



LANCELIN WATER RESERVE WATER SOURCE PROTECTION PLAN

Lancelin Town Water Supply



WATER RESOURCE PROTECTION SERIES

WATER AND RIVERS COMMISSION REPORT WRP 4 1997



WATER AND RIVERS
COMMISSION

Lancelin Water Reserve
Water Source Protection Plan
Lancelin Town Water Supply

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Water and Rivers Commission
Policy and Planning Division

WATER AND RIVERS COMMISSION
WATER RESOURCE PROTECTION SERIES
REPORT NO WRP 4 1997



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Reference Details

The recommended reference for this publication is:

Taylor R (1997), *Lancelin Water Reserve Water Source Protection Plan*, Water and Rivers Commission, Water Resource Protection Series No. WRP 4.

ISBN: 0-7309-7326-3
ISSN: 1326-7442



Executive Summary

About the Water Reserve

Lancelin is a fishing and holiday centre located about 127 kilometres north of Perth in the Shire of Gingin. Water is supplied to the town by the Water Corporation from bores in the unconfined superficial formations.

The source has the potential to be contaminated from fuel spills from recreational users of the dunes within the Water Reserve, fuel storage at bore 1/81 and from residential and industrial subdivisions along the western portion of the reserve.

A Priority 1 source protection area should be declared over the dune and coastal scrub system upgradient of the wellfield which is the key recharge area for the superficial aquifer in this region.

About Water Source Protection Plans

Water Source Protection Plans establish the level of protection required within Water Reserves. The plans identify sources of contamination that should be investigated and set out programs for management of the resource.

The quality of water sources in country Western Australia is protected by proclaiming Water Reserves under the Country Areas Water Supply Act (1947). The Act's by-laws enable the Water and Rivers Commission to control potentially polluting activities, to regulate land use, inspect premises and to take steps to prevent or clean up pollution.

The Water and Rivers Commission aims to work proactively with planning agencies to incorporate water protection in the land planning process. Decisions on land use zoning and subdivision applications have a significant impact on the protection of water sources. The Commission supports the amendment of Town Planning Schemes and Development Strategies that reflect land use compatible with Water Source Protection Plans.

This Water Source Protection Plan provides a basis for establishing compatible land uses within the Water Reserve at Lancelin and is a mechanism for practical implementation of the Commission's protection strategies. Local government decision makers, State planning authorities and operational staff are encouraged to recognise this document as a basis for ensuring the long term protection of this groundwater resource for generations to come.



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1. Introduction

Lancelin is a fishing and holiday centre located 127 kilometres north of Perth. (see **Figure 1**). The town water supply is supplied from groundwater pumped from a Water Corporation wellfield. The wellfield that supplies Lancelin is located to the east of the town and consists of five production bores (2/65, 3/65, 1/74, 1/81 and 3/81) and two monitoring bores (2/81 and 4a/81). The monitoring bore, 4a/81, is positioned to intersect the salt water interface. Water is drawn from superficial formations making it vulnerable to contamination from inappropriate land uses.

The climate of the region is described as Mediterranean with hot, dry summers and mild, wet winters. The long term average rainfall for Lancelin is 652 millimetres. Most rainfall is recorded during the winter months, from May through to October.

2. Hydrogeology

Lancelin is located within the central part of the Perth Basin within the Dandaragan Trough. There are three main aquifers at Lancelin including the superficial aquifer consisting of Tamala Limestone and Safety Bay Sand. This aquifer overlies the older Leederville and Yarragadee Formations. The Lancelin town water supply is drawn from the superficial formations.

The saturated thickness of the superficial formations in the Lancelin area is about 25 metres. The regional direction of groundwater flow is south-westerly, with groundwater discharging over a salt wedge to the

ocean. The depth to the water table in the Lancelin area ranges from 2.5 to 6 metres below ground level.

3. Land Use - Existing and Proposed

The Lancelin wellfield is located to the north east of the town on the margins of an area of unvegetated, mobile unconsolidated dunes. Most of the production bores are located on exposed limestone that supports poor coastal native vegetation. An example of a bore (1/74) and the surrounding dune system is shown in **Plate 1**.

This land is covered by mobile dune systems which are unsuitable for the construction of major infrastructure.

A four wheel drive recreation area exists over most of the proposed Water Reserve which is used by dune buggies and other four wheel drive vehicles.

An industrial subdivision has been established along the south-western boundary of the Water Reserve. The industrial subdivision is unsewered and has been mostly developed. Activities include a concrete batching plant, fuel depot, mechanical servicing facility, houses and storage sheds.

DOLA have recently released some residential land along the western portion of the Water Reserve. Only a couple of these lots have been developed. The subdivision is sewerred.



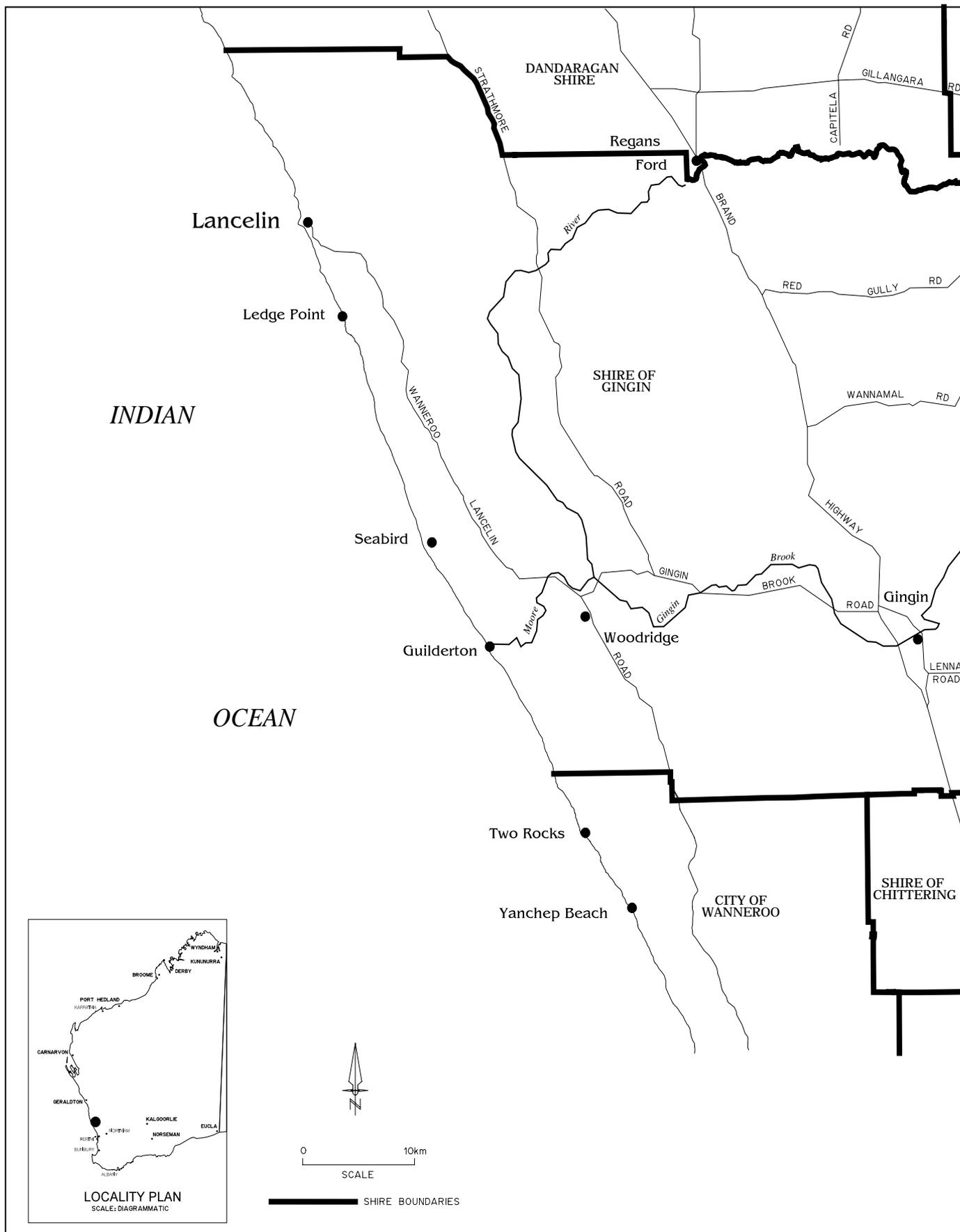


FIGURE 1. LANCELIN LOCALITY MAP





Plate 1: Bore 1/74 and surrounding dune system

4. Potential for Contamination

Quantities of building rubble, soil and rock have been dumped on the margin of the mobile dunes on the eastern edge of the wellfield. This dumping does not constitute a contaminant source although it may set a precedent for the dumping of waste which could cause contamination. There is evidence of the dumping of garden waste in the vicinity of the rubble which reinforces the need for adequate signage.

There is evidence of a heavy vehicle having been serviced in the northern part of the wellfield (dumping of engine oil) as shown in **Plate 2**. This demonstrates the need to provide visual identification of the Water Reserve boundaries and of the need to restrict these types of activities.

A subdivision has been completed to the west of the wellfield, consisting of 79 residential and some industrial lots. The subdivision is sewerred, and some lots are currently being developed. Further subdivision is likely to occur to the north of the existing subdivision. The subdivision is likely to be outside the immediate capture zones of the individual wells.

Bore 1/81 has a back-up diesel operated pump located approximately 4 metres from the wellhead, as shown in **Plate 3**. The storage capacity of the fuel storage drum is about 60 litres and is currently unbunded.





Plate 2: Evidence of heavy vehicle servicing



Plate 3: Fuel storage near bore 1/81



A mining lease (M70/692) exists over most of the proposed Water Reserve. The mine is currently operated by Westdeen Holdings and produces lime sand for use in the surrounding agricultural area. The mining operation is shown in **Plate 4** and involves filling trucks with a front-end loader and operates from approximately February to May each year. There is no fuel storage on site, with the front-end loader refuelling at a local depot. No vehicle servicing occurs on-site. It is intended to concentrate mining activities on to lease M70/250 towards the south of the proposed Water Reserve.

A four wheel drive recreation area exists over most of the proposed Water Reserve which is used by dune buggies and other four wheel drive vehicles. This activity is incompatible with the management objectives for Priority 1 areas as there is a significant risk of a fuel spill or servicing of vehicles in the area.

Midway fuel supplies operates a fuel depot in King Street (Corner of Kendall Road) as shown in **Plate 5**. The facility has a 35,000 litre bulk diesel tank which is currently banded. The site also has two underground storage tanks including a 20,000 litre tank containing unleaded petrol and a leaded petrol tank which is no longer used.

A mechanical servicing facility operates in Mullins Way as shown in **Plate 6**. The facility would produce potential contaminants such as oils, coolants, lubricants, solvents and old vehicle parts.

Potentially contaminating activities from the general industrial storage sites include unbanded above ground fuel storage (see **Plate 7**), car body storage and servicing, drums and other storage.

A map of potential contaminant threats is included as **Figure 2**.



Plate 4: Lime sand mining in Lancelin dunes

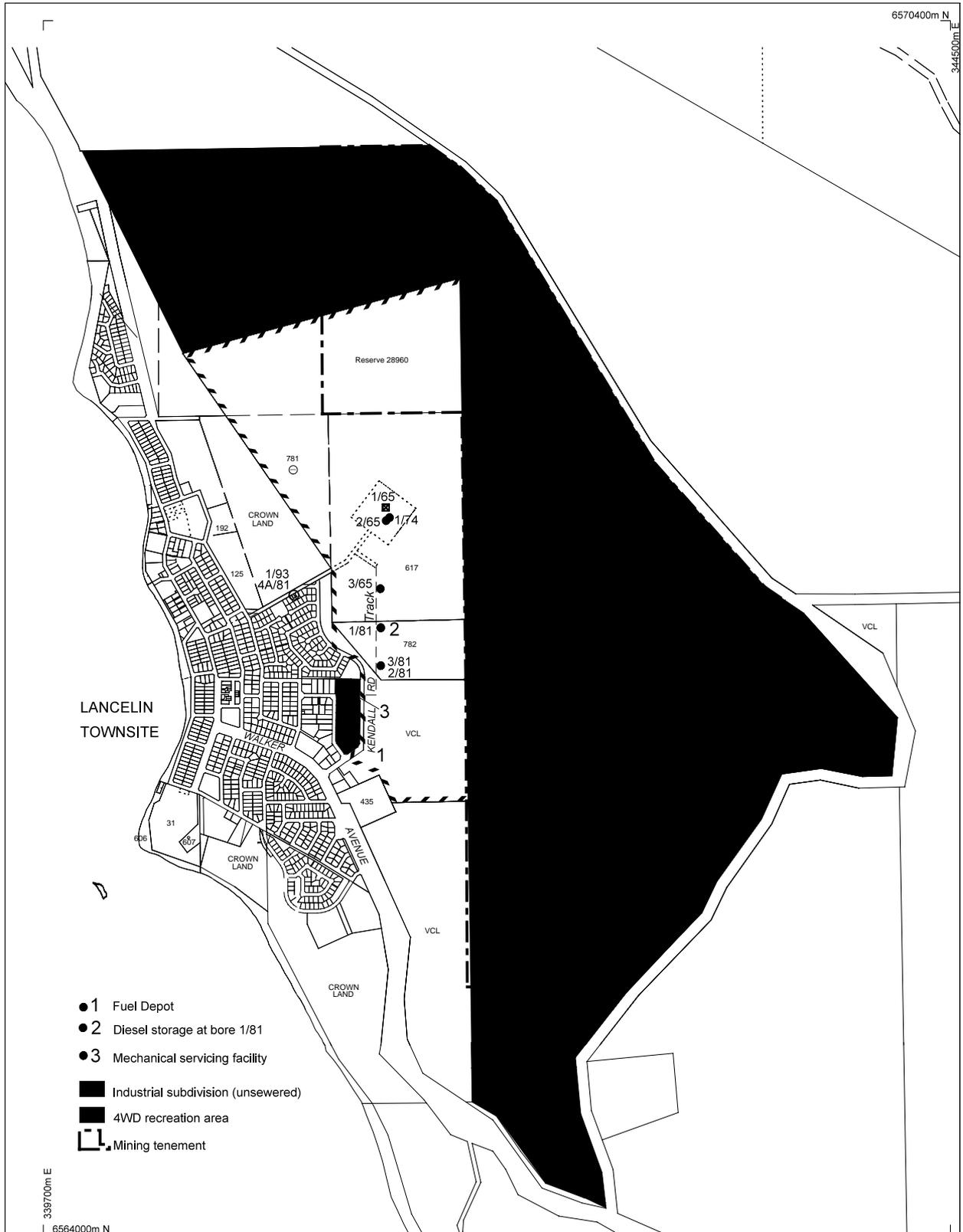




Plate 5: Bulk fuel depot



Plate 6: Mechanical servicing facility



- 1 Fuel Depot
- 2 Diesel storage at bore 1/81
- 3 Mechanical servicing facility
- Industrial subdivision (unsewered)
- 4WD recreation area
- Mining tenement

339700m E
6564000m N

100 0 200 400 600
Metres



- LEGEND:**
- Production Wells
 - Observation Wells
 - ⊠ Abandoned Wells
 - ▨ Water Reserve Boundary



INDEX TO ADJOINING 1:100000 MAPS	
1936	2036
1935	2035
	2034

**FIGURE 2.
POTENTIAL CONTAMINANT SOURCES
WITHIN LANCELIN WATER RESERVE**

Drawn by N.J.A Date 07/01/97



Policy and Planning Division
Public Water Source Protection Section



5. Proposed Proclaimed Areas

The proposed Lancelin Water Reserve includes the mobile dune systems and the outcropping Tamala Limestone upgradient of the wellfield. The northern boundary follows the boundary of Reserve 28960, extending as a prolongation until it intersects an unnamed road. The western boundary follows Reserve 28960 and then extends southward till it intersects Kendall Road. The boundary follows Kendall Road and then extends across to the eastern boundary of lot 435. The southern boundary comprises a prolongation from the intersection of lot 435 and vacant crown land across to an unnamed road. The eastern boundary follows an unnamed road. (see **Figure 3**).

The industrial/residential subdivisions have been deliberately excluded from the Water Reserve following discussions with the Water Corporation (Miotti, pers. comm. 20/3/97).

The Water Reserve at Lancelin should be classified as a Priority 1 source protection area. This classification is based on the following criteria:

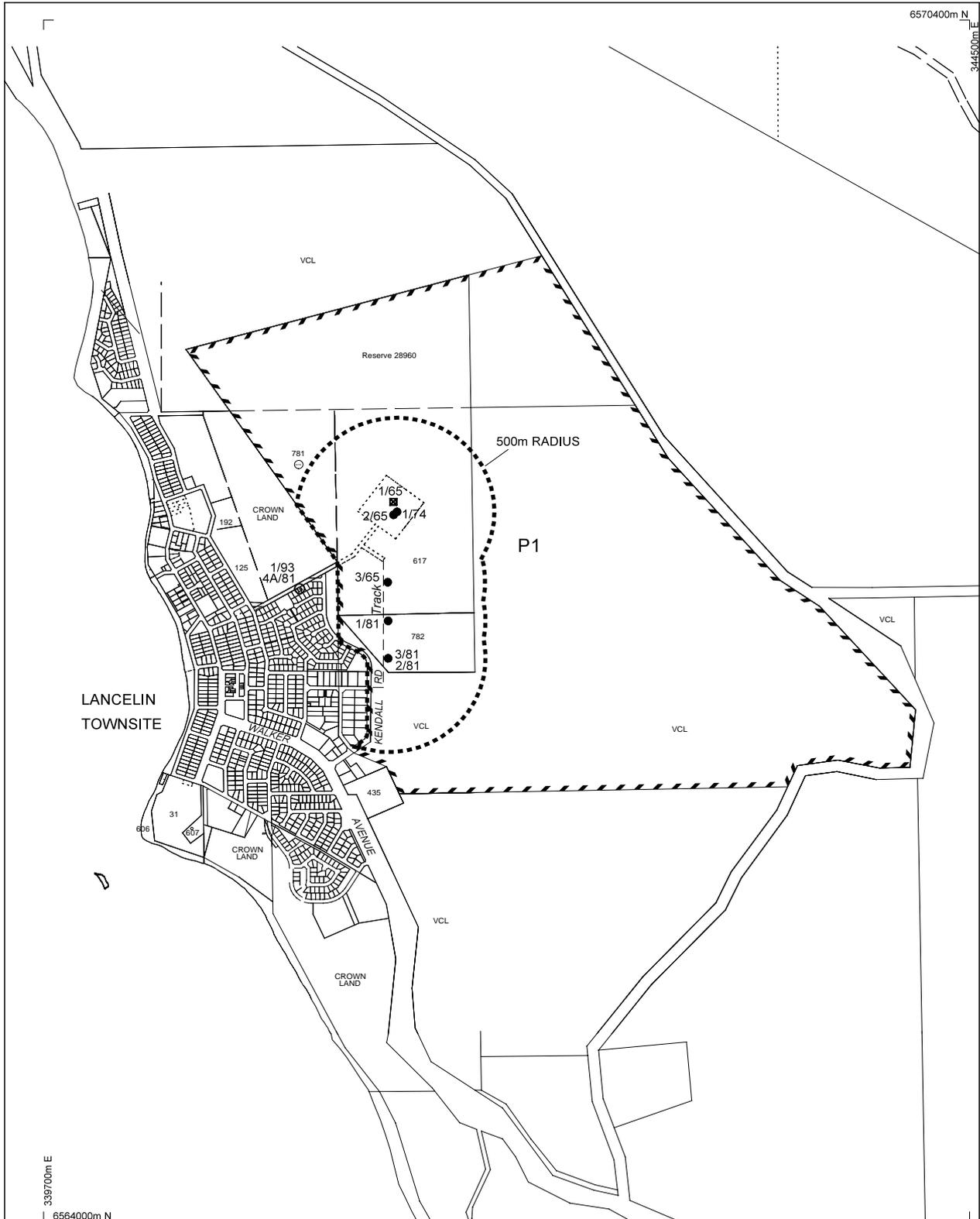
- the area is primarily Crown Land or other reserves;
- the wellfield forms a critical water source for the town of Lancelin;
- the area forms a key recharge zone for the wellfield;
- the transmissive limestone soils in the area and shallow depth to groundwater are such that more intensive development would lead to degradation of the groundwater quality.

A wellhead protection zone should be proclaimed consisting of a 500 metre radius around each bore, truncating on the western boundary of the proposed Water Reserve.



Plate 7: Unbundled above-ground fuel storage





100 0 200 400 600
Metres



- LEGEND:**
- Production Wells
 - Observation Wells
 - ⊠ Abandoned Wells
 - ▨ Water Reserve Boundary
 - ⋯ Wellhead Protection Zone



INDEX TO ADJOINING 1:100000 MAPS	
1936	2036
1935	2035
	2034

FIGURE 3.
LANCELIN WATER RESERVE

Drawn by	N.J.A	Date	07/01/97
Policy and Planning Division Public Water Source Protection Section			



Recommendations

1. The proposed Lancelin Water Reserve should be gazetted under the Country Areas Water Supply Act 1947.
2. Planning Strategies should incorporate the management principles outlined in the Water and Rivers Commission's *Acceptability of Land Use Within Public Drinking Water Source Areas* (see Appendix 1) and reflect the Priority 1 classification given to the water reserve.
3. All development proposals within the Water Reserve which are likely to impact on water quality should be referred to the Water and Rivers Commission.
4. Signs should be erected along the boundaries of the Water Reserve to define the reserve and promote public awareness of the need to protect water quality.
5. A process should be put in place to address any spillage of pollutants within the Water Reserve.
6. A surveillance program should be established to identify any incompatible land uses or potential contaminant threats within the Water Reserve.
7. The Water Corporation should construct a bund for fuel storage or consider electrification or abandonment of the diesel-operated pump near bore 1/81.
8. Implementation of these recommendations should be reviewed one year after this plan is endorsed. A full review of this protection plan should be undertaken approximately every five years.



Implementation Strategy

No.	Description	Implemented by	Timing
1	Gazettal of reserve.	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) 	1997/98
2	Incorporation into land planning strategies.	<ul style="list-style-type: none"> Shire of Gingin 	On-going
3	Referral of development proposals: <ul style="list-style-type: none"> Provide Shire of Gingin with guidelines for referral of development proposals. Referral of development proposals. 	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) Shire of Gingin, Ministry for Planning, Department of Environmental Protection 	1997/98 On-going
4	Erection of signs: <ul style="list-style-type: none"> Development guidelines for signage. Determine location and quantity of signs. Erect signs. 	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) Regional Manager, Midwest -Avon Region (WRC) Regional Manager, Midwest-Avon Region (WRC) 	1997/98 1997/98 1998/99
5	Emergency response procedures: <ul style="list-style-type: none"> Develop response plan. Inform WAHMEMS personnel of special requirements for water reserves. 	<ul style="list-style-type: none"> Project Manager, Regional Support Branch (WRC) Project Manager, Regional Support Branch (WRC) 	1997/98 1997/98
6	Surveillance: <ul style="list-style-type: none"> Develop guidelines for surveillance of water reserves. Implement surveillance program. 	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) Regional Manager, Midwest-Avon Region (WRC) 	1997/98 On completion of surveillance plan
7	Fuel storage near well 1/81	<ul style="list-style-type: none"> Water Corporation 	As defined in Borefield Management Plan
8	Review of this plan and recommendations.	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) 	Initial review 1998/99 Full review 2002/03



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Appendix 1- Acceptability of Land Uses Within Public Drinking Water Source Areas

