

# **Agricultural Study**

**Healesville – Koo Wee Rup Road**

**Pakenham Bypass to South Gippsland Highway**

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## Executive Summary

- The purpose of the study is to provide an evaluation of the impacts on agricultural activities in the area of the Healesville-Koo Wee Rup Road between the Pakenham Bypass and the South Gippsland Highway if upgrading of the road took place. The study includes:
  - The existing road reservation for Healesville-Koo Wee Rup Road between the Pakenham Bypass and McDonalds Drain, and a 100m wide strip along each side of the reservation boundary.
  - The area bounded by McDonalds Drain (Bunyip River), South Gippsland Highway and Sybella Avenue plus a 100m wide strip along the north-west edge of McDonalds Drain (Bunyip River).

- The study area is approximately 990 hectares incorporating livestock, grazing and vegetable growing as the main agricultural production industries.

A major abattoir, livestock marketing facility, and fertiliser and lime depot also operate within the area. These businesses service the agricultural industries beyond the study area attracting customers and servicing clients on a regular basis for up to a 200 kilometre radius.

There are 16 rural residential properties, these have not been included in this study.

- Pasture productivity is critical to productive land use. For the perennial pasture species suited to and growing in the district these can be potentially well stocked, and have late spring fodder surpluses conserved as silage and hay. In this study area pastures generally show visual evidence of under grazing on most properties resulting in the introduction of less productive species. An exception is the pasture production on the dairy farm where a combination of pasture renovation to sow new species, high fertiliser use, and irrigation has resulted in higher productivity.
- Vegetable production in the district is a major industry with particular emphasis on Asparagus, Broccoli, Celery, Cabbage, and Potato crops. Vegetable cropping and packaging provide a key source of employment on the horticultural properties in the study area. Within the farming area the productive vegetable enterprises are linked to the most suitable soil type (Class 2).
- Water supply for irrigation on the vegetable growing enterprises in the study area is provided from on farm storages. There is no direct reliance on roadside catchment as occurs in vegetable production elsewhere in the district. Water supply for stock and domestic use is from mains water or bores and will not be impacted upon by an upgrading of the Healesville-Koo Wee Rup Road.
- It is estimated that there is potentially 20 hectares of good quality land suitable for vegetable production in the area between Ballarto Road and McKays Road that could be removed in the proposed upgrade. Very little of this land is currently being used for vegetable growing, most is being used for rural residential living, or grazing
- There is an area of saline (salt affected) land on the west side of McDonalds Drain near the South Gippsland Highway that would almost certainly become a larger problem if the proposed upgrade passed through this point, potentially affecting adjacent grazing land and reducing pasture production.
- It is suggested that a final review of the favoured option(s) be carried out once identified.

**Agricultural Objective:**

*To minimise impacts on high quality agricultural land, agricultural productivity and the viability of agricultural properties.*

**Background:**

VicRoads has engaged a range of consultants to provide specialists reports to assist in the preparation of the planning study for the Healesville-Koo Wee Rup Road. This report contains an agricultural overview of the study area.

The study area is approximately 990 hectares. It extends from the Pakenham Bypass south of Pakenham to the South Gippsland Highway, south of Koo Wee Rup (see Appendix 1).

The area has been closely evaluated, and information collected on the enterprises to determine the implications of options on their operations

The study included the following key issues:

- Land area/soil type taken up within the proposed road boundary.
- Type of agricultural infrastructure potentially affected by the route and its implications for the productivity on the land.
- Estimated impact on production from the district, from individual properties and potential impact on employment.
- Impact of land severance on land use, management.
- Impact on water supply and irrigation.

The people contacted were identified as the most likely to be able to provide sound data for the study.

Their knowledge, interest, and support was excellent and ensured that the data collected was both accurate and up to date. (See Appendix 2).

**Study Area:**

The study area is relatively small however the range of enterprises is varied.

- Fresh vegetable production and packaging
- Livestock grazing – Dairying and Beef production
- Dairy heifer calf raising
- Livestock Marketing – Saleyards
- Abattoirs
- Fertiliser and Lime distribution
- Poultry Farm
- Equine Agistment
- Rural residential living

In some cases these businesses have homes on site for their owners, staff and family members.

There are 16 properties considered rural-residential that present lifestyle opportunity but have no commercial agricultural or related activity.

Historically the area was dairying and market garden land. Evidence of the past importance of the dairy industry remains with old milking sheds still present in the area. As recently as 1975 there was 293 dairy farms in the old Cranbourne Shire with many in the district surrounding the study area supplying fresh milk to Melbourne residents.

Vegetable production has also been a major industry in the district. The crops grown in the study area are supplied to fresh produce markets in Victoria and interstate, some of the produce (asparagus) is exported.

Land values have been consistently high since the dairy industry concluded in the district. The grazing land easily converted to beef cattle production at moderate stocking rates, and these livestock are now sold through the Pakenham Livestock Exchange, or direct to abattoirs.

The most desirable soils for vegetable production are in the west side of this study area. In other areas the soil types are prone to waterlogging and less suitable to regular cropping.

## **Local Agricultural Environment Features.**

Key features in the district that make this an important agricultural area are:

- **Physiography**

The general area consists of two mountain systems, the Great Dividing Range in the north, ie commencing at the northern edge of Pakenham township, and the Strzelecki's (South Gippsland Hills) in the south, ie just south of Lang Lang. These are separated by an east-west trough, known as the Great Valley of Victoria.

Within this wide lowland along the study area there are low lying undulating hills, eg along Greenhills Road, reclaimed peaty and semi-peat swamp soils, and areas of former sand dunes remaining after the seawater receded, eg along Soldiers Road.

An area of approximately three hectares of saline (salt affected) land is on the west side of McDonalds Drain (Main Drain) near the South Gippsland Highway. Some surface drains have been installed to help the surface water to drain from this area. If the proposed upgrade were constructed through this point it would be expected that following construction of road foundations the area of land affected by the salt could extend further west and north-west. This could potentially reduce pasture productivity unless adequate drainage is installed with the road construction.

- **Land Classification**

### **Assessment of Land Quality**

Within the region assessment of land quality has been based on inherent land and climatic characteristics which are considered in terms of their effect on versatility and inherent productivity for agricultural use.

The assessment is time stable unless there are major social, economic or technological changes. Highly rated areas will maintain an advantage over lower rated areas. Any good or naturally fertile soils with low to moderate slopes and a reliable and suitable climate will remain more capable of agriculture than areas less supported with these attributes.

### **Definition of Agricultural Quality Classes**

An assessment of the agricultural land within the study area has been carried out according to land classes shown in Table 1. This data has been taken from the Department of Agriculture Assessment of Agricultural Quality in Gippsland Report 1984, by I. R. Swan and A.G. Volum.

The majority of the land in the study area is classified Class 3. The Class 3 land takes in the lower loamy clay-loam and clay soils.

There is a section of Class 2 land within the study area on the west side of the Healesville-Koo Wee Rup Road near Soldiers Road and extending towards Ballarto Road. Near Ballarto Road this tongue of land then extends to the east and takes in the study area on both sides of the Healesville-Koo Wee Rup Road south to Railway Road. (See Appendix 3).

Class 2 Land (in this case an area of organic soil locally referred to as peat soil) is highly versatile but has a lower level of inherent productivity than Class 1. It is capable of the majority of land uses but requires greater inputs than Class 1.

**Table 1. Definition of Agricultural Quality Classes**

Class	General Characteristics
1	Class 1 land is the most versatile with the highest inherent productivity. It is capable of the majority of agricultural uses or is very highly productive pasture under flood irrigation. The growing season is 12 months or 11 months with readily utilised underground water.
2	Class 2 land is highly versatile but has a lower level of inherent productivity than Class 1. It is capable of the majority of agricultural uses but requires greater inputs than Class 1 land to achieve high production. The growing season is at least 11 months or 10 months with readily utilised underground water.
3	Class 3 land generally is of limited versatility but is very good dairying and grazing land. It is sometimes suitable for orchards and extensive area cropping but not suitable for intensive uses such as vegetable growing. Sub-class 3a is suitable for more intensive uses providing particular care is taken to prevent soil erosion, or supplementary irrigation overcomes moisture limitations in the summer. The growing season is at least 10 months or 9 months with readily utilised underground water.
4	Class 4 land is capable of extensive grazing but is generally unsuitable for cropping. Sub-class 4a land is suitable for intensive market gardening but supplementary irrigation, high levels of fertiliser and erosion prevention measures are necessary. The growing season is at least 9 months or 8 months with readily utilised underground water.
5	Class 5 land is marginal agricultural land either because of steep slopes and thin skeletal soils, very steep slopes or growing season less than 9 months.
6	Class 6 land is non- agricultural land because it is unavailable for agriculture.

#### • Soil Types

The Class 3 land here is derived from granite to the north that has been weathered over time and flowed out across the plains. There is little coarse material; most is fine loam and clay. Nutrient status is low due to the weathering and the soils are strongly acidic. The sub-soils are deep clays with poor structure. In summer they dry out and crack open. In winter they become very weak, their lack of structure makes them unsuitable for cultivation and hence cropping.

The Class 2 land in this study area is referred to as peat. True peat soils have a minimum of 20% organic matter but these soils in this area commonly have only 10-15%. In their original state they had an organic matter level well in excess of 20%, but tree and related landclearing, drainage and regular cultivation have reduced the organic matter content in these soils.

The surface soils are normally a very dark clay loam with a strong crumb structure, which overlies mottled heavy clays. Soils are strongly acidic throughout but generally have high levels of available phosphorus and potassium. Water holding capacity is high and soil

structure reforms well if cultivation damage occurs. One of the problems with these organic soils is that once dry, they repel moisture strongly and are difficult to re-wet. The strong structure, high fertility and high water-holding capacity make them well suited to vegetable cropping enterprises.



## Climate

### ▪ Rainfall

Average rainfall is 853mm per year, see Table 2 for details. December - April are usually the driest months. In most years rainfall is lowest and evaporation highest during these months and therefore limits plant growth. Long term data shows an average 159 rain days during the year.

Rainfall during the months May-November is the most effective for pasture and horticultural crop growth at that time. Because of the irrigation systems operating within the horticultural enterprises, rainfall and related soil infiltration directly to the plant root zone is a relatively minor source of moisture, however it is an important issue related to on farm water catchments and water storage. There is no irrigation of pasture for grazing stock within the study area, except on the dairy farm..

The 'autumn break' generally occurs in April (early break late March-late break can occur up to June). August to early October is on average the wettest period during the year however in combination with the increasing daily temperatures and longer daylight hours plant growth rates are high during the period September/October.

**Table 2. Temperature and Rainfall Data.**

	Mean Daily Temperature		Mean Rainfall	
	Max	Min	mm	Rain days
January	26.0	11.8	41.5	7.6
February	25.3	12.1	57.1	8.2
March	23.9	10.8	53.5	8.6
April	20.0	8.1	72.3	12.6
May	16.1	6.0	88.7	16.3
June	13.8	4.2	67.1	15.5
July	13.1	3.8	77.9	17.5
August	14.2	4.4	85.1	17.3
September	16.2	5.6	86.1	15.5
October	18.4	7.3	84.8	15.8
November	20.3	8.3	75.8	13.7
December	23.0	10.1	63.4	11.4

The above data is based on the weather station at Tooradin just west of the study area (Commonwealth Bureau of Meteorology records since 1947).

### ▪ Temperature:

Summer temperatures (see Table 2) range from a monthly average of 23-26°C maximum and 10 - 12°C minimum. There are fluctuations in summer temperatures up to approximately 40°C on 5-8 occasions during the period January-February.

Winter temperatures range from a monthly maximum 13-14°C to a minimum 3-4°C. Most of the agricultural area experiences frosts.

Soil temperatures reach low enough levels to retard pasture growth, ie less than 7°C from early June to late July, and low enough to limit nitrification from late May to mid September, (ie less than 10°C). Nitrification is the important process whereby legumes (clovers, lucerne

etc) convert atmospheric nitrogen into a form which plants can use – it therefore has high importance to the grazing industries and little relevance in vegetable enterprises.

Wind also has an influence on plant production, in particular hot north and north-westerly winds which have a damaging effect on plants through drying out or removing soil moisture. Westerly, south-westerly and easterly winds can damage vegetable crops by buffeting plants.

#### ▪ Frosts

Occurrence of frosts depends very much on local conditions such as topography and vegetation. Thus any data on frosts should be interpreted carefully. Sloping sites are generally less subject to frosts than valleys or depressions, and the differences between two nearby sites can be substantial. The study area is flat to very slightly undulating, the area is unfortunately prone to frosts.

When the temperature is between 0.0° and 2.2° conditions are equivalent to a light frost. Using mean daily temperatures as a basis, the probable number of frost per month is shown in Table 3. The likelihood of frosts is especially important when considering crops that are frost sensitive. Some crops cannot tolerate frosts at all, whereas other crops can be severely damaged if frost occurs while they are actively growing.

**Table 3 Probable number of frosts per month**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Heavy</b>	-	-	-	-	3	6	5	4	2	1	-	-
<b>Light</b>	-	-	-	3	7	9	10	7	5	3	2	-

(Commonwealth Bureau of Meteorology records)

#### ▪ Sunlight hours

Sunlight is important in agriculture because it provides the necessary energy for plant growth. Sunlight starts photosynthesis, which is the process in plants for chlorophyll to produce sugars and starch from carbon dioxide in the air and water. The more sunlight hours per day, provided adequate water, warmth and nutrients are available the more plants will grow. This is particularly important in horticultural crops and pastures. The mean hours of sunlight per day for each month are shown in Table 4.

**Table 4 Mean hours of sunlight per day**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
8.0	8.2	6.7	5.2	3.5	3.4	3.8	4.9	5.4	6.4	7.2	7.5

(Commonwealth Bureau of Meteorology records)

## **Water Resources**

The following sources of water are utilised within the study area:

- Stock and domestic bores.
- Town/mains water supply.
- Drains along roadsides, farm dams.
- South East Water Limited.
- Test Bore.

### **Stock and domestic bores**

Stock and domestic bores are generally low level bores frequently 12-25m deep that are supplementing a water supply on a small scale and only suitable for grazing properties. There is little restriction on their use, and it is known that these are not to be established as a commercial irrigation water source. There are approximately 24 bores under this classification servicing properties in the study area.

There are no known deep irrigation bores in the study area. No new licences are being released, however people have been allowed to transfer a bore licence to another location either within or between local landholdings. Frequently 5-8 bores may be put down before a suitable water source can be found. Moving only a short distance, ie 5 metres when drilling a bore can influence water availability.

### **Town/Mains Water Supply.**

There is a water main on the east side of Healesville-Koo Wee Rup Road, from near Ballarto road to Koo Wee Rup. Properties along this section draw water from this pipeline. The water supply is used on most animal/vegetable packing enterprises as well as rural residential properties.

In relation to vegetable production this high quality water source is essential for the disease free 'clean green' nature of the products, particularly for preparation, during trimming, packing etc.

This is probably the most expensive water source in the study area and a key factor limiting its further use.

Catchment from shed and house roofs etc, where collected is mainly used for human consumption.

### **Drains, Creeks and Dams**

Within this study area the drains, creeks and dams are not a major source of water for agricultural use. This is mainly because of the lack of reliable flows, summer dryness, including evaporation.

Two landholders draw water from the large drain on the west side of the Healesville-Koo Wee Rup Road south of Ballarto Road. This water is pumped "off-season", ie in the winter-spring to fill farm storage dams.

In the case of livestock, supply of water via a poly pipe-water trough system removes animal health disease risks associated with failing stock dams.

**South East Water Limited**

Within the study area there are two town sewerage treatment plants, ie Pakenham treatment plant near the Freeway Bypass, and Koo Wee Rup treatment plant on Sybella Avenue near the South Gippsland Highway intersection.

Recycled water from the Pakenham plant is used to irrigate pastures on the dairy farm on the south-east corner of Greenhills Road. This includes all of the pasture paddocks along the Healesville-Koo Wee Rup Road on this property. Irrigation generally takes place from November to April. There is a further 6 properties 2-3km to the East of the study area that utilise recycled water from this plant

The recycled water from the Koo Wee Rup treatment plant has been used to irrigate the Eucalypt Plantation adjacent to Sybella Avenue. The volume of recycled water from the Koo Wee Rup treatment plant is increasing and South East Water Limited are taking steps to pipe water to additional properties south-east of the plantation onto farmland currently under dairy production and grazing. It's aim is to extend pipelines to properties within a kilometre on either side of the South Gippsland Highway.

**Test Bore**

South of the junction of Soldiers Road and Healesville-Koo Wee Rup Road (located within the road easement near the bend in Soldiers Road) there is a test bore that is monitored to evaluate changes in the ground water depth, as well as water quality. The work is done by Southern Rural Water. This reference point may need to be protected, or relocated if it lies in the path of any future road works.

## **Agricultural Production in the Study Area**

### **Beef Cattle**

Beef cattle are the most common livestock enterprise on the farmland. These are comprised of breeding cows and calves and steer production. Stocking rates are generally in the low to moderate range.

Pastures consist of ryegrass, foggrass, and cocksfoot, in places phalaris grass (mainly growing in the southern end of the study area). White clover, strawberry clover, various broadleaf weeds, capeweed and dock are common in pastures. On some properties there is evidence of strong infestations of thistles.

The estimated annual pasture production is 6000-6500 kilograms of drymatter per hectare per year. There is evidence that pasture hay is conserved on some properties in late spring – early summer and either sold off the property or fed back to livestock in late autumn and winter.

Most cattle are purchased and sold through the nearby Pakenham Livestock Exchange or directly to abattoirs.

Vehicle movements per property may be 3-8 trucks movements per year for cattle and 2-8 per year for other activities, ie pasture topdressing or fodder conservation.

Employment – Approximately 12 part time or full time people.

### **Dairy Cattle**

There is one dairy farm in the study area (south-east corner of Greenhills Road). This property has irrigated pastures. The water is recycled water from the South East Water Limited, Pakenham treatment plant. The irrigated pastures on this farm produce approximately 12,000-14,500 kilograms of drymatter per hectare per year, and due to the irrigation growth would occur during every month of the year.

There is one property near Hall Road *grazing dairy heifer replacements on agistment*. This land is moderately productive.

Employment is approximately 4 full or part time people. Vehicle movements 2-3 truck movements per day, and 2-4 cars/utes

### **Pakenham Livestock Exchange**

This complex is a major livestock selling facility, although not part of the study area it is just south of the Pakenham Bypass. It has a high movement of vehicles. Most are large trucks. Cattle are the main type of animal sold. Others are pigs, calves, sheep and horses.

The selling centre operates full market auctions each weekday except Wednesday and some Saturdays.

150,000 cattle pass through the centre each year. 90% from the Mornington Peninsula, West and South Gippsland, Yarra Valley, and Phillip Island areas. A small number of livestock come from the northern areas of Victoria and Southern New South Wales.

In addition to livestock sales there are 30,000-50,000 cattle transhipped through the centre each year. These cattle are transported in, drafted and sent to different clients as larger or smaller transport loads.

**Employment** Approximately 12 full time or part time

Vehicle entry to these premises averages 78 per day. (Includes trucks (66), horse floats, and passenger vehicles).

### **Livestock Abattoirs**

The O'Connors abattoir is located on the east side of Healesville-Koo Wee Rup Road south of Deep Creek. It handles livestock destined for both the Australian market and export contracts. There is also a rendering plant on site for byproducts.

They process 800 cattle per day, these are drawn mainly from Victoria and South Australia. In addition to the company trucks bringing in cattle, farmers deliver their own cattle to the abattoirs.

300 staff are employed working on a day, and afternoon shift, there is a cleaning shift that operates each night.

There are approximately 40 trucks each day either making deliveries or taking product out. In addition there are staff vehicles at shift changes.

### **Elders Fertiliser and Lime Depot**

This business operates in Sybella Avenue at Koo Wee Rup near the South Gippsland Highway. It receives and dispatches between 45-50,000 tonnes of fertiliser and lime annually. This product is distributed to farming properties in West and South Gippsland, Mornington Peninsula and Phillip Island. There are 20 full time employees with a further 10 contractors operating from the business. Vehicle movements each day average 40 trucks and 15 cars/utilities.

### **Poultry Farming**

There are three poultry farms operating along the Healesville-Koo Wee Rup Road. Two of these are broiler farms, (near Island Road) which grow out batches of chickens on a 65-70 day rotation (120,000 per property per batch). The third poultry farm (near Soldiers Road) is used for egg production.

There are approximately six full time or part time employees. Average vehicle movements per property are three to four trucks and six cars/utilities per day.

### **Equine**

Equine agistment is provided on four properties. Two of these properties are fully equipped to graze/feed and train horses. One is located near Watson Road, another is in Ellett road (with adjacent land in the study area).

Approximate vehicle movement for each property is nine vehicles per day including light trucks and vehicles towing horse floats.

### **Fresh Vegetable Production.**

Within the district surrounding the study area there are 280 hectares of land producing vegetables by up to 20 growers at any one time. These vegetables flow on to the domestic and export markets. Approximately 30% of the produce is sold in Melbourne, 40% is transported by road to interstate locations and 30% is exported. Main crops are asparagus, broccoli, celery, cabbage, and potatoes.

Within the study area the main crop is asparagus. This plant is a perennial, once planted it continues to produce for at least 10 years.

Near the corner of Ballarto Road and Healesville-Koo Wee Rup Road there is a fresh vegetable packing shed. This business takes produce from growers across the district and prepares it for transport to markets. Most of this produce comes from the west side of the study area, predominantly from growers in the Island and Manks Road area. The business operator also grows asparagus.

They employ 40 staff on a regular basis, and up to 140 in the spring. These people are based at the packing shed, some also travel to and from the nearby production blocks.

Vehicle movement ranges from eight to 30 trucks per day. Other vehicles are up to 20 cars/utilities, five tractors and four buses (used to transport staff).

During the course of the study it was revealed that a key fresh produce transport company was transferring close to the study area from Kilsyth (week commencing 15 May 2006). This company will transport produce into Melbourne and interstate. In addition they will be transporting Sno peas grown in the Wonthaggi area and brought to their premises for dispatch. Their operation will be located in Dalmore Road and vehicles will be using roads in the study area to reach growers/packers in the district.

### Property Severance and Future Development

If any agricultural land was severed by the proposed road works the remaining land post construction should be able to continue its current agricultural use. There appears to be no loss of essential infrastructure, and therefore no significant impact on any commercial agricultural enterprises.

The potential for new horticultural development in the district is present and likely to have the greatest economic outcome for the Pakenham and Koo Wee Rup area. This is particularly the case for the peaty soils but also for the surrounding loams and clay loams. Transfer of the horticultural base from closer to Melbourne as the residential development takes place will be a driving force.

The poultry industry faces new regulatory processes nowadays. The small size of the land titles in the district and high cost of land means that no new poultry enterprises can be expected. Negative reaction to poultry farms among a significant proportion of the population is a further reason for lack of new poultry enterprises in the area.

The use of severed land for grazing enterprises will continue albeit as a rural lifestyle allotment activity as is occurring in many cases now. To enhance the opportunity of long term success (not automatically as an economic unit) of any severed land for a grazing enterprise and to minimise environmental problems it will be necessary to attempt amalgamation into larger land parcels. As a single unit this should be at or near a minimum of 40 hectares. Areas less than 40 hectares should be avoided on the basis of rainfall, stock and domestic water supply, infrastructure, ie stockyards and shedding, and economic stocking rates (livestock number carried per hectare). Smaller parcels of land could go into horticultural use, particularly for specialty crops.

### Summary of Vehicle Movements:

Table 5 provides an approximate indication of vehicle movements to enterprises in the study area on a per week basis.

**Table 5. Approximate Vehicle Movements to all Enterprises.**

	Total per week	Average per week
Cars and Utilities	4 - 1500	22 - 1250
Tray trucks/Delivery Vans	0.5 – 200	18
Heavy Trucks/Semi trailers	0 - 178	16

Examples of reasons for the vehicle movements: Staff attending work, taking children to school, delivery inwards/outwards of produce, livestock movement, and supplies for businesses.

**Note:** The high number of cars/utilities shown in Table 5 is primarily related to vehicle movements associated with the abattoirs.

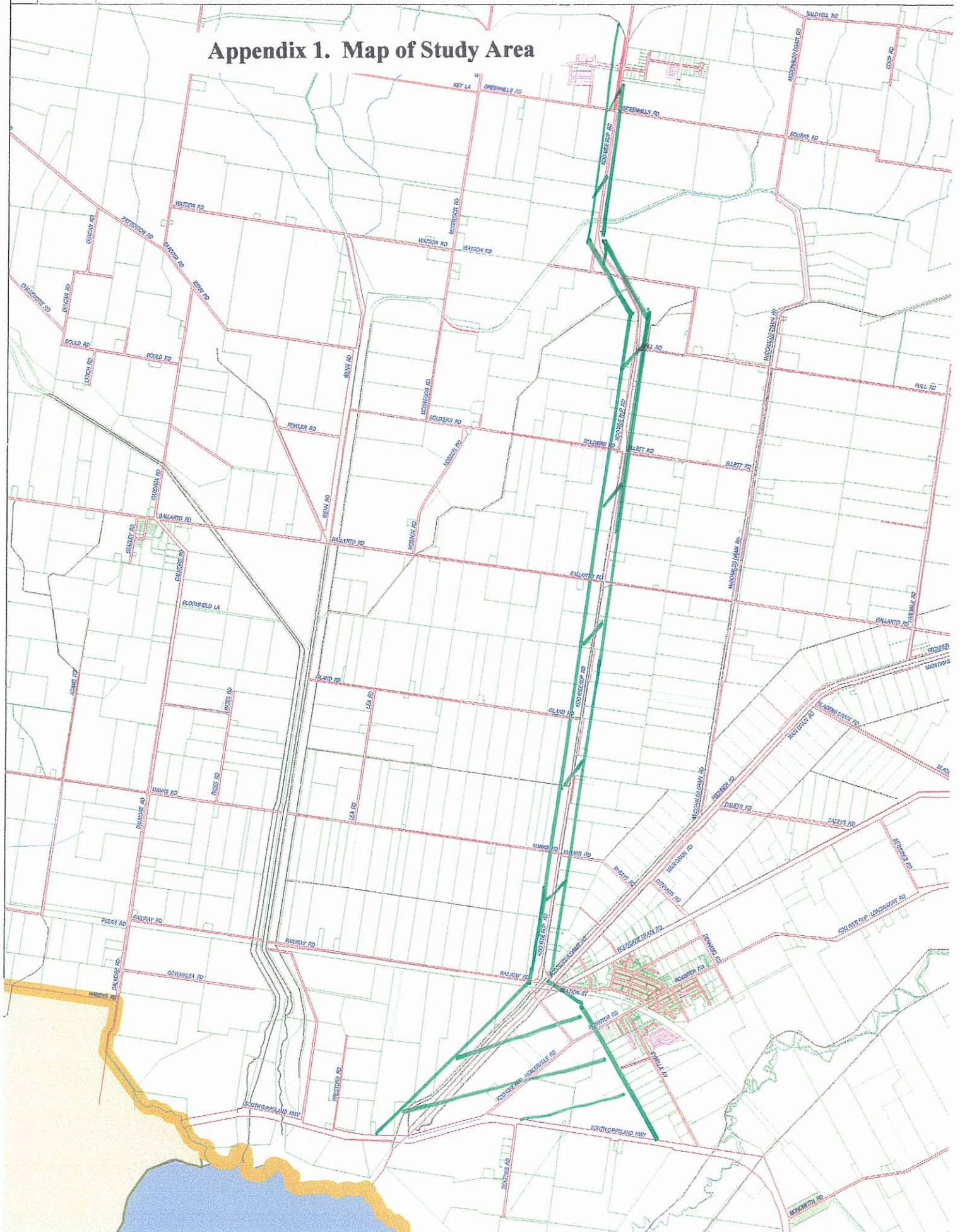
Livestock droving within the study area is not attempted, transfer of slow moving agricultural machinery was not considered a major problem.

People interviewed all expressed concern at current difficulties both entering and exiting properties along the study area, particularly with trucks and vehicles towing trailers/horse floats etc.



# Healesville - Koo Wee Rup Rd

## Appendix 1. Map of Study Area



Scale:1:38025.589 - Date:12th May 2006

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## Appendix 2.

### Contacts:

G. Andrews	Fertiliser supplier	Koo Wee Rup
T. Armstrong	Cardinia Shire	Pakenham
G. Bell	Beef farmer	Koo Wee Rup
F. Crameri	Southern Rural Water	Koo Wee Rup
P. Gardiner	Vegetable grower/packer	Koo Wee Rup
G. Luscombe	Vegetable packer/carrier	Kilsyth/Koo Wee Rup
G. Osborne	Pakenham Livestock Exchange	Pakenham
B. Pickersgill	Cardinia Shire	Pakenham
B. Pyle	O'Connor's abattoirs	Pakenham
W. Santurini	Southern Rural Water	Koo Wee Rup
R. Taylor	Poultry farmer	Koo Wee Rup
R. Williams	Poultry farmer	Koo Wee Rup

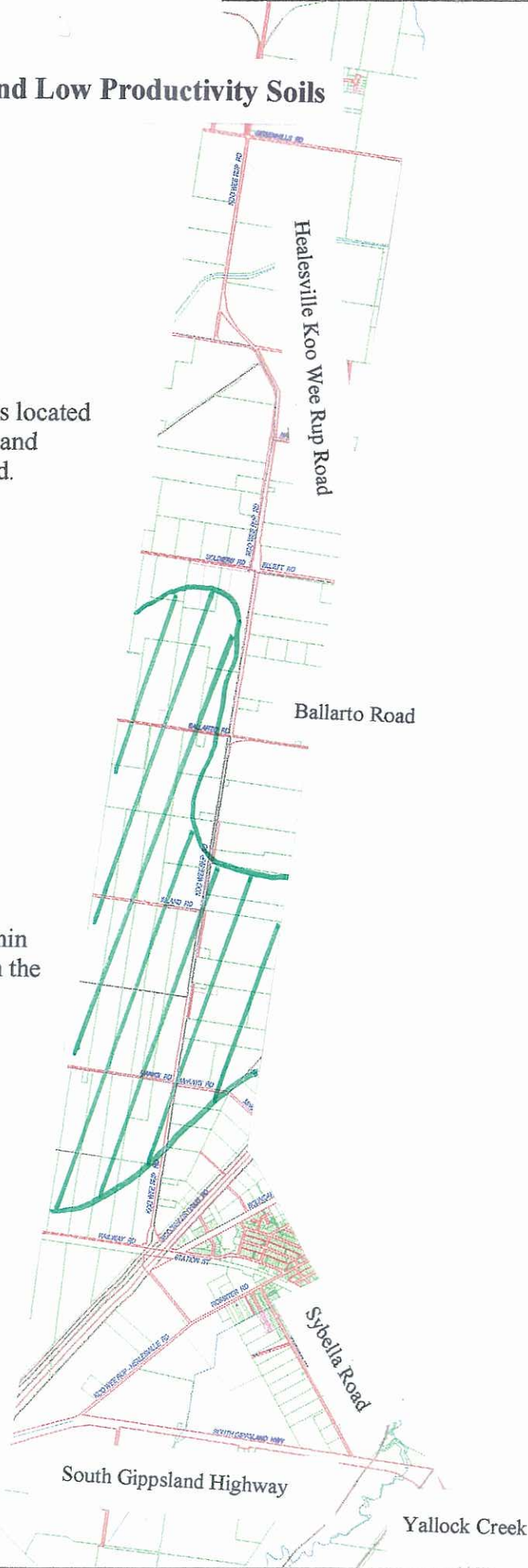


# Healesville - Koo Wee Rup Rd

## Appendix 3. Map of High and Low Productivity Soils

Lower productivity Class 3 land is located within the study area to the north and south of the high productivity land.

High productivity Class 2 land within the agricultural study area is within the green patching near Ballarto Road.



Scale: 1:38025.589 - Date: 12th May 2006

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#### **Appendix 4.**

##### **References:**

Agricultural Audit Cardinia Shire. B Pickersgill, Cardinia Shire 2004

*Assessment of Agricultural Quality of Land in Gippsland*, Victorian Department of Agriculture Research Project Series No 134, 1984.

Atlas of Australian Soils. K.H. Northcote CSIRO Melbourne University Press.

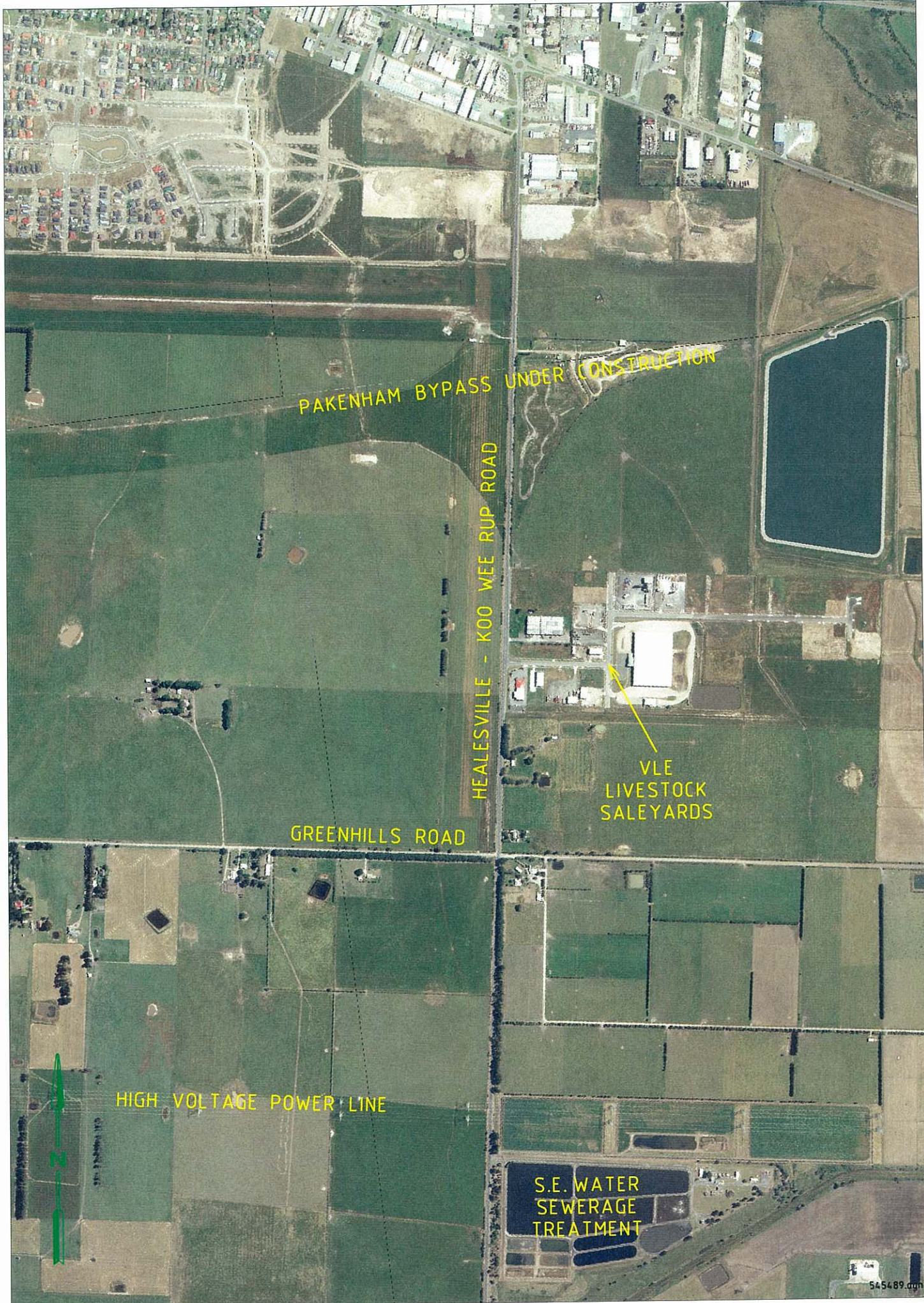
Seasonal Climate Outlook Service, Bureau of Meteorology National Climate Centre, March 2006.

Climate Averages, Bureau of Meteorology National Climate Centre March 2006

Survey of Agricultural Trends in West Gippsland, Department of Agriculture Research Project Series 101.

## **Appendix 5. Aerial Photographs of Study Area and Nearby Farmland**





PAKENHAM BYPASS UNDER CONSTRUCTION

HEALESVILLE - KOO WEE RUP ROAD

GREENHILLS ROAD

VLE LIVESTOCK SALEYARDS

HIGH VOLTAGE POWER LINE

S.E. WATER SEWERAGE TREATMENT





HIGH VOLTAGE POWER LINE

S.E. WATER  
SEWERAGE  
TREATMENT

ENTRY TO O'CONNORS ABATTOIRS

DRAIN (DEEP CREEK)

HEALESVILLE - KOO WEE RUP ROAD

HALL ROAD



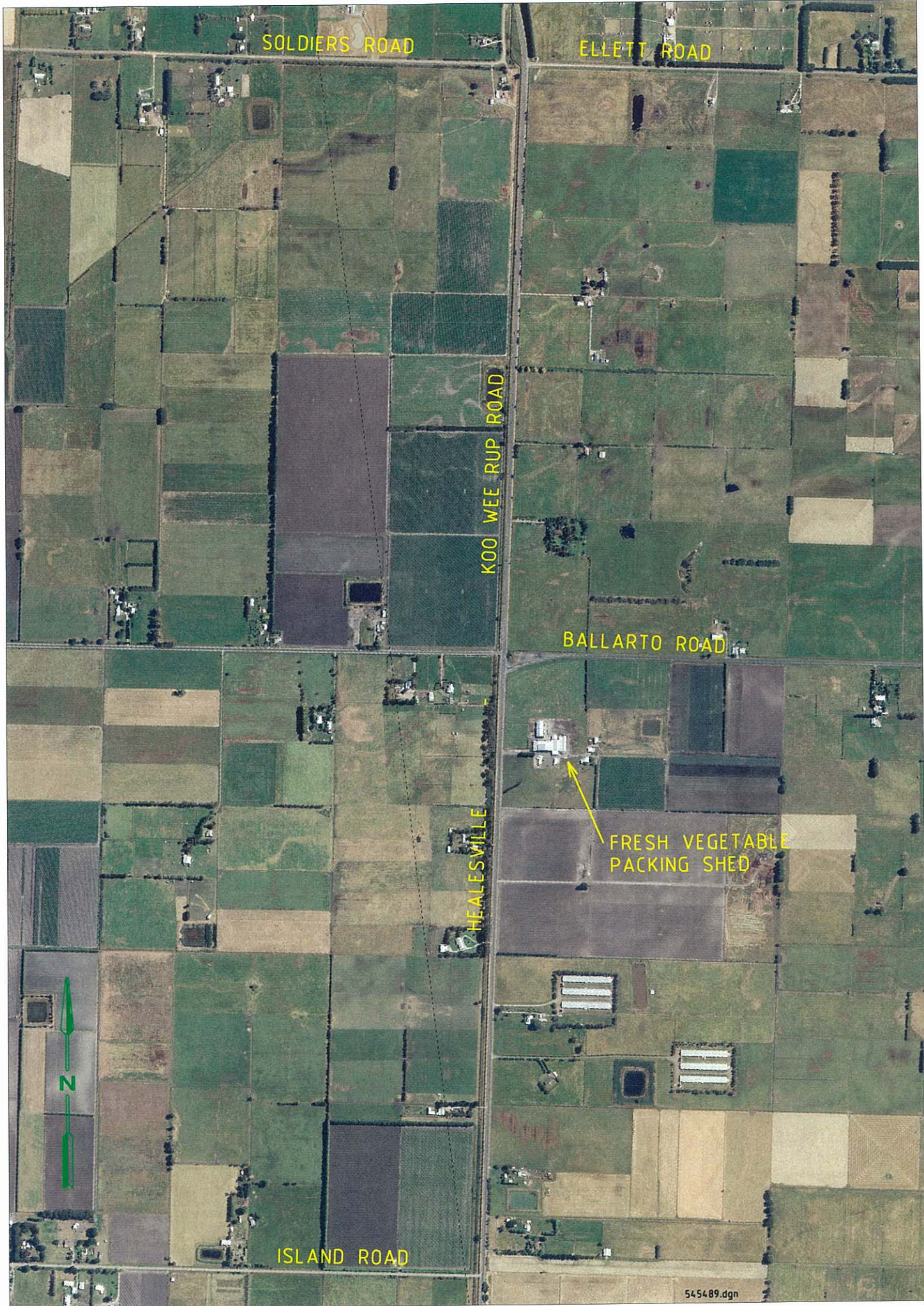
SOLDIERS ROAD

ELLETT ROAD

545489.dgn

545489.dgn





SOLDIERS ROAD

ELLETT ROAD

KOO WEE RUP ROAD

BALLARTO ROAD

HEALESVILLE

FRESH VEGETABLE  
PACKING SHED

ISLAND ROAD

N





ISLAND ROAD

KOO WEE RUP ROAD

MANKS ROAD

McKAYS ROAD

HEALESVILLE

MAIN DRAIN

RAILWAY ROAD  
RAILWAY EASEMENT

KOO WEE RUP  
TOWNSHIP

545489.dwg