd are available in <i>Proposed Biodiversity Certification for the Wagga Wagga Local Environmental Plan 2009</i> report, Department of Environment Climate Change and Water (DECCW).	
15.5.1 Environmental conservation and natural resources management	
The natural environment of the Lloyd area has been described in Mullins and Sutherland (2002), Ecological Australia Pty Ltd (2007) and Thompson (2007). Lloyd contains outstanding examples of extensive White Box Woodlands (part of the Box-Gum Woodland Endangered Ecological Community [EEC]) that provide habitat for a range of threatened fauna, including an endangered population of Squirrel Gliders (Claridge and van der Ree 2004). The site is significant not only for the area and quality of vegetation and habitat, but also because it contributes greatly to the connectivity of landscapes and habitats in the wider Wagga Wagga area.	
WWLEP 2010 zones the Lloyd area zoned a mixture of R1 General Residential, E2 Environmental Conservation and RE1 Public Recreation. In consideration of the outstanding biodiversity values of the site, and the potential impacts of urban subdivision on the endangered woodlands,	

Wagga Wagga City Council, the landholders, and DECCW commissioned biodiversity studies (Ecological Australia Pty. Ltd [2007] and Thompson [2007]) to inform planning decisions that would ensure an “improve or maintain” outcome for the site’s biodiversity.

The studies identified areas of vegetation and EEC in medium to good condition, and recommended the retention of these areas. The studies also identified areas in low condition, and paddock trees, which may be able to be cleared but with appropriate offsets being effected.

The planning outcome, reflected in the zonings for the area in the WWLEP 2010, largely follows the recommendations of the biodiversity studies. A large consolidated area of endangered woodland, totalling 251 hectares, is contained within the E2 zoned land. This includes 245 hectares of White Box Woodland, and 6 hectares of Wagga Wagga Hills Open Forest. Management of this woodland area, zoned E2, is detailed in the “Conservation Management Plan for Zone E2 Areas in Lloyd”.

It is a requirement of LEP biocertification (clause 2, section 4.4 of the Biodiversity Conservation Report) that Council:

- Enter into a planning agreement with the current Lloyd landowners to ensure that the whole E2 zone area is transferred to Council as a reserve and;
- Develop a Conservation Management Plan (CMP) for the new reserve the primary objective of which will be the conservation and restoration of the Box Gum woodlands and associated fauna within Lloyd.

The CMP will be the key document for Council in managing biodiversity within Lloyd and for interpreting the LEP and DCP.

Objectives

- O1 Ensure trees and vegetation contributing to the environmental and amenity value of the locality and region are preserved.
- O2 Maintain and enhance the ecological values of waterways and wetlands, including water quality, stream integrity, biodiversity and habitat, within the Lloyd Urban Release area.
- O3 Maintain and enhance riparian buffers to preserve the environmental values associated with waterway and wetlands, having specific regard to fauna and flora habitats and ecosystems, stream integrity (including erosion management), land use impacts and recreational/visual amenity.
- O4 Protect and manage biodiversity in and adjacent to urban areas.
- O5 Comply with the Biodiversity Certification Report.

Controls

- C1 All development requiring development consent is to be in accordance with the Lloyd Urban Release Area Conservation Management Plan.
- C2 All construction and management activities are to be in accordance with the Lloyd Urban Release Area Conservation Management Plan recommendations.
- C3 Development applications in the area zoned R1 General Residential are to identify and set aside for protection and management the trees in the area of identified Squirrel Glider

Explanatory Note/s:

habitat falling outside the E2 zone at Lloyd (shown in Figure 3 and 4).

Explanatory Note/s:

The protection of Squirrel Glider habitat has been incorporated into the plans at Appendices 2 and 3.

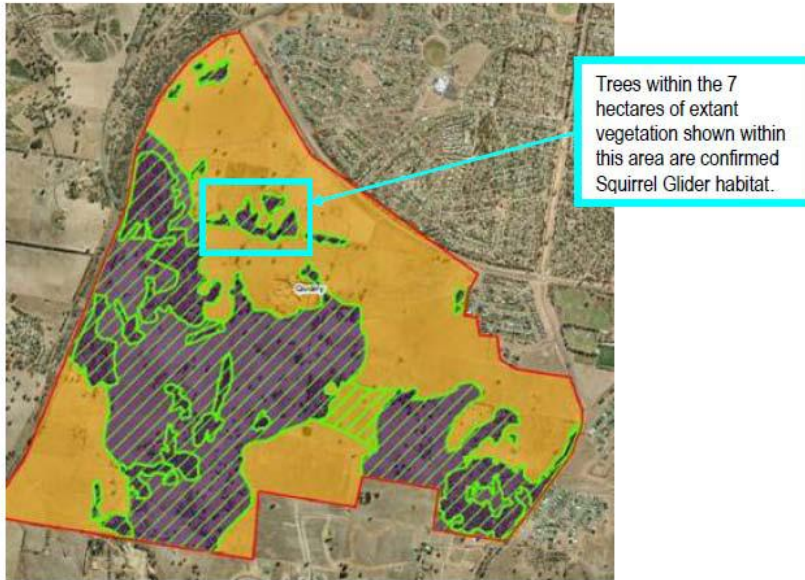


Figure 3 – Squirrel Glider habitat not included in E2 zone.

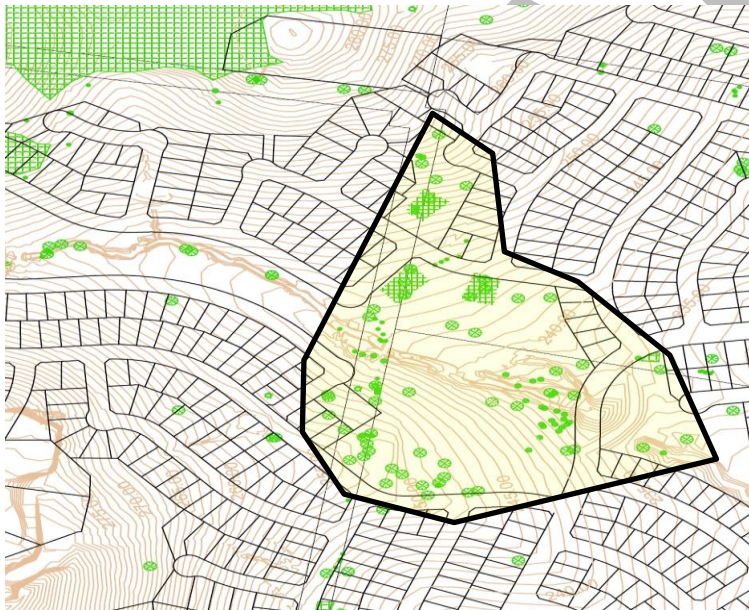


Figure 4 - Squirrel Glider habitat not included in the E2 zone

- C4 In addition to complying with the requirements of the Companion Animals Act 1998, owners of domestic cats resident in the Lloyd Urban release area to manage their cats so that they are not to roam freely outdoors between sunset and sunrise. In this regard Council will, as a condition of development consent, require the imposition of a Section 88B Restriction On Use for all residential subdivisions within the Lloyd Urban Release Area.

15.5.2 Salinity Management

The potential for salinity to affect development varies between recharge and discharge areas. Property owners may be required to obtain specialist

advice to determine appropriate salinity management measures.

Note: A reference to the “study” in this section is a reference to *Salinity Risk and Mitigation Assessment, Lloyd Subdivision, July 2009*.

Objectives

- O1 Encourage Salinity Sensitive Urban Design.
- O2 Minimise the volume of surface water subject to infiltration and subsequent deep drainage by maximising surface water drainage across the entire Lloyd area.
- O3 Minimise earthwork based disturbance to existing undeveloped areas.

Controls

- C1 Permit development in stages that is in accordance with identified salinity constraints and management recommendations.
- C2 Development on land zoned R1 General Residential within the Lloyd Urban Release Area must conform with the 80:20 impervious to pervious development ratio (see Appendix 2 map).

Surface water drainage

- C3 Construction of contour banks on undeveloped land, which will hold water, will not be permitted.
- C4 Surface water drainage from watercourses on undeveloped land should be captured by the constructed drainage system within the relevant subdivision stage.
- C5 All impervious areas on individual house lots must be drained into the internal stormwater system and directed to the piped stormwater system.

Recharge calculation verification for sub-catchments

- C6 Predicted recharge/infiltration must be assessed at the Neighbourhood plan stage at the sub-catchment level, to achieve compliance with the 80:20 impervious to pervious requirement. The infiltration rate for each developed sub-catchment should be equal to or less than the existing sub-catchment infiltration.
- C7 Recharge calculations are to be based on the spread sheet developed by EnviroAg Australia (copy in the Council offices) and are to be verified as correct by a suitably qualified person prior to lodgement with the Council.

Stormwater drainage systems

- C8 The stormwater system(s) are to be:
 - a) impervious to a permeability no greater than 1×10^{-7} m/s.
 - b) designed and constructed so as not to be degraded as a result of peak flow events and have sufficient capacity for peak storm intensities and durations.
- C9 Stormwater discharges from Lloyd are to be detained such that pre-development flows can be maintained or otherwise determined by the relevant authorities to benefit the environment.
- C10 Stormwater drainage plans must be submitted for each stage of the development. The plan must demonstrate how run-on water from the undeveloped areas will be dealt with to prevent impacts upon the new urban areas and minimise infiltration into the ground

Explanatory Notes:

The Council and Riverina Water may introduce, at their cost, a secondary external use water meter system on some properties to monitor external water usage. Data gathered will be used during the reassessment process.

Note: The residential impervious areas in the study were based on the footprint of the house and frontage including roadways, driveways, courtyards and footpaths

water.

Explanatory Note/s:

Drainage of impervious areas

- C11 Built features must be drained to stormwater rather than to lawn or other pervious areas.
- C12 All planned and future impervious areas included in the 80:20 ratio (impervious : pervious) are to be drained to stormwater.

Siting of vegetation areas for interception of shallow groundwater

- C13 Applications for subdivision are to provide details of optimum siting of vegetation for interception of recharge by a suitably qualified person, and will be assessed for such by the Council.
- C14 To double as a mitigation measure against localised groundwater outbreak, native vegetation areas are to be located where shallow groundwater could potentially be intercepted. Effective siting of these areas of vegetation would maximise the bonus reduction in groundwater, recharge achieved through direct groundwater extraction.

Ground Water monitoring

- C15 Monitoring and reassessment must continue during the course of the development of the Lloyd urban release area. All assessment to be undertaken by qualified persons using the model and values developed in the study.

Note: Appendices 3 and 4 include the location of piezometers installed for the ongoing monitoring of groundwater levels.

Management of transitional areas in Stages 1 and 2

- C16 Perennial pasture is to be established in all offset areas (as per the Voluntary Planning Agreements for Lloyd) to minimise groundwater recharge if stages 3 and 4 don't proceed. Following reassessment, the revised offset area should be established to grassy woodland.

Native and water wise gardens

- C17 Gardens calculated towards impervious surface in the release area must have an impervious liner and be drained to Council's storm water system.
- C18 Residential development within the release area must feature predominantly native or 'water wise' gardens to help reduce urban recharge significantly OR the use of rock style gardens utilising low water use plant varieties as an alternative 'water wise' option where the garden is calculated towards pervious surface.
- C19 Rock gardens and similar decorative gardens are to have impervious liners drained to the storm water system.
- C20 All gardens and landscaping should be constructed and maintained using the landscaping and garden design guidelines available from the Council and approved for the Lloyd release area. The guidelines demonstrate how the 80:20 rule can be maintained for the minimising of infiltration of water to the groundwater table.
- C21 Fixed irrigation systems between the front property boundary and the road reserve are not permitted. This area is to be impervious and will not require watering.

- C22 Grey water reuse systems are not appropriate within the Lloyd urban release area.

Explanatory Note/s:

Grey water originates from reticulated town water and this water may be in addition to natural rainfall over the Lloyd area.

Note: The Council and Riverina Water may impose water restrictions (similar to those used in drought conditions) if average water usage is found to be substantially in excess of plant water requirements (monthly quotas). Restriction On Use covenants will be set in place in relation to grassed areas to assist in achieving targets.

Management of transitional areas in Stages 1 and 2

- C1 Perennial pasture is to be established in all offset areas to minimise groundwater recharge in the interim period. Following reassessment, the revised offset area should be established to grassy woodland.

15.6 Bushfire Management in Lloyd

Objectives

- O1 Ensure appropriate relationships between asset protection zones on residential land that adjoins land zoned for Environmental Conservation.
- O2 Avoid adverse impacts from adjoining development on land in the E2 Environmental Conservation zone.

The controls in this section are in addition to Part B Section 4.1 of the WWDCP 2010.

Controls

- C1 Asset Protection Zones are to be wholly within the development lot.
- C2 If the Asset Protection Zone cannot be located wholly within the Residential zone, the APZ can extend into the E2 zone provided that that no trees are removed in that zone.
- C3 The location of building envelopes within Residential zones that adjoin Environmental Protection zones must consider the potential impact of the associated asset protection zone (APZ) on the adjacent E2 zone.

Building envelopes within Residential zones that adjoin Environment Protection zones must be located to avoid impact on the associated asset protection zone (APZ) on the adjacent E2 zone.

15.7 Acoustic Environment

Objective

- O1 Avoid adverse impacts from road or rail noise.

Control

- C1 Dwellings must be set back at least 60m from the centre line of the Great Southern Railway line, and must be set back at least 40m from the centre line of Red Hill Road, as shown by the Open Space plan in Appendix 3.

The open space (RE1) zone along Red Hill Road and the Rail Line provide the required buffer distance.

15.8 Aboriginal and cultural heritage

Part B Section 3 of the DCP contains the controls for heritage conservation. Heritage items are listed in Schedule 5 of the WWLEP 2010. This section contains additional controls to protect the Aboriginal

heritage within Lloyd.

Explanatory Note/s:

Objective

- O1 Respond to the archaeological sensitivity of the site and preserve existing archaeological heritage.

Control

- C1 Sites of Potential Aboriginal Deposits (refer to the Aboriginal Sites Plan), are to be protected through open space and management practices which will be required to ensure the conservation of objects and sites.
- C2 Prior to the commencement of development within any precinct of the Lloyd West neighbourhood, satisfactory consultation is to be carried out with Council and the Aboriginal Community (via the Wagga Wagga Aboriginal Land Council) to notify of the proposed method of management for Aboriginal Heritage Items or sensitive sites.
- C3 Developers are to follow the procedures contained within the NSW National Parks and Wildlife Act 1974 prior to the removal or destruction of any item of Aboriginal Heritage.

The applicant is to advise the OEH Aboriginal Sites Officer whenever work is carried out in proximity to an Aboriginal Heritage Item or sensitive site.

15.9 Wiradjuri Walking Track

Objective

- O1 To allow the progressive realignment of the existing Wiradjuri Walking Track route through the Lloyd West neighbourhood.
- O2 To ensure that formal access to the E2 zoned land is restricted to the Wiradjuri Walking Track only.

Control

- C1 The Wiradjuri Walking Track is to be realigned in accordance with the Wiradjuri Walking Track Plan (see Figure 3 below).
- C2 Where access to the E2 land is not via the Wiradjuri Walking Track appropriate fencing must be erected upon the R1 subdivision boundary to minimise access.

To be inserted once received from Department of Lands

Figure 4 – The Wiradjuri Walking Track

15.10 Residential development

Explanatory Note/s:

Site cover and landscaped area

This section applies to land zoned R1 General Residential.

Site cover is the proportion of a site that is occupied by buildings, garages and other structures. Site cover is particularly relevant to development in the Lloyd neighbourhood due to salinity management needs.

Residential development is required to achieve a site cover impermeable to permeable ratio of 80:20 to minimise infiltration of water to groundwater.

'Site coverage', as defined in the WWLEP 2010 does not include basements, area under eaves, unenclosed balconies and the like.

However, in order to meet the 80:20 rule home owners may need to consider the use of paving, driveways, sheds, and covered pergolas, patios or decks in order to achieve adequate site cover and sufficient impervious areas on site.

All structures and hard stand will require drainage to stormwater in order to collect runoff and reduce groundwater infiltration. Pools may also be considered as a means to reduce permeable area.

Appendix 5 provides a typical lot plan which shows how compliance can be achieved for a particular (smaller sized lot). The various ideas/examples within this lot layout can be used for lots of larger sizes to achieve compliance. Achieving compliance is not only limited to the measures shown in the Appendix.

Objectives

- O1 Achieve a site cover of 80:20 impermeable to permeable ratio required to minimise infiltration of water to groundwater and thereby reduce salinity impacts.

Controls

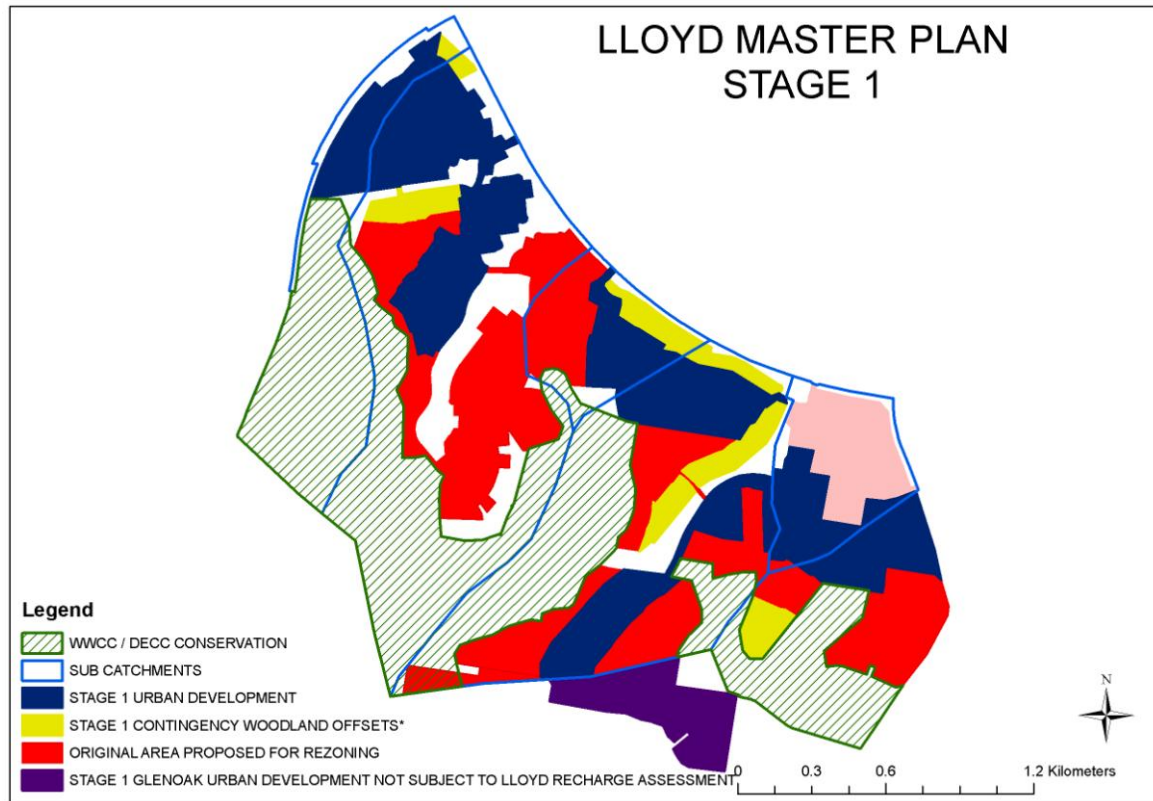
- C1 Site cover on all land zoned R1 is to achieve a minimum impermeable to permeable material ratio of 80:20, based on the various controls in this section.
- C2 The large R1 zoned buffer lots in the western edge of the release area (adjoining Red Hill Road and the Great Southern Rail Line) are to have a maximum 1,000m² development envelope nominated which will be required to meet the 80:20 calculation. The remaining land, provided it is planted to 100% with native vegetation, will not be included in the 80:20 calculation as its infiltration rate will be the same or lower than the pre-development land.
- C3 Building envelopes shall be nominated on all lots within the R5 Large Lot Residential zone. No building envelopes shall encroach on any of the following:
- Existing or proposed service easements,
 - An area that will require the removal of existing trees,
 - Setbacks identified for the purposes of noise buffering,
 - Land situated above the 280 metre AHD contour, unless the building envelope can be serviced with reticulated water and individual approval for each envelope has been obtained from the water supply authority in this regard,

-
- Land within 10 metres of the front boundary of the allotment or land within 10 metres of another building envelope, or
 - Bushfire prone land.

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Appendix 1A

Lloyd (Salinity Management) Masterplan STAGE 1 (courtesy of EA Systems P/L)



Notes

1. Stage 1 Contingency Woodland Offsets area is to remain as perennial pasture until actual water use values and groundwater recharge is re-assessed at the completion of Stage 1.

If the re-assessment finds that recharge estimates used in the current study were accurate, this area is to be established with woodland offset.

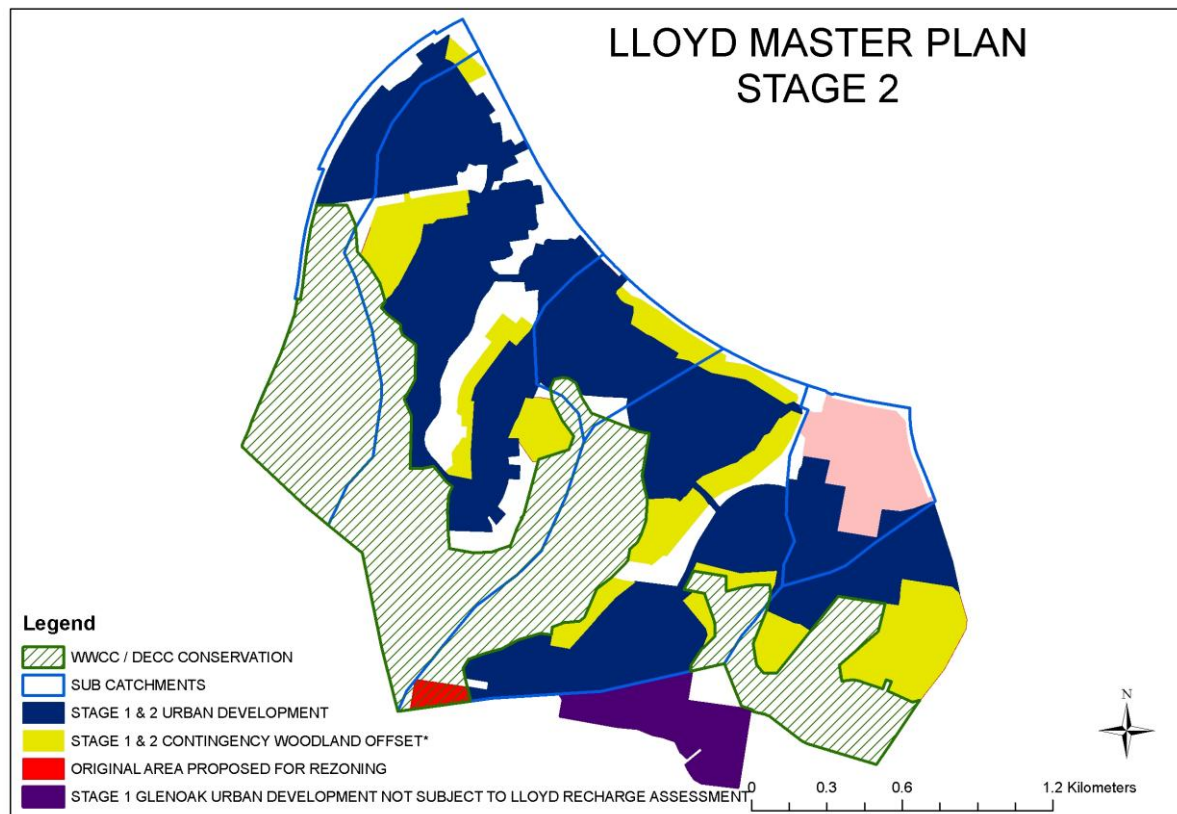
If the re-assessment finds that original recharge estimates were underestimated; this area, as well as sufficient additional land area, is to be converted to woodland offset.

If the re-assessment finds that original recharge estimates were overestimated scope should exist to revise the original recommendations in any or all of the following ways:

- The Stage 1 Contingency Offset area could be developed as residential areas to an extent calculated with the revised data.
- Lots sizes and / or pervious to impervious ratios in the latter development stages could be increased to an extent calculated with the revised data.
- Any restriction on lawn areas and / or watering could be relaxed to the extent calculated with the revised data.

Appendix 1B

Lloyd (Salinity Management) Masterplan STAGE 2 (courtesy of EA Systems P/L)



Notes

1. Depending on the outcome of the re-assessment conducted at the completion of Stage 1 and Stage 2, Contingency Woodland Offsets Area would be used for one of the three possible outcomes described below.
 - Established entirely to offset woodland.
 - Established partially with residential development with the remaining area as woodland offset.
 - Established entirely with residential development.