Kununurra Land Development Program

Summary

Introduction

Kununurra has experienced a period of sustained growth in recent years flowing from increased investment in the Ord River agricultural industry, mining activity and growth of the Kimberley Region as a tourist destination. The proposal to develop Stage 2 of the Ord River Irrigation Scheme (ORIS) is expected to generate a significant increase in local development, including temporary and permanent accommodation for the construction, seasonal and permanent workforces plus the creation of further support industry.

Anticipated population increases based on two agricultural development scenarios are detailed in a report released by the Department of Resources Development in September 1996 titled Ord Irrigation Project - Population Planning Study. The study also considered growth in tourism activity due to the demands placed on this type of accommodation by seasonal workers in the agricultural sector. The analysis predicts the current Kununurra district population of approximately 4500 could increase by up to 2900 people by 2008 which includes 720 temporary seasonal workers. The timing in the Population Planning Study has been deferred by two years based on advice from the Department of Resources Development that indicates ORIS Stage 2 is now likely to commence in late 1999.

Irrespective of the possible development of a satellite town on the WA/NT border to service ORIS Stage 2, the Ministry for Planning has prepared the Kununurra Land Development Program (LDP) as part of the Country Land Development Program to ensure land and infrastructure planning is in place for government agencies to budget for the additional demands on services. The LDP sets out the anticipated land release areas based on planning and advice from the Shire of Wyndham-East Kimberley (SWEK) and the Department of Land Administration (DOLA).

Vacant Land Supply

A Land Use Survey, undertaken by the Ministry for Planning during 1996/97 identified:

- 42 vacant residential lots of which 36 were in the Lakeside area
- 8 vacant commercial lots of varying sizes in the town centre and adjoining Ivanhoe area
- 8 vacant industrial lots of varying size adjoining the town centre and Redridge LIA.

Potential Demand for Housing and Land

In summary, the Population Planning Study predicts the following additional accommodation demands generated by the construction, operations and seasonal phases of ORIS Stage 2 plus tourism. The analysis includes provision for both direct and indirect employment to support ORIS Stage 2 plus the consequential services sector workforce to support overall growth:
- 620 permanent dwelling units in the form of houses and flats
- up to 800 single persons quarters (SPQ) for construction purposes
- 380 caravan bays in two or three new parks may be required from 2003
- 240 additional hotel/motel rooms spread across possibly three new sites.

Consideration may need to be given to housing investment strategies to support ORIS Stage 2 and encourage private housing rather than the potential reliance on company or government housing.

**Future Land Supplies**

Planning is in place to create 1500 residential lots in the Lakeside-Drovers Rest area. Sites have been identified for future tourism and commercial activity predominantly fronting Lake Kununurra. Further light and general industrial land releases are proposed in the existing Redridge LIA, on Weaber Plain.

However, the majority of proposed subdivision development is located on Vacant Crown Land (VCL) and therefore subject to processes in accordance with the Commonwealth Native Title Act 1993. The timing of land release is dependent on the outcome of current negotiations between the State Government and the Miriuwung Gajerrong people.

**Land Planning Issues and Actions**

Zoning is in place to create a further 220 residential lots at Lakeside and 38 industrial lots at Redridge on the Weaber Plain Road. Commercial development opportunities are generally limited to redevelopment adjoining the town centre.

The SWEK and DOLA have initiated a number of actions to meet the anticipated long-term demand for residential, commercial, tourist and industrial development. These include:

- The Kununurra - Foreshore Study, prepared in 1986/87 that sets out the development strategy for tourism, recreation and conservation fronting Lake Kununurra and environs.
- The Structure Plan for Lakeside-Drovers Rest Residential Areas prepared for DOLA in 1995/96 that sets out details of the capacity and form for the residential expansion area.
- The SWEK has initiated a number of amendments to the current town planning scheme (TPS) plus resolved to prepare a new scheme, TPS No.7 to accommodate future development. Current timing for advertising of the new scheme for public comment is late 1997.

A proposal has been endorsed by the Western Australian Planning Commission to undertake a subregional land use planning study for the East Kimberley region under the guidance of the Kimberley Region Planning Committee. The Kununurra Wyndham Area Development Strategy will complement a range of other strategic studies by integrating these into a comprehensive land and water use plan that will provide guidance in future decision-making on strategic development proposals. The identification of suitable serviced sites to construct single persons quarters (SPQ) to support ORIS Stage 2 warrants immediate attention. Recent experiences in establishing these facilities in Port Hedland, identifying suitable sites in Kalgoorlie and Karratha and comment from the SWEK on accommodating workers for the Ord Farm Roads Reconstruction
contract suggest this matter should be a priority. Indicative site requirements for a 400-person SPQ facility is eight hectares. The Lakeside-Drovers Rest Structure Plan may warrant further minor review as it currently provides for two primary school sites based on prevailing criteria at the time of its preparation. With recent changes to the criterion of providing one primary school site for 1800 homes, the Education Department may consider the provision of a second site unnecessary and therefore suggest the current Lakeside site be reviewed to service Lakeside and Drovers Rest better.

Infrastructure Planning and Actions

Water Supply
The Water Corporation revised the 1983 water supply strategy in 1994 in response to the low level of reserve storage in the Kellys Knob tank. The 1994 study identified the immediate requirement for additional tank storage in the Lakeside area as the most cost-effective long-term supply option. A further brief assessment of storage requirements in late 1995, that included provision for development of the Drovers Rest area, confirmed the 1994 study outcomes. Securing a tank site is a high priority, preferably in the Lakeside area adjacent to the Mirima National Park, for the immediate construction of additional water storage. The tank site will support future growth and provide supply security at the lowest long-term cost.

Wastewater
The Water Corporation has finalised the wastewater collection strategy to service long-term land use planning. Capital investment during 1997/98 is required to replace an existing pump station in Ivanhoe Road plus construct an interim station to facilitate development adjacent to the town centre. Further capital investment will be required for an interim pump station to support the next 350 lots to be created at Lakeside prior to significant expenditure to develop Drovers Rest. The Water Corporation will engage a consultant in 1997/98 to review treatment plant capacity and consider alternative effluent disposal strategies. Consideration should be given to including the commercial/industrial area adjoining the town centre as part of the statewide Infill Sewerage Program as a lack of servicing is constraining major redevelopment opportunities. Alternatively, funding assistance may be available through the Department of Commerce and Trade's Regional Headworks Assistance Scheme.

Electricity
Western Power's Regional Power Division reviews its rolling Five Year Development Plan on an annual basis. Indications are that the current 11 megawatt (MW) peak demand for the Kununurra-Wyndham System is expected to increase to 15MW over the next five years, well within the capacity of the 30MW Ord Hydro plant that took over supply in mid 1995. The existing 10MW diesel-fired station within the town will remain on standby for a further one to three years. However, the cost and provision of maintaining standby generation in the longer term if the diesel station is decommissioned remains an issue requiring resolution.

Transport Planning
The Department of Transport and Main Roads WA have prepared complementary regional strategies. The Kimberley Regional Transport Strategy was released in September 1997. The Roads 2020 - Kimberley Regional Road Development Strategy released in October 1997 acknowledges the possible long-term
requirement for a bypass around Kununurra to accommodate increasing traffic volumes, particularly west to the port of Wyndham. An initial section of the bypass may be required in the short term to link the Ivanhoe and Weaber Plain Roads to transport sugar cane. The strategy also identifies upgrading of Weaber Plain Road and Victoria Highway as priorities.

**Education**
The Education Department of WA (EDWA) prepared a comprehensive internal study in June 1996, titled Kununurra - Student Demography and Strategies for the Future Delivery of Education. The report discusses a range of scenarios to accommodate the anticipated demand through to 2007. EDWA has no current plans to develop any new facility unless growth rates exceed projections or stakeholder consensus and ministerial support for change in the service delivery strategy dictate the requirement for new initiatives from 1998/99.

**Health Services**
The Kununurra Hospital is operating in excess of an 80 percent occupancy rate. Additional facilities are likely to be identified as part of a proposed Needs Review of the North West Health Service during 1997/98. The review will identify future service delivery strategies, staff requirements and capital investment for the Gascoyne, Pilbara and Kimberley Regions.

**Other Services**
The Land Development Program has not examined other State government services that are not represented on the Infrastructure Coordinating Committee of the WAPC. However, the LDP will be referred to relevant agencies such as Homeswest, WA Police Service and Family and Children's Services as an indication of anticipated development activity.
Land Release Plan

1. Introduction

Kununurra has experienced a period of sustained growth in recent years flowing from increased investment in the Ord River agricultural industry, mining activity and growth of the Kimberley Region as a tourist destination. This growth is reflected in the level of housing investment and development activity over the same period.

Kununurra is also the major administrative centre for the East Kimberley. Its location 40 kilometres from the Western Australia border provides accessibility to services for settlements such as Timber Creek in the Northern Territory.

The proposal to develop Stage 2 of the Ord River Irrigation Scheme (ORIS) is expected to generate a significant increase in local development ranging from temporary and permanent accommodation for the construction, seasonal and permanent workforces to the establishment of further support industry.

1. Ord Irrigation Project - Population Planning Study

Anticipated population increases based on two agricultural development scenarios are detailed in a report released by the Department of Resources Development in September 1996 titled Ord Irrigation Project - Population Planning Study.

Briefly, the study assessed two agricultural development scenarios based predominantly on either sugar or cotton with the population centred on Kununurra. The study also considered growth in tourism activity due to the demands placed on this type of accommodation by seasonal workers in the agricultural sector. The analysis predicts the current Kununurra district population of approximately 4500 could increase by up to 2900 people by 2008 which includes 720 temporary seasonal workers.

The impacts on population estimates resulting from the possible construction of a satellite town located on the WA / NT border are undefined due to the cost and uncertainty of such a proposal. The uncertainty will remain for at least another 12 months until the current Expressions of Interest for Development of Stage 2 are analysed and a development strategy is approved in mid 1998. Whatever the outcome, construction of ORIS Stage 2 is anticipated to commence in 1999/2000.

2. Kununurra Land Development Program

Irrespective of the possible development of a satellite town, the Ministry for Planning has prepared the Kununurra Land Development Program (LDP) as part of the Country Land Development Program. The LDP is a short-term implementation mechanism within the framework of the State Planning Strategy. It has been prepared as part of the statutory role of the Western
Australian Planning Commission (WAPC) to advise Government on land use planning and the coordination of land development and infrastructure throughout the State.

The Kununurra LDP sets out the anticipated land release areas based on planning and advice from the Shire of Wyndham-East Kimberley (SWEK) and the Department of Land Administration (DOLA). The LDP provides direction for key infrastructure agencies represented on the Infrastructure Co-ordinating Committee of the WAPC to budget for additional demands on services.

The majority of proposed subdivision development is located on Vacant Crown Land (VCL) and therefore subject to processes in accordance with the Commonwealth Native Title Act 1993. The timing of future land release for townsite development is dependent on the outcome of current negotiations between the State Government and the Miriuwung Gajerrong people.

2. Land supply and Demand
   1. Population and Housing

Figure 1 presents estimated resident population (ERP) and housing data from the past three censuses. The data reflects figures for both the Shire plus the Kununurra township. The township figures are an estimate of the ERP and includes the Ord Irrigation census collection district that surrounds Kununurra.

![Figure 1 - Population and Dwelling Stock](image)

The 1996 Census data indicates there were also 2500 visitors in the Kununurra district at the time of the census in August. This represents a significant increase in the service population that places additional demand on services in the local community.
2. **Historic Lot Creation and Uptake**
   - DOLA is the primary land release agency and undertakes this function presently under the Land Act 1933. Under the Land Administration Bill currently before Parliament, future subdivision of Crown land will require approval under the Town Planning and Development Act 1928.
   - MfP’s Statutory Support System indicates some subsequent minor freehold subdivision activity has also occurred under the Town Planning and Development Act 1928.
   - Residential lot uptake data is provided by the Australian Bureau of Statistics (ABS) from local government returns and is based on actual dwelling commencements. Table 1 provides an indication of both the lot uptake and the number of dwelling units created.

Separate dwelling commencement data is included for the Census Collection District that surrounds the town to indicate the level of building activity on the periphery which includes caretaker residences in the light industrial estate and farming properties.

- Commercial and industrial lot uptake data is derived from local government records of building licences issued that are valid for two years. The data provided by the SWEK includes new works, additions and alterations and is for the whole shire. SWEK indicates the majority of this work has occurred in Kununurra and the surrounding district.

3. **Vacant Land Stock and Housing Availability (March 1997)**

A Land Use Survey was undertaken by the Ministry for Planning in March 1997 to ascertain vacant residential land stocks. An earlier survey in March 1996 captured details of commercial and industrial land use activity across the town. The survey data was released in May 1997.

The survey identified:

- 42 vacant residential lots of which 6 were located adjacent to the town centre and Lily Creek with the remaining 36 in the Lakeside area.
- 8 vacant commercial zoned lots of varying sizes.
- 8 vacant light and general industrial lots of varying size adjoining the Town Centre and in the Redridge LIA. The
survey identified a further 38 vacant undeveloped lots in Redridge which are to be released in the future.

Data from real estate agents indicates only two residential, one commercial and three industrial lots were available in March 1997. Real estate agency data also indicates a limited housing stock available both for sale and rent. There were 32 houses listed for sale at March 1997 with 14 houses and units available for rent.

4. **Anticipated Demand for Land and Accommodation**

The Ord Irrigation Project - Population Planning Study details potential demands for temporary and permanent accommodation between 1999 and 2008 for both agricultural development scenarios. The study includes demands generated by the construction, operations and seasonal phases of ORIS Stage 2. The analysis includes provision for both direct and indirect employment to support development and the consequential services sector workforce to support overall growth.

Table 2 summarises anticipated additional accommodation requirements resulting from ORIS Stage 2 plus ongoing growth in the tourism sector. The data is drawn from Table 15 of the Population Planning Study. The summary is based on Scenario 1 - Broadhectare Sugar Farming which generates the highest population projections and accommodation demands.

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<td>447</td>
<td>438</td>
<td>419</td>
<td>459</td>
<td>481</td>
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*SPO = Single Persons Quarters*

**Table 2 - Anticipated Accommodation Demand**

The timing has been deferred by two years based on advice from the Department of Resources Development that indicates ORIS Stage 2 is now likely to commence in late 1999.

**Permanent Housing**

This is discussed subsequently in the context of land supply. Consideration may need to be given to housing investment strategies to support ORIS Stage 2 and encourage private housing construction rather than the potential reliance on company or government housing.

**Short-Term Accommodation**

The Population Planning Study has included analysis of short-term accommodation capacity and identified there may be a need to
provide the following additional facilities by 2008 to meet seasonal and tourist demands:

- 380 bays in two or three new parks may be required from 2003 to cater for anticipated increases in tourism. Some of the six existing caravan parks have scope for expansion for a further 200 bays to increase the current capacity to 42 bays.
- 240 additional hotel/motel rooms spread across possibly three new sites.

**Single Persons' Quarters (SPQ)**

The Land Development Program considers the more pressing issue is the identification of suitable serviced sites to construct SPQ facilities as and when required. Recent experiences in accommodating these facilities in Port Hedland, identifying suitable sites in and around Kalgoorlie and Karratha and comment from the SWEK on accommodating workers for the Ord Farm Roads Reconstruction contract suggest this matter should be a priority. Indicative site requirements for a 400 persons facility is approximately eight hectares.

3. **Land Supply Outlook**
   1. **Townsite Growth Strategy**

Details of the residential, tourist and industrial growth areas are indicated on Figure 2 which also reflects current land use zonings.

Kununurra's long-term growth is constrained principally to a north-south axis defined by the main irrigation channel to the west, Lake Kununurra to the south-west and Mirima (Hidden Valley) National Park to the east. Limited tourism and recreational growth is proposed on an east-west axis along the Victoria Highway and Lake Kununurra.

Briefly, residential growth is confined to the south of Lily Creek Lagoon in the Lakeside and Drovers Rest areas. Commercial land release opportunities are limited with future development expected to be accommodated predominantly from redevelopment of existing commercial and industrial land adjoining the town centre. Tourist development is proposed predominantly around the waterfront of Lake Kununurra. Future industrial land development is earmarked for the Redridge area extending north along Weaber Plain Road.

The SWEK and DOLA have initiated a number of actions to meet the anticipated long-term demand for residential, commercial, tourist and industrial development:

- The Kununurra - Foreshore Study, prepared by planning consultants Taylor Burrell in 1986/87 sets out the development strategy for tourism, recreation and conservation fronting Lake Kununurra and environs. The study formed the basis for Amendment No.9 to Town Planning Scheme No.4.
The Structure Plan for Lakeside-Drovers Rest Residential Areas prepared by Taylor Burrell for DOLA in 1995/96 sets out details of the capacity and form for the residential area. The structure plan also includes a detailed drainage sub-study.

2. **Residential Development**

**Lakeside-Drovers Rest**

The area will provide predominantly single residential development although scope exists to create larger special rural lots in the adjoining area where soil conditions restrict residential development.

Anticipated lot yield capacity of the respective localities are:

- Lakeside 772 lots (balance remaining 448 lots)
- Drovers Rest 1048 lots

To date two precincts in Lakeside have been fully developed with a third partially complete. These areas have created 324 residential lots plus provided sites for commercial, community, recreation and primary school uses. The structure plan has identified further housing opportunities on commercial and recreation sites in Precincts 1 & 2 that are now considered surplus to requirements due to revised planning criteria. The SWEK has initiated rezoning over one site and deferred the other at present.

The remaining unsubdivided capacity of 1500 lots exceeds the anticipated requirements of 620 lots for ORIS Stage 2. DOLA has scheduled subdivision design during 1997/98 for the infill areas, the balance of Precinct 3 and Precinct 4 to create 240 lots.

Consideration will need to be given to commence detailed design by 2003 for the initial stages of Drovers Rest based on remaining capacity in Lakeside.

The Lakeside-Drovers Rest Structure Plan may warrant further minor review as it currently provides for two primary school sites based on prevailing criteria at the time of its preparation. With recent changes to the criterion of providing one primary school site for 1800 homes, the Education Department may consider the provision of a second site unnecessary and therefore suggest the current Lakeside site be reviewed to service Lakeside and Drovers Rest better.

**Hidden Valley**

The Lakeside Structure Plan excludes details of the adjoining Hidden Valley area located to the east of the Victoria Highway adjoining Mirima National Park. The area has previously been identified for residential development with 38ha zoned accordingly under the current Town Planning Scheme No.4 as indicated on Figure 2.
Indications from DOLA and SWEK are that, despite the potential for up to 500 lots at Hidden Valley, development is unlikely due to the area's proximity to the Mirima National Park.

3. **Commercial and Tourism Development**

**Commercial Development**

As indicated, commercial land release opportunities are limited to predominantly redevelopment of existing commercial and industrial land adjoining the town centre. Further development of the Redridge LIA will provide scope to relocate a number of incompatible industrial land uses. However relocation opportunities are currently restricted due to the limited land availability at Redridge and the constraint to further development until native title land matters are resolved.

Lack of sewerage for the majority of the commercial/industrial area adjoining the town centre constrains major redevelopment opportunities.

The Water Corporation is considering a proposal to construct a new interim sewerage pump station and pressure main in Ivanhoe Road to support redevelopment along Bandicoot Drive. Construction of the pump station and initial gravity sewer as far as Redgum Avenue will provide opportunities to extend the infill sewer network to facilitate further redevelopment.

Irrespective, consideration should be given to include the area in the statewide Infill Sewerage Program. Alternatively, funding assistance may be available through the Department of Commerce and Trade's Regional Headworks Assistance Scheme.

**Tourism Development**

A number of sites for future hotel/motel and caravan parks have been identified in the Foreshore Study. The majority of sites, referred to as Special Development Sites predominantly front Lake Kununurra, Kona Inlet and Lily Creek Lagoon. Other accommodation sites are also proposed fronting the Victoria Highway as part of the redevelopment of the Ivanhoe commercial/industrial area.

The 500m buffer around the existing Kununurra Wastewater Treatment Plant encroaches into a portion of the proposed office and tourist accommodation zone that fronts the Victoria Highway near Ivanhoe Road. A number of land uses, including tourist accommodation, are not considered appropriate within the buffer. The State Industrial Buffer Policy gazetted in May 1997 as a Statement of Planning Policy under s5AA of the Town Planning and Development Act 1928 includes buffer zones to infrastructure. The State Industrial Buffer Policy requires town planning schemes to acknowledge and restrict land uses to appropriate and compatible uses within buffer zones.
4. **Industrial Land**

DOLA has prepared subdivision design for two further releases totalling 38 lots in the Redridge LIA. Development of these lots requires the construction of roads and extension of services.

The SWEK has initiated Amendment No. 40 to rezone 35ha to General Industry along Weaber Plain Road, immediately north of the existing Redridge industrial area. Structure planning will be prepared in accordance with provisions of TPS No.4.

The SWEK advises it has identified a 200ha site, five kilometres to the south-east on the Victoria Highway suitable for heavy industry. The site on Vacant Crown Land will be included in the new town planning scheme currently being prepared.

5. **Land Release Timing**

The accompanying inventory Table 3 and Figure 3 outline details of land release areas, including lot yield potential. Details of many of the tourist sites are limited due to the present conceptual nature of the proposals.

Timing remains the outstanding issue as future development is dependent on the outcome of current native title negotiations.

DOLA indicates it has a number of actions under way to provide additional residential and commercial lots in the foreseeable future. This includes seeking disposal of vacant housing lots held by government agencies plus the release of seven town centre lots in October 1997.

Once cleared, staging of development is likely to proceed in accordance with the Lakeside Structure Plan, commencing with Precinct 3 to 5 of Lakeside. Beyond Precinct 5, servicing issues such as establishing new sewer catchments and constructing bridgeworks or culverts over Little Lily Creek to the south are likely to dictate the development program.
Infrastructure Supplement

Introduction

The Infrastructure Supplement has been prepared to examine major physical and human services infrastructure required to support land development activity and service the community.

The Supplement has examined the following infrastructure in consultation with the responsible authority or service provider:

Hydraulic Services
- Water Supply
- Sewerage
- Drainage

Energy Services
- Electricity

Transport Planning
- Regional Transport
- Road Development Strategy
- Public Transport

Health Services
- Hospital Services

Education Services
- Primary and Secondary

Key infrastructure components discussed in the Infrastructure Supplement are indicated on Figures 3 and 4. Major short-term capital investment in infrastructure by relevant government servicing agencies is identified in the Infrastructure Investment Plan at the conclusion of the Supplement. The Infrastructure Supplement includes commentary on strategic land planning issues and studies as this forms the basis for the planning and provision of infrastructure i.e. strategic land use planning provides the nature and spatial extent of future land use for which infrastructure can be planned.

Land Planning

Strategic Planning
The Western Australian Planning Commission has endorsed a proposal to undertake a land use planning study for the East Kimberley region. The study in the form of a regional development strategy will be prepared jointly with the Kimberley Development Commission as outlined in the State Planning Strategy. The Kununurra Wyndham Area Development
Strategy (KWADS) will consider subregional and local planning issues for existing and proposed development which are expected to be dominated by agriculture, mining and tourism. KWADS will complement a range of other strategic studies by integrating these into a comprehensive land and water use plan that will form a guide to assist decision-making on future development proposals.

Statutory Planning
Land use in Kununurra is presently controlled by the Shire of Wyndham-East Kimberley through Town Planning Scheme No.4 which was gazetted in 1985. The Shire has engaged consultants Koltasz Smith to prepare TPS No.7 to accommodate anticipated residential, commercial and industrial development resulting from ORIS Stage 2. Current timing for advertising of the new scheme for public comment is late 1997.

Water Supply
Kununurra Water Supply Scheme
The Water Corporation is responsible for the Kununurra Water Supply Scheme and has provided the following commentary.

Water Resources
Kununurra presently draws its potable water supply requirements from a borefield in the water reserve adjoining the main irrigation channel on the northern bank of Lake Kununurra. Borefield capacity was increased by an additional bore in 1996, taking capacity from 9.4 megalitres/day (MLD) to 11.9 MLD. The 1995 peak day demand was estimated at 7.8 MLD. Annual demand per service is in the order of 700 kL which is approximately twice the average Perth metropolitan figure.
Allowing for one bore to provide standby capacity, the 9.4 MLD production rate can support between 1750 and 2400 equivalent residential services, depending on demand. Scope exists to expand the borefield capacity by equipping a number of undeveloped bores in the existing water reserve.

Distribution
Borefield production is stored locally and pumped as required by transfer pumps through the town reticulation to a storage tank on Kellys Knob. The tank provides limited reserve storage (six to eight hours) in the event of a prolonged power interruption or major pump station failure. In response to the low level of reserve storage, the Water Corporation reviewed the 1983 supply concept in 1994 to meet long-term development.
The planning review identified the most cost effective and secure method of servicing the future growth at Lakeside was by additional storage on elevated Vacant Crown Land adjoining the southern end of the Mirima National Park adjacent to Lakeside. While there has been some opposition to the proposal of locating a storage tank in this vicinity, due principally to visual concerns, the Water Corporation advises it will continue to negotiate for a 6000m2 site subject to native title, environmental assessment and community acceptance.
The alternatives to the Lakeside Tank are both significantly more expensive and far less secure. These options include:

- additional storage at Kellys Knob and major main upgrades through the town
possibly ground storage in the Lakeside area with an elevated tower to provide the necessary pressure

continuous booster pumping.

Relative storage capacities and top water levels are:

<table>
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<tr>
<th>STORAGE</th>
<th>Capacity Megalitres</th>
<th>Top Water Level (m AMD)</th>
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<tr>
<td>Borefield</td>
<td>1.00</td>
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<td>Kellys Knob</td>
<td>2.25</td>
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<td>Lakeside (proposed)</td>
<td>6.30</td>
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**TABLE 4 - WATER SUPPLY STORAGES**

**Impacts of Future Development**

The 1994 planning requires further review as it did not consider the Drovers Rest area. The review will identify headworks funded components that include source development and transfer pumping, storage tanks and distribution mains of 250mm diameter and above.

The Water Corporation proposes to construct the Lakeside Tank and connecting main as soon as possible a site is secured. Further transfer main upgradings will be required along Victoria Highway between Weaber Plain Road and the tank outlet as development in Lakeside-Drovers Rest proceeds.

**Sewerage**

**Kununurra Wastewater Scheme**

The Water Corporation operates the town's wastewater collection, treatment and effluent disposal systems and has provided the following commentary.

**Collection System**

Due to the flat terrain, the collection system is a series of gravity catchments and pump stations. The unsewered portions of town are the Ivanhoe commercial/industrial area adjacent to the town centre and the Redridge industrial estate along Weaber Plain Road. Long term planning makes provision to service both areas.

The Water Corporation are replacing and upgrading an existing pump station in Coolibah Drive during 1997/98. Consideration is also being given to construct an interim pump station and pressure main opposite Bandicoot Drive in Ivanhoe Road to facilitate redevelopment of the proposed commercial/ tourism precinct along Victoria Highway.

**Wastewater Treatment**

Oxidation lagoons provide secondary level treatment to meet Department of Environmental Protection licence conditions on the quality of final effluent. The plant's current capacity is nominally 1850m3/day although proposed changes to design criteria may extend this to 2500m3/day. At the lower loading figure, the plant has capacity to support approximately 6600 people (based on 280 litres/person/day).

**Effluent Disposal**

Treated secondary effluent is currently disposed of into the neighbouring main irrigation channel for dilution and dispersal. The Water Corporation is to engage a consultant in 1997/98 to further review treatment capacities and consider alternate effluent disposal strategies such as crop and tree irrigation.
Impacts of Future Development
The Water Corporation has prepared the wastewater collection strategy to service long-term land use planning. The Lakeside-Drovers Rest area will ultimately require the creation of possibly three additional pump station catchments. Integral to the long-term planning is the preparation of a staging strategy to augment the collection system capacity as required. The current system development strategy for Lakeside is to construct an interim pump station to service the balance of Precinct 3 plus Precincts 4 and 5 (approximately 350 lots). The interim facility will pump to the existing Lakeside pump station, allowing deferment of a new permanent pump station, pressure main and major gravity sewer along Victoria Highway, estimated to cost about $2 million. These new longer term permanent works will provide capacity for the full development of the Lakeside-Drovers Rest area. The new permanent pump station in Lakeside may also take over and phase out the existing Lakeside pump station.

Drainage
Drainage is an important component in subdivision design for Kununurra due to the incidence of tropical downpours associated with cyclones and thunderstorm activity. The SWEK has responsibility for the operation and maintenance of the drainage system. A comprehensive drainage plan has been prepared for Lakeside-Drovers Rest as part of the structure planning for the area.

Electricity
Power Generation
Western Power's Regional Power Division is responsible for the East Kimberley Power System. Western Power purchases power on a priority access basis from Pacific Power's 30MW (MW=megawatt) Ord Hydro Plant which has taken over the power generation function for the East Kimberley. The Ord Hydro plant also supplies the Arygle Diamond project. The existing 10MW diesel fired power station in Kununurra is being retained for at least 12 months to provide standby generation capacity while the Ord Hydro system reliability is proved. The cost and provision of maintaining standby generation in the longer term if the diesel station is to be de-commissioned remains an issue for consideration.

Demand
Western Power's 1997 Five Year Development Plan indicates the current 11MW peak demand of the Kununurra-Wyndham System is expected to increase to 15MW over the next five years.

Transmission
The Kununurra-Wyndham System is connected to the Ord Hydro plant by a private 132kV transmission line that terminates at the terminal substation in Messmate Way adjacent to the diesel power station.

Customer Services Network
From the terminal station, four 22kV feeders distribute power to the Packsaddle and Weaber Plain irrigation areas, the Lakeside residential locality and the fourth feeder stepping up to 33kV to supply Wyndham. A series of 6.6kV feeders distribute power around town, east to Lily Creek and west to the Diversion Dam.
**Impact of Future Development**
Western Power's Regional Power Division reviews demand forecasts annually to prepare the Five Year Development Plan. Demand forecasting is prepared for three planning horizons:

- short term (three years)
- medium term (five years)
- long term (10 years)

The annual review monitors demand and generating capacity and triggers further planning actions if the forecast demand is expected to exceed the system's safe dependable generating capacity within two years.

The Land Development Program will assist Western Power's Regional Power Division in Kununurra in planning the future customer services network to support proposed development.

**Transport Strategies And Programs**

**Kimberley Transport Towards 2020 - The Kimberley Regional Transport Strategy**
Prepared by the Department of Transport for implementation by the Kimberley Development Commission, the strategy was finalised and released in October 1997.
It sets out an integrated transport framework in response to a number of economic, social and transport policy-based influences that aim to maximise future economic development of the Kimberley over the next 25 years.
While the broader transport strategies have minimal impact on land development, the provision of transport related infrastructure and services are a key component in supporting overall growth strategies.
The strategy has reviewed all forms of transport and identified a number of actions related to infrastructure, freight and passenger services. While the Strategy acknowledges that the majority of transport modes are already in place to meet the long term needs, it specifically identifies the climatic impacts of the "wet" season and associated heat and humidity as affecting the two key modes of transport in and out of Kununurra i.e. road and air. Upgrading Victoria Highway to appropriate standard for the national highway that will provide an all weather link both east and west and increasing the length and capacity of the Kununurra Airport runway are actions identified to meet the three objectives of the strategy.
The 1987 Kununurra - Foreshore Study Policy Map indicates a future north-west extension of the runway to the east bank of the Ord River downstream of the Diversion Dam. The supporting text indicates the extended runway will have capacity to handle larger Boeing 737 aircraft.

**Roads 2020 - Kimberley Regional Road Development Strategy**
The final strategy released in October 1997 identifies a number of road development projects in the immediate Kununurra area. It should be noted that the Roads 2020 program is not fully funded and subject to an annual review of priorities given the dynamics of demand generated by emerging needs.
As outlined in the Kimberley Regional Transport Strategy, a recent High Court decision invalidated the State Fuel Levy which formed part of the funding for $1 billion 10 Year Road Program. However, a distribution of the Commonwealth fuel levy has been put in place to assist with the Program.
Main Roads WA released The 1997 Road Program - The Next Ten Years in September which details the anticipated capital works. None of the listed major projects has attracted funding in the 1997 Program. A further $6.2
million has been allocated to the Ord Farm Roads Reconstruction between 1997 and 2000. Other minor projects such as KIM130 maybe funded from other parts of the Program such as direct grants or minor works for safety initiatives.

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Project (Responsibility)</th>
<th>Project Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIM130</td>
<td>Victoria Highway (State)</td>
<td>Construct dust use path</td>
</tr>
<tr>
<td>KIM16</td>
<td>Victoria Highway (National/State)</td>
<td>Widen and seal from Wyndham to VAANT border</td>
</tr>
<tr>
<td>KIM117</td>
<td>Kununurra Bypass (National/State)</td>
<td>Construct a Type 2 formed road</td>
</tr>
<tr>
<td>KIM50</td>
<td>Weaber Plain Road</td>
<td>Construct and &amp; widen to Type 4 sealed road</td>
</tr>
<tr>
<td>KIM50A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KIM51</td>
<td>Weaber Plain to Perry Creek</td>
<td>Depend upon ORIS Stage 2</td>
</tr>
</tbody>
</table>

**TABLE 5 - ROADS 2020 PROJECTS**

For project KIM117 - Kununurra Bypass, an initial section of the bypass may be required in the medium-term to link the Ivanhoe and Weaber Plain Roads to transport sugar cane.

**Public Transport**

There is presently no public transport service other than taxis in the Kununurra area. The Department of Transport advises there are six metered taxis in Kununurra. This compares with 43 in Kalgoorlie-Boulder to serve 30,000 people, 22 in Port Hedland for approximately 15,000 people at present and 14 in the Karratha/Dampier area for 12,000 people.

**Health Services**

The ORIS Population Planning Study, SWEK Shire Directory and KDC Kimberley Economic Perspective provide information on the nature and extent of the health services. In summary, the Kununurra District Hospital is a 26 bed facility and provides a range of medical services supported by visiting specialists from Perth. A range of other services are also available within Kununurra which include community health and dental services.

The ORIS Population Planning Study outlines the current status of health and medical services in Kununurra. The study discusses the need for a potential doubling in hospital capacity over the next 10 years and proposes that staged upgrades be undertaken with the capacity in place prior to the peak construction workforce.

The ORIS Population Planning Study also indicates the anticipated growth may be adequate to support two private general practitioners with the assistance of the Health Department to establish these practices.

More recent commentary from the Kimberley Health Service indicates:

- The Kununurra Hospital is operating in excess of an 80 percent occupancy rate. Additional facilities are likely to be identified as part of a proposed Needs Review of the North West Health Service during 1997/98. The review will identify future service delivery strategies, staff requirements and capital investment for the Gascoyne, Pilbara and Kimberley Regions.
Kununurra's role as the principal settlement in the East Kimberley and its proximity to the Northern Territory are likely to influence the provision of additional services and infrastructure being located in Kununurra. It is unlikely there would be adequate demand generated from any future satellite settlement in the Ord Irrigation Area to justify full medical facilities, given the high cost to establish health services in the region.

The difficulty of attracting general practitioners to the country to service a small population base, particularly where hospitals employ registered doctors is likely to limit the opportunity of establishing a GP practice in the medium-term.

Education Services

Primary AND Secondary Schooling

The Facilities, Policy and Planning Branch of the Education Department of WA (EDWA) prepared a comprehensive internal study in June 1996, titled Kununurra - Student Demography and Strategies for the Future Delivery of Education. The study, prepared in response to the anticipated ORIS Stage 2 demand includes details of current school capacities and strategies to accommodate growth.

Kununurra's schooling is currently centred on or adjacent to a 15ha site to the north of the town centre. The site incorporates the full education spectrum from TAFE, secondary, primary through to pre-primary. St Joseph's Catholic Primary School is located on an adjacent site in Coolibah Drive to the west.

The ORIS Population Planning Study, SWEK Shire Directory and Kimberley Development Commission's Kimberley Economic Perspective provide information on the nature and extent of the education services available, noting that due to low retention rates, the Kununurra District High School is able to offer only limited subjects through a "mixed mode" of learning which includes some correspondence lessons.

Table 6 provides details of capacities of permanent facilities and enrolments for 1997.

<table>
<thead>
<tr>
<th>Schools</th>
<th>Permanent Capacity</th>
<th>1997 Enrolments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kununurra DHS</td>
<td>220</td>
<td>182</td>
</tr>
<tr>
<td>Kununurra PS</td>
<td>520</td>
<td>453</td>
</tr>
<tr>
<td>Kununurra PPS</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>St Joseph's Catholic PS</td>
<td></td>
<td>198</td>
</tr>
<tr>
<td>St Joseph's Catholic PPS</td>
<td></td>
<td>35</td>
</tr>
</tbody>
</table>

EDWA monitors enrolment levels through a February and August census of all schools statewide including private schools. The pre-primary enrolment figures in Table 6 are combined four and five year olds. The pre-primary capacity is dependent upon the number of part-time four year olds and full-time five year olds.

Impact of Future Development

The Facilities Policy and Planning Branch has prepared enrolment projections for the State School System based on preliminary ORIS Stage 2 employment estimates. The projections have been deferred by two years to be consistent with the amended timing for ORIS Stage 2. EDWA has made a further 20 percent provision for the consequential workforce resulting from ORIS Stage 2.
The Future Delivery of Education report discusses a range of scenarios to accommodate the anticipated demand through to 2007. These include:

- Continuing with the current arrangements of a single State facility with the addition of six temporary classrooms, five primary and one pre-primary.
- Construct a new primary school at Lakeside. Indications are this would be viable from the year 2000 but would not become a high priority before 2005.
- Upgrading the Kununurra District High School to senior high school status. Even with the anticipated growth from ORIS Stage 2, historic reductions in enrolment levels between Year 7 to 8 and further reductions in retention rates from Year 10 to 11 are unlikely to provide the student numbers to form the minimum five classes (three in Year 11 and two for Year 12) to offer a basic upper school curriculum.

EDWA has no current plans to develop any new facility unless growth rates exceed projections or stakeholder consensus and ministerial support for change in the service delivery strategy dictate the requirement for new initiatives by 1998/99.

Other Services

The LDP has not examined other State government human services not represented on the Infrastructure Coordinating Committee of the Western Australian Planning Commission. The LDP will be made available to relevant agencies such as Homeswest, WA Police Service and Family and Children's Services as an indication of anticipated development activity.

<table>
<thead>
<tr>
<th>Program Compilation By The Ministry For Planning</th>
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<tbody>
<tr>
<td>Stewart Darby Data Collection, Analysis and Report</td>
</tr>
</tbody>
</table>
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