

3 POLICY CONTEXT

The State Planning Policy Framework

The following State Planning Policies within the Wellington Planning Scheme are pertinent to issues of land supply and rezoning of land in Wurruk for residential purposes:

- **Clause 11.02** (Urban Growth)

Response:

This Clause emphasises the need for all municipal Councils to assess and monitor residential land supply across their cities, suburbs and townships and ensure that it does not begin to influence the property market in a negative fashion, either through an undersupply or oversupply of developable land. To achieve this, the State Government recommends that where growth is possible, the land supply across a city, suburb or township should remain at least 15 years, based upon the most up to date demand figures.

The proposed rezoning of land across Wurruk is predicted to elevate land supply across the Sale/Wurruk area to around 16.2 years based upon current figures, but should be around 15 years once the likely time lag between authorisation and the actual rezoning occurring, i.e. 18 months, is taken into account.

Hence, the conclusions reached in this analysis accord with the land supply expectations set out in this Clause.

- **Clause 12.01** (Biodiversity)

Response:

This Clause emphasises the need for all municipal Councils to protect significant habitats and flora communities within threatened and endangered ecological vegetation classes to foster broad biodiversity across the State. The calculation of available land factored into the land supply analysis for the Wurruk Growth area excludes any areas within the site that will require protection due to their threatened or endangered nature.

Hence, the density projections for the land being examined in this report present an accurate portrayal of supply once the provisions of this clause are taken into account.

- **Clause 13.02** (Floodplains)

Response:

This Clause discourages the consideration of flood prone land for development. The calculation of land supply provided by the rezoning of land across Wurruk excludes flood prone land.

Hence, the projections in this report accord with the objective and strategies of this Clause.

- **Clause 13.05 (Bushfire)**

Response:

This Clause discourages the consideration of land that is prone to bushfire risk for development. The area in Wurruk being considered in this report is not affected in a Bushfire Management Overlay and is not understood to be under consideration for inclusion by the Country Fire Authority due to its generally cleared nature and extensive setbacks from any forested land.

Nonetheless, it is in an area that could potentially be susceptible to impacts from a bushfire elsewhere and, hence, like the rest of Wurruk, is considered to be in a "Bushfire Prone area" under the Building Code of Australia. As such, all buildings constructed on the site will need to consider what risks may arise from a bushfire elsewhere and how they can best be managed. To that end, the consideration of road structure and the accessibility of the various estates to the CFA appliances has been taken into account in the density projections used.

Hence, the figures used in this study are accurate in light of the provisions of this Clause.

- **Clause 15.01 (Urban Environment)**

Response:

This Clause encourages the use of best practice urban design in consideration of the optimal layout for a residential subdivision. Consideration must be given to the context of the site and how best to make any new development blend in with what surrounds it whilst also overcoming existing shortfalls in community infrastructure, where appropriate. It also suggests that residential development should be designed with a focus on allowing future residents to pursue healthy, active lifestyles and gain access to internal and external facilities on foot or bicycle.

The calculation of likely yield from a rezoning in Wurruk factors in the inclusion of a minimum 5 hectare recreation reserve and neighbourhood community centre, with a network of walk cycle paths around any potential development.

Hence, the land supply scenario considered in this report is in accordance with this Clause.

- **Clause 15.02 (Sustainable Development)**

Response:

This Clause encourages the use of best practice urban and architectural design to achieve the optimal outcome for energy efficiency and easy non-motorised vehicle transport in a residential development. The density factors used in the calculation for the rezoning in Wurruk incorporate these outcomes.

Hence, the land supply figures reached in this report reflect the intent of this Clause.

- **Clause 15.03 (Heritage)**

Response:

This Clause emphasises the need for development to only occur in circumstances where the historically relevant vestiges of pre and post European Settlement activity are either preserved or recorded, as appropriate. The area considered for rezoning has examples of

relevant post-European settlement activity, i.e. the Kilmarnock Park mansion, and may bear evidence of pre-European settlement activity, insofar as it has an area of sensitivity to Aboriginal Cultural Heritage in its southeast corner. The density figures arrived at for the overall development reflect the necessary actions to protect the post-European settlement activity, while the area with potential pre-European settlement activity is mostly excluded from the development calculation.

Hence, the land supply figures reached in this report reflect the intent of this Clause.

- **Clause 16.01 (Residential Development)**

Response:

This Clause encourages consideration of issues relating to the integration of housing with the market demand, the appropriate location of new housing, diversity of housing choice and housing affordability in any new residential development. The land supply figures used in this report are based upon an outcome whereby these matters are incorporated in any new development layout through the use of a variety of lot sizes and the creation of good walk/cycle and road linkages back to Sale's central activity district from all lots within any new estate.

Hence, the conclusions reached in this report are accurate in light of the objectives and strategies within this Clause.

- **Clause 18.01 (Integrated Transport)**

Response:

This Clause encourages the integration of various transport modes with land use outcomes in order to provide multiple safe and efficient options for travelling within residential estates and to key external sites. The figures used in this analysis take into account the provision of transport options that will achieve these objectives.

Hence, the conclusions reached in this report are accurate in light of the objectives and strategies within this Clause.

- **Clause 18.02 (Movement Networks)**

Response:

This Clause promotes sustainable personal transport, with an emphasis on providing future residents of any residential estate with the option of walking, cycling, driving or taking public transport to and from all key destinations within a reasonable distance from the development site. These outcomes have been incorporated in the land supply calculations set out in this analysis.

Hence, the conclusions reached in this report are accurate in light of the objectives and strategies within this Clause.

- **Clause 19.02** (Community Infrastructure)

Response:

This Clause promotes the integration of health, education and cultural facilities with new development. The density calculation for the area being considered for rezoning excludes a site that will be set aside of a community facility that can provide some of these services, with the balance available across the existing Wurruk Primary School on the opposite side of the Princes Highway, or within Sale, both of which will be easily accessible via car, cycle or on foot.

Hence, the conclusions reached in this report are accurate in light of the objectives and strategies within this Clause.

- **Clause 19.03** (Development Infrastructure)

Response:

This Clause promotes the timely provision of water supply, sewerage, telecommunications and drainage infrastructure. The density outcomes considered in this analysis take the provision of these services of all commandable portions of the development area into account.

Hence, the conclusions reached in this report are accurate in light of the objectives and strategies within this Clause.

Local Planning Policy Framework

The following Local Planning Policies within the Wellington Planning Scheme are pertinent to issues of land supply and rezoning of land in Wurruk for residential purposes:

- **Clause 21.02-1** (Settlement and Housing)

Response:

The land that is being considered for rezoning is within the designated Wurruk township boundary under the Structure Plan and is either fully or partially flanked by existing residential development on all sides. Furthermore, the majority of the land has the capacity to be served by a full suite of reticulated services.

Hence, this Clause is supportive of the rezoning of the entirety of the land in accordance with the Structure Plan and the supply figures will not be impacted by its objectives.

- **Clause 21.02-3** (Environmental Risks)

Response:

The southern and eastern extremities of the land are recognized by the West Gippsland Catchment Management Authority as being subject to flooding in a 1 in 100-year rainfall event. This land supply analysis does not include these areas within its assessment of the available supply.

Hence, the constraints flagged by this clause have been adequately considered as part this analysis.

- **Clause 21.02-5 (Built Environment and Heritage)**

Response:

Consideration is given in the predicted lot yield to the need to restrict development around the Kilmany Park Homestead, in line with the recommendations of the Heritage Study carried out by Trethowan.

Hence, the land supply figures and general analysis accords with the objectives of this clause.

- **Clause 21.02-6 (Economic Development)**

Response:

This Clause emphasises the need for Sale to continue to fulfil its role as the primary service centre within the municipality and this will not be able to be achieved without the capacity for its population to continue growing in line with the expected demand. So, the need to retain an adequate, i.e. 15 year, land supply is supported by this clause.

Hence, an expectation that the demand figures used in this report will continue to be pertinent is inherent in this Clause.

- **Clause 21.02-7 (Transport)**

Response:

The Princes Highway has recently been duplicated adjacent to the northern portion of the Wurruk rezoning site and at the intersection with Settlement Road, with roundabouts created in anticipation of future residential growth in this corridor.

Hence, the rezoning of land in Wurruk can be achieved in line with the objective of this Clause.

- **Clause 21.02-8 (Infrastructure)**

Response:

A gravity-fed reticulated sewerage main is already available along the southern side of the Princes Highway, with reticulated natural gas, water and electricity already connected across the rezoning area to existing residences to the west. Hence, the area that is being considered for rezoning can be fully serviced for an economical price.

Hence, the potential servicing delays foreshadowed in this clause will not constraint the provision of land supply across the study area.

- **Clause 21.03-1 (Vision)**

Response:

This Clause encourages ongoing population growth within designated growth corridors across the Shire, of which Wurruk is a major one and supports the creation of land supply that delivers a safe, well-serviced and generally liveable environment.

Hence, as the land supply figures used in this report, are geared to achieving these ends in Wurruk, they are supported by this Clause.

- **Clause 21.03-2 (Strategic Framework Land Use Plan)**

Response:

The land supply figures used in this report are based upon the projections and expectations expressed in the Sale, Wurruk & Longford Structure Plan, which is referenced in this Clause.

- **Clause 21.04-2 (Settlement Objectives)**

Response:

All land considered in this analysis of land supply is within the township boundaries designated through the Sale, Wurruk & Longford Structure Plan mapping and is able to connect with the existing vehicular and pedestrian/cycling network and reticulated services.

Hence, it will be able to achieve the supply figures that are forecast while remaining in compliance with the objectives of this Clause.

- **Clause 21.04-3 (Settlement Strategies)**

Response:

The supply figures outlined in this analysis predict that there is presently 7.5 years of supply available. So, consideration of rezoning further land to return the supply to between 10-15 years is necessary to meet the strategies set out in this Clause. Moreover, the Clause encourages the use of the Sale, Wurruk & Longford Structure Plan in determining supply and demand figures, as has also been done. The yield figures are based upon a density that will allow the creation of estates that:

- are within the designated township boundaries;
- encourage healthy lifestyles;
- do not include inappropriate rural lifestyle development;
- will not detrimentally affect high quality agricultural land or significant environmental assets;
- encourages diversity of housing choice;
- avoids creating new lots on flood-prone land;
- is sympathetic to the heritage values of Kilmory Park Estate;
- will provide a positive impression when viewed from the Princes Highway;
- are able to provide appropriate community infrastructure to support active lifestyles through the integration of walking/cycling facilities to key sites;
- can accommodate appropriate effluent and stormwater discharge systems;
- can accommodate a network of public open spaces for recreation and other municipal purposes; and,
- can utilise existing urban infrastructure.

- **Clause 21.05-1 (Vision)**

Response:

The land supply figures used in this report are based upon the densities that will ensue from development of the land in line with the mapping in the Sale, Wurruk and Longford Structure Plan, while taking into account the following principles:

- Creation of high quality public open spaces;
- Formation of a sustainable community that integrates with existing adjoining developments;
- Easy accessibility by car, cycle, or on foot;
- Creation of inclusive neighbourhoods; and,
- Protection of culturally significant features, e.g. Kilmany Park mansion.

- **Clause 21.05-2 (Township Roles)**

Response:

The figures used in the calculation of potential supply are based upon the creation of estates that will create a diversity of housing choice with new community facilities within a new 5-hectare recreation reserve.

This outcome is foreshadowed in this Clause and, hence, the figures can be relied upon.

- **Clause 21.05-3 (Regional City)**

Response:

The figures in this analysis are based upon the rezoning of land for residential use in Wurruk as suggested in the Sale, Wurruk & Longford Structure Plan and can be delivered in a timely and sequential manner.

Hence, the findings in this report remain in accordance with the objective and strategies in this clause.

- **Clause 21.05-4 (Housing Choice and Diversity)**

Response:

The supply figures used in this report are based upon the creation of a diverse range of lot sizes across residential development adjacent to the Princes Highway and south of Arnup Road in Wurruk.

Hence, they accord with the strategy and objectives outlined in this clause.

- **Clause 21.05-5 (Residential Development)**

Response:

The land supply figures are based upon a development density in Wurruk that can incorporate walkable neighbourhoods, bus routes, water sensitive urban design, energy

efficiency/sustainability measures, staged reticulated infrastructure delivery, access to community facilities, a range of lot sizes and appropriate sequencing.

Hence, the figures arrived at accord with the objective and strategies of this clause.

- **Clause 21.05-7 (Design Excellence)**

Response:

The figures used in this report factor in a development density across Wurruk that will allow the protection of the Kilmany Park mansion through retention of appropriate sightlines to it, high quality open space and an appropriate relationship to adjoining low density residential estates.

Hence, the conclusions accord with the objective and strategies of this clause.

- **Clause 21.05-9 (Movement Network)**

Response:

The figures used in this report accommodate the creation of an integrated movement network in a legislative-compliant manner that can cater for vehicular, pedestrian and cyclist access safe and efficient manner and enhance the connection between Wurruk and Sale's central activity district.

Hence, the supply figures used in this document meet the requirements set out in this clause and can be relied upon.

- **Clause 21.05-11 (Sensitive Assets)**

Response:

The supply figures used to predict yields from the rezoning of the Wurruk area factor in the need to retain significant native vegetation and waterways, whilst incorporating water sensitive urban design methods.

Hence, the supply figures used in this document meet the requirements set out in this clause and can be relied upon.

- **Clause 21.05-12 (Implementation)**

Response:

The density calculation method used in this report takes into account the need to create a road structure that meets CFA requirements, walking/cycling routes that connect all residents with recreation reserves, drainage reserves that meet best practice guidelines and reticulated infrastructure across estates with lots ranging from 600m² to above 4,000m². Moreover, consideration is given to the need to protect the significance of Kilmany Park Mansion and its immediate surrounds and the comments and feedback from VicRoads, Gippsland Water and the West Gippsland Catchment Management Authority.

Hence, the supply figures that have been relied upon are sensitive to the requirements set out in the objective and strategies of this clause.

- **Clause 21.13-2 (Biodiversity)**

Response:

The density projected for the Wurruk development site incorporates the exclusion of sensitive environmental assets, such as indigenous vegetation and waterbodies and watercourses.

Hence, the figures arrived at in this report can be relied upon for an accurate analysis of land supply as a result of a rezoning in Wurruk.

- **Clause 21.14-3 (Flooding)**

Response:

The areas that have been deemed prone to flooding by the West Gippsland Catchment Management Authority, have been excluded in the calculations of developable land across the Wurruk rezoning site.

Hence, the assumptions in the land supply analysis can be considered accurate in light of the objective and strategies in this Clause.

- **Clause 21.16-1 (Built Environment)**

Response:

The assumptions made about the density that will be achievable across the Wurruk development have taken into account best practice theories about the creation of sustainable residential estates, such as the creation of a safe walk/cycle movement network, the incorporation of useable public open spaces and the need to orient housing to take best advantage of solar rays.

Hence, the supply figures anticipated for the Wurruk development are sensitive to the objectives and strategies outlined in this clause.

- **Clause 21.16-2 (Heritage)**

Response:

The need to protect the Kilmany Park mansion through the limitation of development around it has been factored into the calculation of density across that part of Wurruk.

Hence, the land supply figures used in this report are accurate as regards the requirements that will be imposed on any development through the objective and strategies of this Clause.

- **Clause 21.18-2 (Road Infrastructure)**

Response:

The development area within Wurruk enjoys access to an excellent road network externally and the density figures that are used in this study anticipate the creation of an appropriately scaled and aligned road network within the site.

Hence, the land supply figures used in this report provide an accurate portrayal of the likely outcomes from the rezoning of the land in Wurruk.

- **Clause 21.18-5** (Walking and cycling)

Response:

The land supply figures used in this report take into account the need for an integrated and comprehensive walk/cycle network to be created across the Wurruk development area.

Hence, the outcomes foreshadowed in this investigation can be relied upon in light of the objectives and strategies set out in this Clause.

- **Clause 21.19-1** (Physical Infrastructure)

Response:

The Wurruk development site considered in this analysis is surrounded by low density residential development on both sides; so, its development could not be considered as leap-frogging existing infrastructure.

Hence, the supply figures in this study are considered accurate as regards the objective and strategies of this clause.

- **Clause 21.19-2** (Community Infrastructure)

Response:

The density anticipated from the Wurruk development factors in the need for relevant items of community infrastructure to be created as part of the overall development.

Hence, the supply figures used in this report can be relied upon in light of the objective and strategies of this clause.

- **Clause 22.03** (Heritage)

Response:

The need to protect the Kilmany Park mansion through the limitation of development around it has been factored into the calculation of density across that part of Wurruk.

Hence, the land supply figures used in this report are accurate as regards the requirements that will be imposed on any development through the objective and strategies of this Clause.

4 RESIDENTIAL LAND SUPPLY

Residential land supply was calculated by combining existing vacant lots and the lot capacity of broadacre land in Planning Zones appropriate for residential development across Wurruk and Sale. This includes the General Residential Zone and the Low Density Residential Zone within Sale and Wurruk's settlement boundaries, as defined in **Clause 21.05**.

4.1 Vacant Lots

Information about existing vacant lots, as at April 2016, was captured using real estate websites (e.g. realestate.com.au), site inspection and a review of aerial photography in conjunction with zoning maps.

Only lots which met the following criteria were captured:

- All available vacant lots in the General Residential Zone and Low Density Residential Zone;
- All lots in an adopted settlement boundary.

For illustrative purposes, **Figure 1** shows the location of the four residential estates that are currently under construction or retain vacant lots across Sale and Wurruk in relation to the subject sites.



Figure 1: Aerial view of Sale showing the location of the subject sites in relation to the residential estates currently under development across Sale

The outcomes of this investigation of vacant lot supply are displayed in Table 5.

	Available Vacant GRZ Lots
Cobains Estate (Stage 1)	51
Glebe Estate (Stage 4)	22
Glenhaven Estate (Stage 2)	12
Infill Sites (Sale)	26
Infill Sites (Wurruk)	9
Total:	114

Table 5: Vacant Lots in Existing Residential Zoned Estates or infill sites across Sale & Wurruk

	Available Vacant LDRZ Lots
The Ridge Estate	16
Sovereign Estate	2
Infill Sites (Sale)	9
Infill Sites (Wurruk)	5
Total:	32

Table 6: Vacant Lots in Existing Low Density Residential Zoned Estates or infill sites across Sale & Wurruk

4.2 Broadhectare Lots

Broadhectare lots were identified based on the LandVic website. Only lots that met the following criteria were captured:

- All lots in the General Residential Zone that are greater than 5,000m² and within the Sale and Wurruk township boundaries as defined in the mapping at **Clause 21.05**; and,
- Lots in the Low Density Residential Zone that are greater than 10,000 m² (one hectare) and fall within the Sale and Wurruk township boundaries as defined in the mapping at **Clause 21.05**.

4.3 Broadhectare Lot Capacity

Broadhectare lot capacity was calculated using the following formulas:

- For each broadhectare lot, where there was a known endorsed development plan (showing proposed subdivision layout), incorporated plan, provisional plan or subdivision permit, such plans were used to estimate the lot capacity.

Where this information was not available, the following methodology was used:

- Ascertain the area of each broadhectare lot;
- Deduct any part of the lot which is encumbered (for example, by an easement) to determine the initial lot capacity;
- Deduct 25% of the remaining unencumbered area for open space (5%) and internal access roads (20%) to result in a net residential developable area;
- Apply an average density of 9 lots per gross hectare for General Residential Zoned Land, and 1.9 lots per gross hectare for Low Density Residential Zoned Land to determine the lot capacity of each broadhectare lot; then,
- Round down to the whole number.

	Broadhectare GARZ Lots
Cobains Estate	120
Glenhaven Estate	56
Glebe Estate	43
Woondella Estate	47
Infill Sites (Sale & Wurruk)	20
Total	286

Table 7: Broadhectare General Residential Zoned Lots and Low Density Residential Zoned Lots in Sale & Wurruk

	Broadhectare LDRZ Lots
Park Ridge Estate	119
'White's' Land, Settlement Road	17
Total	136

Table 8: Broadhectare Low Density Residential Zoned Lots in Sale & Wurruk

4.4 Existing Land Supply (Vacant and Broadhecture)

Based on the methods outlined above, the number of lots available for residential land supply has been provided at **Table 9**, below.

Estimated supply is 568 lots, including 146 existing vacant lots and 422 lots in broadhecture lot capacity.

	Vacant land	Broadhecture lot capacity	Total
General Residential Zone	114	286	400
Low Density Residential Zone	32	136	168
Total	146	422	568

Table 9: Estimated land supply in Sale & Wurruk (April 2016)

5 DEMAND FOR HOUSING

5.1 Components of Housing Demand

In locations such as Sale and Warrack, demand for housing is driven by two main factors:

- Gradual growth in permanent population due to the ageing of Australia's population, decreased household sizes, international immigration and general depopulation of traditional farming areas into urban centres; and
- Growth in key local industries, such as resource exploitation (Oil and Natural Gas refinement at Longford and offshore in Bass Strait), Defence (expansion of the RAAF Base – East Sale), Corrections (expansion of Fulham Prison), Agriculture (Ongoing intensification of irrigated dairying and vegetable growing and usual activity in agroforestry and dryland grazing).

Figures 2 & 3, which includes excerpts from a newspaper article in the Gippsland Times dated Tuesday, 29th of December, 2015, provides evidence of the economic impetus that Sale is presently experiencing and provides some background to the factors referenced above.



Figure 2: Excerpt from "Million dollar boom time" article, Page 1 of the Gippsland Times, 29/12/2015

Million dollar boom time

From page 1

THA full-scale stages five and six at the Woodbine Estate and was planning to develop the land, including some of the blocks for dual and triple the houses as the town grows.

As the RAAP project started up, Mr Chalmers said extra pressure may be placed on the local rental market, and he also predicted house prices would increase.

"Full time employment will be here for some weeks of time," Mr Chalmers said.

"There will need to stay and buy a house rather than rent."

"You would think that every person here to go up, but you would still hope that they're

affordable," he said.

Mr Chalmers said there was probably not enough new housing coming on line now to meet future demand, but there was land available in the Glenorchy, Glenorchy and Glenorchy areas, which house and land packages still affordable, particularly for those on dual incomes.

"But in the long term, it will be a housing development," he said.

Mr Chalmers said he had seen a slight increase in the number of properties bought by investors following the RAAP land auction, adding that there were a number of other projects coming up.

"And probably another 10 per cent of our market are investors, so they are never sleeping."

he said.

Mr Chalmers said while most people who worked in Sale lived there, nothing was more likely to benefit from developments on the horizon, particularly places like Stratford and Longford, where people lived but commuted to Sale for work.

"While all these jobs are generated, it creates new jobs as well."

"It is really good news for residents who have been living it tough," he said.

Mr Chalmers said with excellent schools and medical facilities and affordable housing locally as well as low interest rates to help attract new people, the future was bright for Sale.

Figure 3: Excerpt from "Million dollar boom time" article, Page 3 of the Gippsland Times, 29/12/2015

These factors will influence the number of dwellings that are needed within the municipality over time, and therefore the number of lots that will be required to support this growth.

This section provides a review of these growth factors, augmented by analysis of historical data such as dwelling approvals and property values. This additional analysis provides further evidence relating to the future demand for dwellings in the municipality.

5.2 The Gippsland Regional Growth Plan

Clause 11.02-1 of the SPFF states that planning must give consideration to the official State government population projections (currently *Gippsland Regional Growth Plan*). This document makes projections about how key towns across the Gippsland region will grow over the coming 25 years to 2041.

The Gippsland Regional Growth Plan was released in 2014 and is the most up to date set of projections.

The plan estimates that Sale will require an additional 1,500 dwellings by 2041.

5.3 Building Approvals

Historical building approval data for residential development has been analysed to show historical trends in new housing development and activity that will indicate future likely rates. Building approvals at the municipal level provide a useful alternative or comparison to broad population projections when estimating future housing demand.

Table 10 provides the total building approvals for new dwellings across Sale and Warruk over the period 2005-2015, while **Figure 4** represents this data in a column graph format to more clearly demonstrate the trends over the study period.

Year	Number of Building permits issued			
	Sale		Warruk	
	GRZ	LDRZ	GRZ	LDRZ
2005	64	6	1	7
2006	71	10	1	24
2007	72	11	3	22
2008	83	10	0	17
2009	77	2	3	17
2010	89	1	3	12
2011	72	3	1	8
2012	70	1	2	6
2013	72	2	1	14
2014	75	1	1	4
2015	72	1	1	5
Totals	817	48	14	136
Annual Averages	74.3	4.4	1.3	12.4

Table 10: New dwelling approvals Data 2005-2015

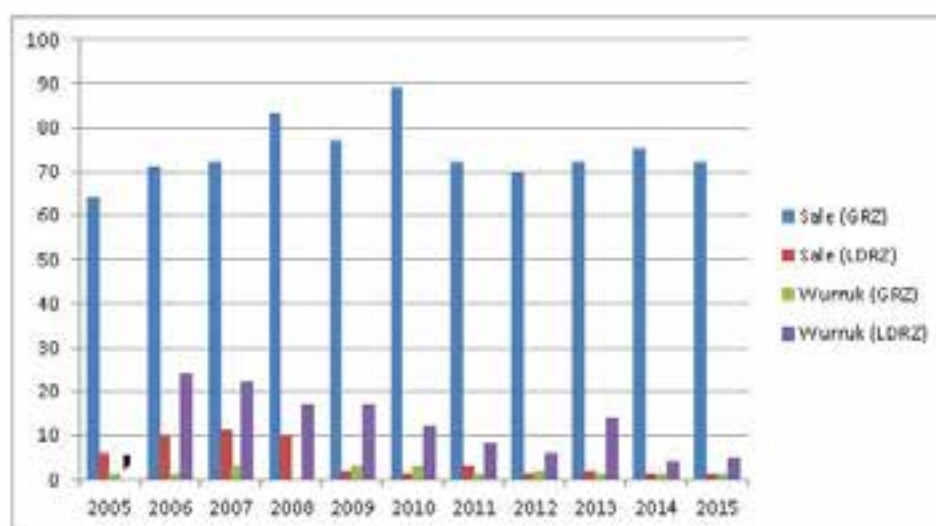


Figure 4: New dwelling approvals Data 2005-2015

Building approvals data from 2005-2015 shows that construction of new dwellings in the General Residential Zone has remained fairly static at around 70 dwellings per year, while there was a generally consistent decrease in new dwelling construction in the Low Density Residential Zone. This decline could, in part, be explained by a tightening of the more attractive supply in this market.

For example, of the 32 vacant lots recognised in this zone:

- 4 of the infill lots within Wurruk directly abut the Princes Highway but have not yet been discounted to account for this amenity impact;
- 9 of the 16 vacant lots at Park Ridge have never been offered for sale; and,
- 7 of the infill lots within Sale have only just come onto the market.

This leaves just 12 Low Density Residential Lots across Sale and Wurruk that have been for sale for more than 1 to 2 months and are not hampered by potential amenity impacts.

5.4 Estimated Demand for Housing

Table 11 shows the various projected demand rates compiled from the Gippsland Regional Growth Plan and Building Approvals.

Based on the various rates presented, future dwelling requirements could range from 60 to 92.4 per annum, representing an average of 76.2 new dwellings per annum.

	Gippsland Regional Growth Plan	Building Approvals	Average
Estimated Dwelling Demand per annum 2016-2041	60	92.4	76.2
Estimated Dwelling Demand 2016-2041 (Average)	1500	2,310	1,905

Table 11: Housing demand indicators summary

6 ESTIMATED YEARS OF SUPPLY

6.1 Estimate Years of Land Supply

Based on the demand indicators and supply assessment, the number of years of demand that the existing lot supply will meet can be estimated. **Table 12** shows the calculation of supply in terms of years.

Using the average of the two demand scenarios, the residential land supply in Sale and Warruk as at April 2016 is estimated at 7.5 years, with a variance of between 6.2 and 9.5 years.

	Lots per annum	Years Supply
Gippsland Regional Growth Plan	60	9.5
Building approvals in Sale & Warruk	92.4	6.2
Average	76.2	7.5

Table 12 Estimated Years Supply

6.2 Impacts of the rezoning the subject sites in Warruk

As discussed previously, the Sale, Warruk & Longford Structure Plan recommends rezoning of a set of contiguous parcels of land in Warruk to the General and Low Density Residential.

Once this occurs, the land supply figure for Sale/Warruk will alter in two ways:

- The 136 broadhectare Low Density Residential Zoned lots presently located in the Park Ridge Estate and White's land in Warruk will become broadhectare General Residential Lots, so the 136 lots Low Density Residential Lots presently included in the overall supply figure will need to be subtracted; and
- An additional 800 broadhectare lots will need to be added to the overall land supply figure to represent the likely yield from all land being rezoned across Warruk.

The outcome of these alterations will be the addition of 664 lots to the overall land supply across Sale and Warruk.

So, based upon the average demand figure of 76.2 dwellings per annum, the rezoning in Warruk outlined in the Structure Plan would add 8.7 years land supply and bring the overall figure to 16.2 years.

However, given the lead time of around 1-2 years before the land is likely to be rezoned, the supply will be less than 15 years by the time the lots can be considered to be available as broadhectare land supply.

Another factor in the consideration of the impacts of rezoning the subject sites is that they will be developed by five syndicates that each own separate parcels within the development area and will also provide a mixture of different densities.

- General residential zoned lots of between 600m² and 900m², which will be similar to those on offer in the existing estate across North Sale;
- Low Density Residential Zoned lots with area of at least 2,000m² with connection to all reticulated services, which will be largely unique across the Sale/Wurruk area; and,
- Low Density Residential Zoned lots with area of at least 4,000m², with connection to all reticulated services bar sewer, which will be similar to lots in The Ridge and Sovereign Estates in Wurruk.

At present rates, there is every likelihood that the Glebe, Woondella, and Glenhaven Estates will have fully developed and sold all of their remaining lots by 2019, with only the Cobains Estate likely to still providing significant supply by the time the Wurruk developments are offering lots to the market.

Given the spread of ownership and road access arrangements across the rezoning sites in Wurruk, development will, by necessity, commence across three fronts:

- I. 600m²-1,000m² General Residential lots adjacent to the Princes Highway in the north;
- II. 2,000m² Low Density Residential lots adjacent to Reid Drive/Arnup Road in the west; and,
- III. 4,000m² Low Density Residential lots adjacent to Settlement Road in the southeast.

Lots in Wurruk's northern development front will commence competition for market share with the remaining stages of the Cobains Estate in around 2018-9, while the western and southeastern development fronts will not have any significant direct market competitor when they start offering lots to the market at around the same time, apart perhaps from each other.

By the time the Cobains Estate has been completely sold out, which should occur in around 2020-2021, market competition for 600m² - 1,000m² lots in Wurruk's northern development front will be coming from the central parts of the Wurruk development as road access is brought across from Reid Drive and up from Settlement Road into two individually owned, General Residential Zoned parcels in the heart of development area.

The speed of development across the Wurruk development sites will then depend on market demand, but it is submitted that the risk of land banking in order to starve supply and drive up prices over the next 15 years is quite low due to the capacity for competition to be sustained across the Wurruk development area itself.

6.3 Impacts of residential rezoning in North Sale

Apart from the "western growth area" in the Sale, Wurruk & Longford Structure Plan, i.e. Wurruk, the report also recommends that an investigation of the potential for residential development be undertaken across a "northern growth area", which would be comprised of land that is presently located in the Farming Zone on the north side of Sale. This area is predicted in the Structure Plan to have the potential to yield 1,500 lots, although subsequent development approvals will have reduced that figure, i.e. the new Sale Specialist School on the west side of the Princes Highway and the Sale Greyhound Club redevelopment on the north side of the Sale-

Maffra Road will occupy land within the "northern growth area" that was anticipated as being suitable to provide for lots.

Given the land earmarked for rezoning across Wurruk is owned by 5 separate and competing syndicates, Council will not need to rezone alternative land for residential development in North Sale to maintain a competitive market. So, further rezoning across the northern growth area can be based purely upon an analysis of supply and demand.

There are roundabout works presently underway at the intersection of Cobains Road and the Princes Highway; so, it would appear that the most logical place for the next round of residential rezoning to occur after Wurruk would be on the land to the east of the Cobains Estate, i.e. the 43 hectares of land along both sides of Chinaman's Lane. It is expected that release of this supply, which would yield around 400 residential lots, will become necessary once the Cobains Estate and the Glenhaven Estates are complete and the 8.7-year supply that Wurruk offers has been depleted to a 5-year supply or less, i.e. sometime between 2025 and 2030. A rezoning of this land would boost supply across Sale to back over 10 years, which will be ample to ensure that the building market retains confidence that demand will continue to be met over the medium to long term and prices do not start to escalate beyond the capacity of prospective purchasers.

It is noted that Council has recently undertaken to prepare an outline development plan for the "northern growth area" in order to establish a framework for how that part of Sale may be able to develop, when appropriate. However, this strategic work has revealed physical constraints that will need to be overcome prior to any serious consideration of rezoning, i.e. difficulties with stormwater drainage due to the general flatness of the area, the physical barriers created by the Melbourne-Bairnsdale Railway line and the Princes Highway, a shortfall of pedestrian footpaths connecting back to the central activity district in the area, the thinness of the Cobains Road reserve, the flightpath for aircraft associated with the East Sale RAAF Base and the large number of separately owned lots, etc. The capacity of the market to absorb the cost of overcoming these physical constraints will obviously also need to be considered prior to rezoning of any land within the northern growth area.

Heritage Assessment

regarding the heritage issues

pursuant to the proposed

Review of the significance and extent of heritage overlay HO63 (Kilmany Park)
on the Schedule to the Heritage Overlay of the Wellington Planning Scheme

at

'Kilmany Park'

1613 Settlement Road, Wurruk



8 April 2016

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1. Executive Summary

The 'Kilmory Park' estate at Warrak, near Sale, was established in 1841 by squatter William Pearson. Systematically developed over time by both Pearson and his son, also William Pearson, the estate eventually covered an area of approximately 30,000 acres.

By the beginning of the 20th century, at the centre of the estate, a homestead had been developed, which reflected the fortunes of both the estate and the Pearson family in its extent, facilities and architectural pretension. Incorporating buildings designed by one of regional Victoria's notable domestic architects, J.H.W. Pettit, and Melbourne's pre-eminent commercial and domestic architects, Harry B. Gibbs and Finlay Architects, the homestead consisted of: a significant mansion house, formal gardens, various domestic outbuildings, a purpose-built racing horse stable and various estate buildings, including men's quarters. The social status of the Pearson family, as formidable members of the Victorian horse racing industry, generous public benefactors within the Gippsland region and a political dynasty seen through successive generations serving as state parliamentarians, resulted in 'Kilmory Park' serving as a social centre for both the Sale district and the upper echelons of Victorian state society during the Victorian and Edwardian periods, including royalty, state governors, Melbourne gentry and notable residents of the Sale district. The homestead and its setting, including gardens, grounds and surrounding landscape, are significant for these associations.

Following the significant reduction of the estate, due to compulsory acquisition by the Closer Settlement Board from the early 1910s, and the eventual disposal of the homestead and its remnant land by the Pearson family in the 1920s, its acquisition as a Presbyterian Church boys' home in 1923 (the Kilmory Park Farm Home for Boys) saw the construction of multiple buildings directly related with the operation of the home and the education, social welfare and training of the boys who lived there, including: a school house (c.1927), a dloyd room, designed by renowned Public Works Department Percy Everett (c.1949); and a recreation centre (1962), presumably designed by notable Post-war era architect Keith Reid. These buildings have contributory significance for their social and architectural significance; socially for the operations of the boys' home and architecturally for being good examples of their typologies in addition to their provenance as works of architects Percy Everett and, presumably, Keith Reid. A series of caretakers' and labourers' houses associated with the operation of 'Kilmory Park' as the boys' home and as a dairy farm, by the Uniting Church of Australia (following the closure of the boys' home and its transfer from the Presbyterian to Uniting Churches in c.1977) are not significant.

In 1995, 'Kilmory Park' was placed on sale by the Uniting Church and purchased by surgeon Mr. Daryl Page on December 18th 1995.

In 2005, 'Kilmory Park' was identified as being of 'State' significance and was subsequently included on the Schedule to the Heritage Overlay (HO) to the Wellington Planning Scheme, for these associations, as HO68 – Kilmory Park. An English Oak in the gardens of the homestead was also included on the HO at this time for its associations with visiting royalty and the social status of 'Kilmory Park' during the Victorian and Edwardian periods.

In 2015, Mr. Daryl Page engaged Trethowan Architecture (Trethowan) to undertake a heritage assessment of the property. The heritage assessment was commissioned following the decision by Dr. Page to review the significance of the property and the ability for partial subdivision of outlaying areas of the property. These actions have included the engagement of planners (Beveridge Williams Development and Environment Consultants) to advise on the potential for subdivision of these identified outlaying areas of the property.

This Heritage Assessment reviews the significance of 'Kilmory Park' in its current form and assesses the perceived heritage impacts on the ascribed heritage significance of the property associated with its partial subdivision.

2. Introduction

2.1 Background

This Heritage Assessment has been prepared for 'Kilmany Park', 1613 Settlement Road, Wurruk. The Assessment is applicable to all land, at the above address, covered by heritage overlay HO68 (Kilmany Park) only.

The Assessment has been commissioned by Dr. Daryl Page.

The author of the Assessment is Sam Nicholls, in consultation with Bruce Trethowan.

2.2 Purpose of the Document

The purpose of this document is to assess the significance of all the land, outbuildings and landscape elements contained on the property 'Kilmany Park' – hereafter referred to as the property (refer Figure 1).

The intent of the document is to determine the potential for subdivision of specific areas of the property covered by the existing heritage overlay (HO68 – Kilmany Park) and the potential impact on the significance of the heritage overlay should subdivision occur.

2.3 Location

The property, 'Kilmany Park', is located on Settlement Road, Wurruk, approximately 5km south-west of Sale (refer Figure 1). The property is jointly bordered, to the north, by neighbouring farmland and the eastern extent of the minor roadway Armap Road. To the north of Armap Road, established subdivisions of 1 acre allotments have been developed, the nearest bound by Mountview Drive to the north and east, Armap Road to the south and Reid Drive to the east. The subdivisions incorporate approximately nine streets (drives and courts). The farmland bordering the north boundary of the property is the subject of proposed rezoning and residential redevelopment that would form an extension of this existing subdivision. The remaining boundaries of the property are bordered by the major roadway Settlement Road (to the east) and neighbouring farmland to the south and west.

The property consists of the majority of those remaining vestiges (land and buildings) of the former 'Kilmany Park' estate and the later 'Kilmany Park Farm Home for Boys', including: the mansion house, outbuildings, gardens, parkland, surrounding paddocks and extant stands of European and indigenous trees. While the majority of buildings remain on the property, several buildings associated with both the homestead complex and the later boys' home have been subdivided into separate titles and therefore exist as individual properties. These individual properties are Nos. 148A, 148B, 148C, 148D and 148F Reid Drive. A road easement, an extension of Reid Drive, extends through the northern section of the homestead complex. Refer to Section 5.2 (Built Form) of the report for descriptions of the subdivided properties.



Figure 1 Location of the property within the context of the Wurruk and Sale, the property is indicated.
Source: Google Maps, 2016



Figure 2 Diagram showing the 2008-09 subdivision of the northern extent of the homestead complex, overlaid with a coloured key. The coloured key indicates the subdivided properties as: 148A Raid Drive (pink), 148B Raid Drive (purple), 148C Raid Drive (orange), 148D Raid Drive (red), 148F Raid Drive (green), and the road easement (cyan). Source: Land Victoria

2.4 Reference Documents

The following documents have been referenced in the preparation of this Heritage Assessment:

- Heritage reports:
 - John Hawker Horticulturalist, Heritage Victoria, Kilmany Park, Sale – Plant Survey, 20th March 1997.
 - Anne Napier Architect, Proposed Subdivision 'Kilmany Park' Settlement Road, Wurruk, 1st December 2005.
 - David Helms Heritage Planning + Management, Kilmany Park Sale, Review of heritage significance, January 2009.
- Planning reports:
 - Beveridge Williams Development and Environment Consultants, South Wurruk Development Plan, July 2014 (Draft).

3. Heritage Listings and Controls

3.1 Statutory Listings

3.1.1 Heritage Act 1995

3.1.1.1 Victorian Heritage Register

The property is not included as a heritage place on the Victorian Heritage Register (VHR), pursuant to the Heritage Act 1995.

Despite the subsequent reference to the property as being of 'State' significance (refer Section 3.1.2.3 Property Significance), is not included on the VHR.

3.1.2 Planning and Environment Act 1987

3.1.2.1 Wellington Planning Scheme

The property is identified as heritage overlay HO68 – Kilmany Park – on the Heritage Overlay Map of the Wellington Planning Scheme (refer Figure 3). The heritage overlay relates to the land and subject buildings of the property, including the subdivision discussed at Section 2.3 (Location). External paint and tree controls apply as a result of the Heritage Overlay, however, no internal controls are applicable.

In addition, HO68 includes the additional heritage overlay identified as HO151 (Oak Tree) on the Heritage Overlay Map. Tree controls are applicable as a result of the Heritage Overlay.

3.1.2.2 Heritage Studies

The property has been the subject of the previous heritage studies and reviews:

- Context Pty Ltd, Wellington Shire Heritage Study: Stage 1 – Volume 1: Study methods and results, May 2005.
- Context Pty Ltd, Wellington Shire Heritage Study: Stage 1 – Volume 2: Environmental History, May 2005.
- Anne Napier Architect, Proposed Subdivision 'Kilmany Park' Settlement Road, Wurruk, 1st December 2005.
- David Helms Heritage Planning + Management, Kilmany Park Sale: Review of heritage significance, January 2009.

The **Wellington Shire Heritage Study: Stage 1** (Context Pty Ltd, 2005) was initially undertaken in order to assess the significance of the property as part of its inclusion on the Schedule to the Heritage Overlay of the Wellington Planning Scheme. This significance was assessed on the basis of historical research previously undertaken as part of the inclusion of the property on the non-statutory registers of the National Trust of Australia (Victoria) and the now-archived Register of the National Estate (refer Section 3.2 Non-Statutory Listings). The property was assessed as being of 'State' significance as a result of this assessment (refer Section 3.1.2.3 Property Significance).¹ The property was subsequently included within heritage overlay HO68 as a result of its identified significance. The Statement of Significance developed for the property, as part of the assessment, was based on those developed by the National Trust of Australia (Victoria) and the Register of the National Estate. The English Oak tree (*Quercus robur*) was identified as having significance in light of its inclusion on the National Trust of Australia Register of Significant Trees.²

In May, 2005, the property was re-assessed in the report **Proposed Subdivision 'Kilmany Park' Settlement Road, Wurruk** (Anne Napier Architect, 2005). The report was based on an application to subdivide the buildings on the property onto a series of 6 individual allotments.³ The report undertook further historical research, extracting quotes from two published sources,⁴ and provided a physical assessment of the individual buildings on the property.⁵ In its assessments of the perceived impacts associated with subdivision, the report extracted quotes from the Heritage Victoria published

¹ Context Pty Ltd, Wellington Shire Heritage Study: Stage 1 – Study methods and results, 2005, p. 130.

² Wellington Shire Council, HERMES database record no. 128012, Place Citation Report 'English Oak (*Quercus robur*)', p. 2.

³ Anne Napier Architect, Proposed Subdivision 'Kilmany Park' Settlement Road, Wurruk, 1st December 2005, pp.4-5.

⁴ Proposed Subdivision 'Kilmany Park' Settlement Road, Wurruk, pp.2-3.

⁵ Proposed Subdivision 'Kilmany Park' Settlement Road, Wurruk, pp.3-5.

document *Guidelines For The Assessment of Heritage Planning Applications*.⁶ In light of the information gleaned from these documents, the report developed a series of recommendations for the management of the property.

Amongst others, it recommended:

- Subdivision of the property into the proposed 6 allotments was appropriate
- HO68 remain over all allotments, despite the subdivision, as part of a broader management plan for the heritage overlay
- Internal controls to the individual properties need not apply
- External paint controls be removed from selected allotments; and
- External tree controls be removed from selected allotments

The subdivision of the property into the proposed number of allotments occurred, creating the new properties 148A – 148F Reid Drive.⁷ The heritage overlay was retained its existing boundary (refer Figure 3).

In January, 2009, the property was again re-assessed in the report *Kilmany Park Sale: Review of heritage significance* (David Helms Heritage Planning + Management, January 2009). The report was based on a review of the significance of the property in order to provide recommendations to alter the extent of HO68.⁸ A history of the property was developed and based, like that of the *Wellington Shire Heritage Study: Stage 1*, on the previous research undertaken by the National Trust of Australia (Victoria) and the Register of the National Estate; an assessment of the property was undertaken as part of the report.⁹ Based on the assessment and previous historical research, a Statement of Significance was developed for the property.¹⁰

The preceding heritage reports (Napier, 2005 and Helms, 2008) are included at Appendix C.

3.1.2.3 Property Significance

The property, 'Kilmany Park', is identified as being of 'State' significance in the *Wellington Shire Heritage Study: Stage 1 – Volume 1: Study methods*. State significance is defined as:

*State significance: those places that are considered to contribute to the heritage of Victoria.*¹¹

The Statement of Significance for the property reads as follows:

Kilmany Park is of considerable historical and aesthetic significance to Wellington Shire and the Gippsland region.

Historically, it has associations with the pastoral settlement of Gippsland in the mid-nineteenth century and illustrates the status of the pastoralists within Gippsland society. It has important associations with the locally important Pearson family who were influential in local and Victorian commerce and politics. Aesthetically, the present Classically [sic] derived mansion with the wide arcaded loggia at ground level and superimposed upper arcade with segmental arches and ponderous central pediment, is notable as one of the last of the conservative Classical mansions erected in Victoria. (RNE criteria A.4, B.2, D.2, E.1 & H.1)

*(The Commission is in the process of developing and/or upgrading official statements for places listed prior to 1991. The above data was mainly provided by the nominator and has not yet been revised by the Commission.)*¹²

⁶ *Proposed Subdivision 'Kilmany Park' Settlement Road, Wumuk*, pp. 5-9.

⁷ Land Victoria, Planning Property Report – 148B Reid Drive, Wumuk, 23rd February 2016, p. 1.

⁸ David Helms Heritage Planning + Management, *Kilmany Park Sale, Review of heritage significance* – January 2009, p. 1.

⁹ Helms, *Kilmany Park Sale, Review of heritage significance* – January 2009, pp. 2-4.

¹⁰ Helms, *Kilmany Park Sale, Review of heritage significance* – January 2009, pp. 4-5.

¹¹ *Wellington Shire Heritage Study: Stage 1 – Study methods and results*, 2005, p. 10.

¹² Wellington Shire Council, HERMES database record no. 120062, Place Citation Report 'Kilmany Park', p. 2.

The Statement of Significance for the English Oak reads as follows:

This English Oak (Quercus robur) at Kilmany Park planted by King George V when visiting the property as the Duke of York on 15 May 1901 is of historical and scientific (horticultural) significance to Wellington Shire. Historically, it is significant for its associations with King George V and a reminder of his visit to Sale at the time of Federation. It demonstrates the importance of Sale as city and Kilmany Park. Scientifically, it is of horticultural significance as a fine mature specimen of this species. (RNE criteria A.4, D.2 and H.1)¹¹

The Statements of Significance for 'Kilmany Park' and the Oak Tree have been derived from the Statements of Significance developed by the Register of the National Estate and the National Trust of Australia (Victoria), refer Section 3.2 Non-Statutory Listings.

The heritage citations for 'Kilmany Park' and the Oak Tree, contained in the Wellington Shire Heritage Study, are included at Appendix A.

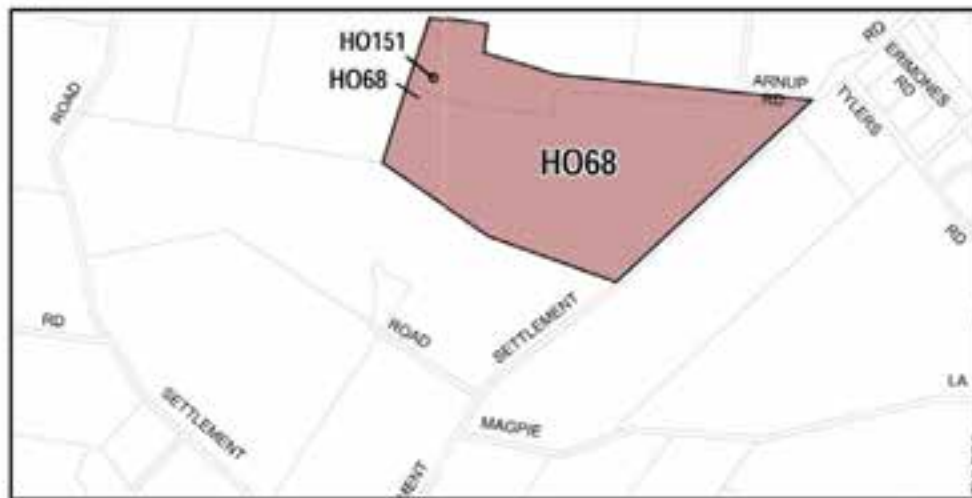


Figure 3 Extract of the heritage overlay map from the Wellington Planning Scheme; the extent of the property is indicated.
Source: Wellington Planning Scheme

¹¹ Wellington Shire Council, HERMES database record no. 128012, Place Citation Report 'English Oak (Quercus robur)', p. 2.

3.2 Non-Statutory Listings

3.2.1 Register of the National Estate

The property is included on the now archived Register of the National Estate (RNE), known as the Australian Heritage Database, as Place ID 4772 – Kilmany Park. The property was registered as a historic building on 21 March 1978.

The registration for the property includes the following Statement of Significance:

Gilman Park is one of the oldest established properties in eastern Victoria and largely founded by William Pearson. Resolute Scot, successful pastoralist, politician, and mining entrepreneur. The present Classically [sic] derived mansion with the wide arched loggia at ground level and superimposed upper arcade with segmental arches and ponderous central pediment, is one of the last of the conservative Classical mansions erected in Victoria and notable for this fact. William Pearson junior was a model of his father's career.¹⁴

There are no statutory requirements as a result of the registration

The accompanying citation for the registration is included at Appendix B.

3.2.2 National Trust of Australia (Victoria)

The property, and the English Oak tree planted by The Duke of Cornwall and York, are classified by the National Trust of Australia (Victoria).

The 'Kilmory Park Homestead' is classified as being locally significant - file no. B2969. The building was classified on 7th December 1972.

The classification for the property includes the following Statement of Significance:

A two-storeyed mansion on a particularly grand scale, built in 1901 for the major squatter William Pearson, and notable for the variety of its art nouveau plaster decoration, the art nouveau timber screen in the drawing room, the imposing stair lobby and the great balcony, now partially built in

The 'Quercus robur' (English Oak) is classified as being state significant – file no. T11099. The tree was classified on 10th April 1997. The tree is included on the National Trust of Australia Register of Significant Trees.¹⁰

The accompanying citations for the classifications are included at Appendix B.

¹⁰ Department of the Environment – Australian Government, ‘Kilmany Park, Reid Dr, Woom’ in Australian Heritage Database, accessed 20 January 2016 at <http://www.environment.gov.au/aushp>.
https://search.proxyspace.com/search?place_name%3Dkilman%20park%20list_code%3DRNC%20keyword_PO%2On%20keyword_SS%2On%20keyword_PV%2On%20latitude_14%3DS%20longitude_14%3DE%20longitude_24%3DE%20latitude_24%3DS%20region%20atplace_id%3D77

¹¹ National Trust database, *Kilnsey Park Homesleaf*, accessed 20 January 2016 at <http://hdl.handle.net/100720006>

* Wellington Shire Council, HERMES database record no. 128012. Place Citation Report 'English Oak (*Quercus robur*)', p. 2.

4. History

4.1 Contextual History

4.1.1 Settlement of North Gippsland

From the early 1840s, the Gippsland region of Victoria was initially settled by 'squatters'¹⁷ who took up licenses on vast runs of Crown land. The majority of these early settlers were Scottish emigrants.¹⁸ This followed earlier exploration into Gippsland, from New South Wales, by Scottish explorer Angus McMillan from December 1839.¹⁹

The inaccessibility of Gippsland from Melbourne during this early period was well noted, the Crown Lands Commissioner for Gippsland, Charles Tyers, abandoning his attempt at a 'practical overland route', in September 1843, instead opting to sail for Port Albert in January 1844.²⁰ Prior to this, the majority of attempts at an overland route into the central plains of North Gippsland had been made from the New South Wales borders, via the mountain trail of Angus McMillan through alpine Gippsland.²¹ Those settlers opting for the alpine route shepherded livestock (both sheep and cattle) on a journey that, in the case of the early 'overlander' William Odell Raymond in June 1842, took four months.²²

Other Scottish squatters that opted for the overland route included William Pearson who, at the age of 23, started for Gippsland in June 1841. Travelling overland toward the Murray River (to the future site of Albury), Pearson followed the Mitta-Mitta River toward Mt Gibbo from where he travelled overland, via Ormeo, into Gippsland where he took up a 'run'²³ on the central plains, in what would become the Sale district, in September 1841.²⁴ He named his run 'Kilmany Park'.

4.2 Place History

4.2.1 William Pearson of 'Kilmany Park'

William Pearson (1818-1893) was born at Hilton, Parish of Kilmany, Fife, Scotland and educated at Edinburgh High School.²⁵ The son of a retired Royal Navy officer,²⁶ Captain Hugh Pearson,²⁷ young Pearson developed a penchant for the sea and was assigned to an American timber ship by his father in the expectation it would dissuade him from entering the seafaring profession. Captain Pearson's attempts achieved the opposite effect with young Pearson jumping ship and joining the service of an East Indiaman,²⁸ in 1838, where he eventually rose to the position of third officer by the age of 20.²⁹ Following the death of Pearson's father in 1839, he left the sea and sailed from Greenock, Scotland for Australia in September 1840. Pearson arrived in Adelaide early in 1841 from where he travelled overland to Port Phillip (Melbourne) and thence onwards to Gippsland.³⁰

Upon his arrival in Gippsland in September 1841, from Ormeo, with a herd of cattle co-owned with fellow settler Malcolm Macfarlane,³¹ Pearson took out a license in his mother's name, Helen Pearson of Edinburgh, for a run of 12,800 acres,

¹⁷ Squatter: Someone who settled on Crown land to run stock, especially sheep, initially without government permission, but later with a lease or licence. (Macquarie Dictionary definition)

¹⁸ Peter Syme, *Gippsland's Lucky City: A History of Sale*, 1994, p. 19.

¹⁹ Theo Webster, 'McMillan, Angus (1810-1865)', *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, first published in hardcopy 1967, accessed online 3 February 2018: <http://adb.anu.edu.au/biography/mcmillan-angus-2416/entry1203>

²⁰ *Gippsland's Lucky City: A History of Sale*, p. 19.

²¹ *Gippsland's Lucky City: A History of Sale*, p. 19.

²² *Gippsland's Lucky City: A History of Sale*, p. 19.

²³ Run: A large area of grazing land; a rural property; a grazing run; a sheep run. (Macquarie Dictionary definition)

²⁴ Alexander Henderson, 'Pearson of Kilmany Park', *Henderson's Australian Families*, 1941, p. 27.

²⁵ 'Pearson of Kilmany Park', *Henderson's Australian Families*, p. 27.

²⁶ 'Pearson of Kilmany Park', *Henderson's Australian Families*, p. 27.

²⁷ Mervyn Stevenson, *Kilmany's Stories 1911-2011*, 2011, p. 4.

²⁸ East Indiaman: a large armed sailing vessel of the East India Company. (Macquarie Dictionary definition)

²⁹ *Kilmany's Stories 1911-2011*, p. 4.

³⁰ 'Pearson of Kilmany Park', *Henderson's Australian Families*, p. 27.

³¹ 'Pearson of Kilmany Park', *Henderson's Australian Families*, p. 27.

before eventually transferring this into his own name in 1848.³² Pearson's change in ownership of the license was no doubt influenced by the preceding right obtained by squatters, in 1847, for freehold title on homestead blocks and long leases, of up to 14 years, on remaining land.³³

Securing freehold on the homestead block led to the development of more permanent structures after 1847, including the first 'Kilmany Park' house: a gable roofed weatherboard bungalow of sorts, with five sets of French doors opening onto a recessed verandah beneath a continuous roofline (refer Figure 5). In c. 1870-71, this house was superseded as the principal residence on the estate with Pearson commissioning a new house,³⁴ to a design by Norwich-born, Sale-based architect and surveyor John Henry Wroth (J.H.W.) Pettit (refer Figure 6).³⁵ Despite being superseded, the original house was retained as an annexe to the new residence with an internal connection between the two, via a small hipped-roof weatherboard link (refer Figure 5).

William Pearson's character was defined by 'reputed aristocratic looks and stern demeanour' yet demonstrated a quick reaction when 'he believed his honour was being questioned'.³⁶ He also demonstrated an aptitude and ruthlessness in his business and personal pursuits, aiding in his development of 'Kilmany Park' as one of the great pastoral properties of Victoria. In 1862, the first example of this business acumen came at a time of threat to the squatting class's leased land on the Sale plains, via the terms of the Duffy Land Act. The Duffy Land Act was established in the 1860s as a response by government to assist out of work ex-miners establish themselves as small farmers or 'selectors' by reverting Crown land to freehold title. The majority of this land was identified as that Crown land held by the ruling squatter class under licensee or lessee agreement, the best of which was reserved by the government for disbursement via auction. In 1862, a pact was entered into by the various Gippsland squatters in which they would not bid against one another in the auctions held at land offices in the regional centres of the district. In the instance of one of these sales, this pact was dishonoured with William Pearson bidding on the neighbouring run to 'Kilmany Park', 'Fulham Station', and ultimately un-seating the squatter of Fulham, Captain J.W. Jones. Following a public denunciation of Pearson in the editorial of the *Gippsland Times* after the event, it was reported that Jones suicided not long thereafter.³⁷ Having procured the entirety of 'Kilmany Park' per the Gippsland squatters' pact and the majority of 'Fulham Station' via auction, the whole was converted into freehold title by 1868.³⁸ In 1872, further accounts of Pearson's questionable conduct with regard to land acquisition at the local land board arose when morass land (marshy ground) leased by him at Warrak was opened up to selectors. In this instance, the police magistrate W.H. Foster and district surveyor W.T. Dawson were in attendance in an attempt to thwart Pearson's undue influence over the sale through his use of several 'dummy bidders' on his behalf, including the private schoolmaster to his children Reginald Wynne, so that it appeared that land was being purchased by the selectors for whom it was intended. In 1877, a candidate for the seat of North Gippsland asserted that the failure of the land sales between Sale and Rosedale and been due to being 'dummed by Pearson'.³⁹ While questionable, the adoption of these practices was ultimately successful with Pearson increasing 'Kilmany Park' to over 14,500 acres by 1882.⁴⁰ By 1894, the property totalled 17,000 acres.⁴¹ At the beginning of the new century, the estate covered nearly 30,000 acres.⁴²

The acquisition of such land did come at significant cost, however Pearson's diversified business portfolio extended beyond that of pastoral pursuits. In June 1865, Pearson's fortuitous investment, along with other leading squatters on the Sale plains,⁴³ realised the establishment of the Long Tunnel Extended Gold Mining Company mine at Walhalla, Pearson being its largest shareholder with 900 shares.⁴⁴ With an initial share price of £5, resulting in a capital outlay of £4,500, Pearson's

³² 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

³³ *Gippsland's Lucky City: A History of Sale*, p. 43.

³⁴ 'Tenders', *Gippsland Times*, 8 December 1870, p. 2.

³⁵ 'John Henry Wroth Pettit', Design and Art Australia Online, accessed 5 February 2016: https://www.daan.org.au/who/john-henry-wroth-pettit/personal_details/

³⁶ Deirdre Morris, 'Pearson, William (1818-1893)', *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, first published in hardcopy 1967, accessed online 9 February 2016: <http://adb.anu.edu.au/biography/pearson-william-4384>

³⁷ *Gippsland's Lucky City: A History of Sale*, p. 43.

³⁸ *Kilmany's Stories 1911-2011*, p. 4.

³⁹ *Gippsland's Lucky City: A History of Sale*, p. 44.

⁴⁰ *Kilmany's Stories 1911-2011*, p. 4.

⁴¹ 'Kilmany Park', *The Leader*, 18 August 1894, p. 8.

⁴² 'The Gippsland Capital - An Other's See It', *Gippsland Times*, p. 3.

⁴³ *Gippsland's Lucky City: A History of Sale*, p. 34.

⁴⁴ *Kilmany's Stories 1911-2011*, p. 4.

share price rose to £212, realising dividends of £512 per share over the 45 years of the mine's operations⁴⁰ between 1865 and 1911.⁴¹

With the systematic increase in his wealth, Pearson further expanded his interests, investing in costly social pursuits, including hunting and horse racing, that would later become lynch pins in the social structure of the Gippsland community. Pearson was the first to introduce fox hounds into the Gippsland region for the sport and maintained them as 'master of the hounds', a position he retained until 1868 when he handed the responsibility to the newly formed Sale-district Hunt Club.⁴² His interest in horse racing in particular became a primary focus over time, initially beginning him as a race horse owner running at the local racecourse at Flooding Creek (as Sale was then known) where he won his first race in 1842.⁴³ Later, he became an important supporter in the development of the Greenwattle Racecourse at Sale, both as an official of the Sale Turf Club and as a horse owner.⁴⁴ In 1867, Pearson's contribution to the local racing industry began to border, in the eyes of some in the community, on undue influence with a question of a monopoly raised in light of Pearson's positions as secretary, treasurer and collector of funds for the Gippsland Turf Club in addition to him being the race handicapper and owning horses competing in the races.⁴⁵ His response to his critics, particularly with regard to his method of handicapping horses, was a claim for damages in a libel suit that he subsequently lost.⁴⁶ Not one to suffer failure, Pearson instead broadened his focus further afield to the metropolitan races of Melbourne and subsequently placing greater emphasis on the development of his racing stable at Kilmany Park, the Pearson stable even possessing its own racing colour – black with a white stripe.⁴⁷ In 1880-81, Pearson commissioned improvements to the Kilmany Park stables including the construction of a purpose built racing stable, again engaging Sale-based architect John Henry Wroth Pettit.⁴⁸ Constructed by Rosedale builder William Allen,⁴⁹ the stable consisted of 10 loose boxes and 5 stalls.⁵⁰ At its height the stables were considered 'the best outside Melbourne'.⁵¹ consisted of the central stable buildings and three training tracks, two of which were specifically designed for jumpers (steeple-chase) incorporating 'stout post and rail and log and stone fences' for training the horses, the whole overseen by a staff of 24.⁵² For those employed in the stables, rough treatment was incurred under Pearson, especially the jockey who 'rode a bad race on a horse that was expected to win and did not, he was "given a hiding" when he got home'.⁵³ Outside of the stables however, Pearson possessed a reputation as a notable breeder within Victoria, becoming members of both the Victoria Amateur Turf Club (Caulfield Racecourse) and the Victoria Racing Club (Flemington Racecourse), the latter including a position on the Racing Club Committee.⁵⁴ While experiencing great success, reputedly winning over 300 races and breeding over 100 winning horses,⁵⁵ the Melbourne Cup eluded his grasp; his nearest win with the Kilmany Park-bred horse 'Commoion' finishing second in 1884.⁵⁶ In October 1893, having 'completely broken down', 'Commoion' was shot at 'Kilmany Park', the destruction of the horse making significant headlines in *The Age* newspaper.⁵⁷ Following his destruction, 'Commoion' was buried in the gardens of the homestead.⁵⁸

⁴⁰ *Kilmany's Stories 1911-2011*, p. 4.

⁴¹ Parks Victoria, 'Long Tunnel Extended Gold Mine', accessed online 5 February 2016: <http://parks.vic.gov.au/visit/long-tunnel-extended-gold-mine>

⁴² *Gippsland's Lucky City: A History of Sale*, p. 45.

⁴³ *Kilmany's Stories 1911-2011*, p. 4.

⁴⁴ *Gippsland's Lucky City: A History of Sale*, p. 44.

⁴⁵ *Gippsland's Lucky City: A History of Sale*, p. 44.

⁴⁶ 'Pearson, William (1818-1892)', *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, accessed online 9 February 2016: <http://adb.anu.edu.au/biography/pearson-william-4384>

⁴⁷ *Gippsland's Lucky City: A History of Sale*, p. 44.

⁴⁸ 'Tenders', *Gippsland Times*, 1 November 1880, p. 2.

⁴⁹ 'A Pioneer Builder Passes – Mr Allen, of Rosedale', *Gippsland Times*, 3 January 1924, p. 2.

⁵⁰ 'Kilmany Park', *The Leader*, 18 August 1894, p. 6.

⁵¹ 'Devastating Grass Fires at Sale', *Gippsland Times*, 17 February 1944, p. 1.

⁵² 'Melba's Cup – Not Commoion', *Gippsland Times*, 21 February 1944, p. 2.

⁵³ 'Passed Away – Mr Geo. Wallace', *Gippsland Times*, 22 May 1952, p. 1.

⁵⁴ *Kilmany's Stories 1911-2011*, p. 4.

⁵⁵ *Kilmany's Stories 1911-2011*, p. 4.

⁵⁶ *Gippsland's Lucky City: A History of Sale*, p. 44.

⁵⁷ 'Death Of A Famous Racehorse – Commoion Shot at Kilmany Park', *The Age*, 27 October 1893, p. 6.

⁵⁸ 'Kilmany Park', *The Leader*, 18 August 1894, pp. 6-7.

While openly criticised by many in the Sale district, no doubt in light of his reputation for business, Pearson possessed supporters. In 1864, this support was bought to the fore in Pearson's election to the seat of North Gippsland in the Victorian Legislative Assembly, a seat he was re-elected to in 1866.¹⁴ Resigning his seat in light of his opposition to the introduction of salaries for Legislative Assembly members, he subsequently ran for, and was elected, as the Representative of Eastern Province from 1881 and the Representative of Gippsland from 1882,¹⁵ retaining the seat until his death in 1893.¹⁶ Developing standing in the community as a politician in light of his continued re-election, Pearson's personal investment in the Sale district was no more defined than his contribution, in 1893 at the height of the 1890s depression, of £20 to the Gippsland Hospital to see the institution through following the closure of the National Bank in Sale and with it the loss of the Hospital's credit balance.¹⁷

In light of his increasing time spent in Melbourne between the racing calendar and political appointments, Pearson purchased land in St Kilda East, at the intersection of Orrong and Inkerman Roads (now Inkerman Street) in 1864 for the construction of a townhouse, no doubt leaving a manager in charge of 'Kilmany Park' in his absence. In 1876, he commissioned the construction of a vast suburban 20-room villa, 'Craigellachie', at the centre of the 12 acre estate.¹⁸ The main entrance to the property was entered off Inkerman Street with a trade entrance, to a stable complex overlooked by an estate cottage, off Orrong Road.¹⁹ Significantly larger than comparable stable blocks on neighbouring villa estates, the increased size would have no doubt been a result of the buildings stabling for both the 'Craigellachie' household and race horses from the Kilmany Park stable, 'Craigellachie' providing Melbourne based stabling prior to and after race meets before their return to the racing stables at 'Kilmany Park'. The proximity of the 'Craigellachie' estate to Caulfield Racecourse would have also been advantageous.

The Hon. William Pearson MLC died at 'Craigellachie', St Kilda East, on 10th August 1893.²⁰



Figure 4 Hon. William Pearson I (1815-1893); image date c.1880-1893, photographer unknown. Source: State Library of Victoria

¹⁴ *Kilmany's Stories 1911-2011*, p. 4.

¹⁵ *Kilmany's Stories 1911-2011*, p. 4.

¹⁶ 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

¹⁷ *Gippsland's Lucky City: A History of Sale*, p. 88.

¹⁸ City of Glen Eira, HERMES database record no. 35209, Place Citation Report 'Craigellachie, 2b and 2c Lynedoch Avenue', p.2.

¹⁹ State Library of Victoria, MMGW Detail Plan No. 1430, Shire of Caulfield.

²⁰ *Kilmany's Stories 1911-2011*, p. 4.



Figure 5 External view of the first 'Kilmory Park' house, constructed after 1847 by William Pearson, looking north; photographer and date unknown. The image is taken from the carriage circle (circular driveway) at the front of the house. Note the roofline and chimney of the 'Meat House' to the immediate left of the house.
Source: Pearson-Trumble Family Collection (image courtesy of Angus Trumble, Canberra)



Figure 6 External view of the second 'Kilmory Park' house, constructed in c.1870-71, looking north-west; photographer and date unknown. The image is taken from the gardens to the south-east of the house. Note the original house constructed by William Pearson in the background at right.
Source: Pearson-Trumble Family Collection (image courtesy of Angus Trumble, Canberra)

4.2.2 The Pearson Dynasty

Hon. William Pearson MLC (1818 – 1893)

William Pearson was a defining character in the settlement and development of Gippsland. From the early years of the region's settlement, he positioned himself at the centre of community life, in the Sale district particularly, and by virtue his family as one of the defining 'squatocratic' dynasties of the late Victorian – early Edwardian age.⁷¹

In 1859, William Pearson married Eliza Laura Travers⁷² at 'Grassdale', Gippsland, the two having met on a return trip of Pearson's to his native Scotland earlier that year.⁷³ Eliza was the daughter of H.J. Travers, who, like Pearson, was previously in the service of the East India Company.⁷⁴ Following their marriage, William and Eliza Pearson realised five sons and two daughters:

- Hugh Pearson (1860-1874) – born 'Kilmany Park', Sale
- Henry Travers Pearson (1861-1880) – born 'Kilmany Park', Sale
- William Pearson (1864-1919) – born 'Craigellachie', St Kilda East
- John Benward Pearson (1866-1925) – born 'Kilmany Park', Sale
- Alexander Buchanan Pearson (1869-1920) – born 'Kilmany Park', Sale
- Helen Pearson (1871-1891) – born 'Kilmany Park', Sale
- Laura Margaret Pearson (1874-1905) – born 'Craigellachie', St Kilda East.⁷⁵

Hon. William Pearson MLC (1864 – 1919)

Given the premature death of his two elder brothers, the third son, William Pearson, succeeded them at 'Kilmany Park' as heir apparent. Following his education at the Geelong Church of England Grammar School, he travelled abroad for two years with Bishop Arthur Green before returning to 'Kilmany Park' under his father's direction on the Estate. Pearson subsequently acquired 'Bonegilla' station near Wodonga.⁷⁶ On 2nd July 1887, Pearson wed Sophie Emily Gooch, daughter of George Cornelius Gooch of 'Coonalpyn Station', South Australia,⁷⁷ the two returning, with their young family, to 'Kilmany Park' upon his father's death at 'Craigellachie', from heart disease at the age of 75, in 1894.⁷⁸ Following their marriage, William and Sophie realised one son and two daughters:

- William Roy Pearson (1891-1923) – born 'Bonegilla' station, Wodonga⁷⁹
- Helen Pearson (1893-1975) – born 'Bonegilla' station, Wodonga⁸⁰
- Emily Laura Pearson (known as Mim)⁸¹ – born St Kilda.⁸²

Upon his return to 'Kilmany Park', William Pearson (Junior) assumed the mantle of his father as head of the Pearson family and its position at the centre of community life, and the social squatocratic elite, in the Sale district / Gippsland region. Like his father he took a keen interest in local affairs, including several years as a member of both the Sale Borough Council and Rosedale Shire Council, a term as President of the North Gippsland Agricultural Society and a patron of the Sale Turf Club as its President. Admired for his commitment to community life, he made his private golf course available to the Sale Golf Club following its founding in 1901. In the event of big private tournaments at the 'Kilmany Park' course, Pearson invited boys from Sale to caddy for the gentry of Melbourne who descended upon 'Kilmany Park' to compete. Ever the gentlemen, Pearson had the unwritten rule that these gentlemen golfers be responsible for their caddies being well fed at the preceding

⁷¹ Squatocratic, from Squatterocracy: the long-established and wealthy landowners who regard themselves as an aristocracy. (Macquarie Dictionary definition)

⁷² Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

⁷³ Kilmany's Stories 1911-2011, p. 4.

⁷⁴ Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

⁷⁵ Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

⁷⁶ Kilmany's Stories 1911-2011, p. 4.

⁷⁷ Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

⁷⁸ Kilmany's Stories 1911-2011, p. 4.

⁷⁹ Pearson of Kilmany Park', Henderson's Australian Families, pp. 28-29.

⁸⁰ 'Granny' in The Tumble / Diaries, Angus Trumble, published 15 December 2008, <http://angustrumble.blogspot.com.au/2008/12/granny.html>

⁸¹ Pers. comm.: A. Trumble to S. Nichols, via email, 22 January 2018.

⁸² Pearson of Kilmany Park', Henderson's Australian Families, pp. 28-29.

luncheon he would host in the grounds of the homestead. On one occasion where he noticed one caddy, Arthur Mitchell, being neglected, Pearson confronted 'the offending golfer and dispatched him forthwith to the Sale Railway Station'.¹³ In 1896, Pearson, like his father, entered state politics, running for the same Province his father represented. Elected to the seat, he remained a member of the Council until 1916.¹⁴ He carried on the famous horse stud established by his father, albeit with lesser focus on racing and more on breeding, the large 10 box racing stable previously full of horses in training during his father's time given over to 3 thoroughbred horses. Despite winding back horse-led operations at 'Kilmany Park', by 1894, the estate still supported a stud of 200 horses, nearly all thoroughbreds.¹⁵ Like his father, Pearson maintained an extensive workforce on the estate, including a chauffeur known purely as 'Old Sock', the Pearson's car reputedly one of the first seen in Gippsland.¹⁶ Emily Pearson too assumed her own responsibilities within local affairs, being much admired for her charitable work.¹⁷ While maintaining the majority of his father's vices, Pearson was still yet to make his mark at 'Kilmany Park'.

From 1903, Pearson began his improvements to the property, beginning with 'making and forming 75 chains of roadway', tenders for the project being called by Sale architect G.H. Cain in May, 1903.¹⁸ The works potentially related to the formation of the main driveway to the house, the distance of 75 chains (approx. 1.5kms) comparable to the current length of the driveway. All this was perhaps in preparation for what would be Pearson's ultimate gesture, that being a house with architectural pretension that would maintain the Pearson's of 'Kilmany Park' at the centre of the district socially beyond his life time. Constructed between 1905-06 to a design by pre-eminent Melbourne architects Harry B. Gibbs & Finlay,¹⁹ the c. 1870-71 house on the estate was gutted, a second storey added and the whole extended to create a mansion with a vast imitation ashlar, cement rendered, double-storey colonnade wrapping around three sides of the building. The post-1847 weatherboard house on the estate, which had previously survived as part of the homestead complex, was demolished as a consequence of these works. The mansion was constructed from bricks produced at Young's Brickworks in Raglan Street, Sale, the number of workmen engaged by Pearson in its construction large enough to support its own social club which conducted eel fishing contests on Lake Guthridge, toward the edge of Sale; one event in 1906 attracting 19 competitors and a crowd of onlookers.²⁰ A Melbourne-based newspaper, *The Leader*, did a photographic feature on the homestead, shortly after the completion of the mansion, in July 1906.²¹

Like his father, Pearson entertained at 'Kilmany Park' on a grand scale. In 1901, his hospitality was on show when honoured with being received by his HRH The Duke of Cornwall and York (later King George V) during his Victorian visit to open the first Commonwealth Parliament in Melbourne.²² On this occasion, the Duke planted an English Oak tree in the homestead's gardens.²³ In 1905, his hosting of the Easter Encampment of the 10th Regiment Australian Light Horse saw him lavish the entire regiment. His generosity, 'not forgotten', resulted in him being bestowed the rank Honorary Colonel.²⁴ In 1906, entertaining at 'Kilmany Park' ascended to another level of social hierarchy following completion of the mansion, with Pearson hosting the Farmer's Convention in July of that year the perfect opportunity. Over the course of the event, attendees were received by the Governor of Victoria, Sir Reginald Talbot, with convention delegates and an additional 400 residents of the Sale district hosted on the front lawns.²⁵ Following inspection of the mansion, a large marquee was erected at the rear of the mansion which served afternoon tea to all those in attendance.²⁶ This would become one of the last great events hosted at the mansion, the days of 'Kilmany Park' as a symbol of the squatocracy and what they represented.

¹³ *Gippsland's Lucky City: A History of Sale*, p. 147.

¹⁴ 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

¹⁵ 'Kilmany Park', *The Leader*, 18 August 1894, p. 6.

¹⁶ Pers. comm.; A. Trumble to S. Nichols, via email, 22 January 2016.

¹⁷ *Gippsland's Lucky City: A History of Sale*, p. 123.

¹⁸ 'Tenders', *Gippsland Times*, 25th May 1903, p. 2.

¹⁹ 'Tenders', *Gippsland Times*, 17 April 1905, p. 2.

²⁰ *Gippsland's Lucky City: A History of Sale*, p. 109.

²¹ 'Kilmany Park Estate, Near Sale', *The Leader*, 7th July 1906.

²² 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

²³ Wellington Shire Council, HERMES database record no. 128012, Place Citation Report 'English Oak (*Quercus robur*)', p. 1.

²⁴ *Gippsland's Lucky City: A History of Sale*, p. 110.

²⁵ *Gippsland's Lucky City: A History of Sale*, p. 109.

²⁶ *Gippsland's Lucky City: A History of Sale*, p. 110.

coming to a dose as a tide of sentiment turned against the ruling squatters, both at government level and within the local community.

During the early 1900s, agitation in Sale toward absentee landlords of vast squattocratic estates drew resentment in the community, such individuals seen as making no contribution toward the district, or Sale in particular, and therefore in effect were actively contributing to the slowed growth of the town.¹⁰⁷ While criticism was rife in the case of Henry Foster,¹⁰⁸ a resident of Tasmania whose family had owned the vast 'Heart Estate' since 1848,¹⁰⁹ community criticism of William Pearson was held but muted, despite his considerably larger holding. This was in light of his residing at 'Kilmany Park' for part of the year and the major contributions of himself and his wife to the town; William in his role as public benefactor and parliamentarian and Sophie for her contributions toward local charities.¹¹⁰ Later, in 1910 and despite his considerable contributions to the district, injustice would be delivered to William Pearson in the compulsory acquisition of the western portion of 'Kilmany Park',¹¹¹ an area covering some 8,600 acres (refer Figure 14).¹¹²

Following the sale of the Estate's western section, at the end of 1912, Pearson took his family to England for an extended period. During this time, Sophie Pearson and her daughters, Helen and Mim, were presented at an evening court to King George V and Queen Mary. Their trip also included time on the continent, including Menton in southern France and skiing in Switzerland. While there, the only Pearson son, Roy, enrolled in the British Army, eventually serving as a Lieutenant in the 13th Hussars in Mesopotamia and the King's Own Yorkshire Regiment in France.¹¹³ With Roy remaining in Britain, Pearson and the remainder of the family sailed for Victoria in 1914, however with their only son remaining in Britain, the family returned in 1915 and stayed for the duration of the First World War. Anticipating the length of their stay, Pearson did not contest his parliamentary seat in the Legislative Council in 1916. In his absence, his Australian affairs were left with his brothers (John and Alexander) and a group of, apparently, 'incompetent business agents'.¹¹⁴ In 1918, upon the outbreak of the notorious 'Spanish Flu' pandemic which was contracted by both Helen and Mim, Pearson and his family returned to Victoria and the safety of 'Kilmany Park'.¹¹⁵ Eventually reaching Victoria in 1919, the pandemic killed approximately 10,000 people nationally.¹¹⁶ William Pearson, being 'in indifferent health for some time' eventually succumbed to heart failure in April of that year,¹¹⁷ a potential complication of the influenza pandemic.

The Hon. William Pearson MLC died at 'Kilmany Park', at the age of 54,¹¹⁸ on 31st March 1919.¹¹⁹



Figure 7 Hon. William Pearson II (1864-1919), date and photographer unknown. Source: Pearson-Trumble Family Collection (Image courtesy of Angus Trumble, Canberra)

¹⁰⁷ Gippsland's Lucky City: A History of Sale, p. 123.

¹⁰⁸ Gippsland's Lucky City: A History of Sale, p. 123.

¹⁰⁹ Foster, John (1792-1875), Australian Dictionary of Biography, National Centre of Biography, Australian National University, accessed online 11 February 2016: <http://adb.anu.edu.au/biography/foster-john-2061>

¹¹⁰ Gippsland's Lucky City: A History of Sale, p. 123.

¹¹¹ Kilmany's Stories 1911-2011, p. 4.

¹¹² Gippsland's Lucky City: A History of Sale, p. 146.

¹¹³ 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

¹¹⁴ 'The Pearsons in London' in The Trumble Diaries, Angus Trumble, published 4 March 2008, <http://angustrumble.blogspot.com.au/2008/03/pearsons-in-london.html>

¹¹⁵ 'Granny' in The Trumble Diaries, Angus Trumble, published 15 December 2008, <http://angustrumble.blogspot.com.au/2008/12/granny.html>

¹¹⁶ Australian Emergency Management Knowledge Hub, 'Epidemic - Spanish Flu, Australia-wide 1919', accessed 12 February 2018, <https://www.emknowledge.gov.au/source/97/1918/epidemic-spanish-flu-australia-wide-1919>

¹¹⁷ 'Obituary - The Late William Pearson', Gippsland Times, 3 April 1919, p. 3.

¹¹⁸ 'Obituary - The Late William Pearson', Gippsland Times, 3 April 1919, p. 3.

¹¹⁹ 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.



Figure 8 Mr. W. Pearson's Residence', an extract from the photographic feature 'Kilmory Park Estate, near Sale'. External view of the entrance front of the third 'Kilmory Park' house, looking north-west, shortly following its completion in 1906. Note the croquet hoops on the central lawn (left), indicating its original use as a croquet lawn, and the angled brick edging to the surrounding gardens beds (right). Source: *The Leader*, 7th July 1906, p. 33.



Figure 9 Internal view of the Drawing Room of the third 'Kilmory Park' house, looking west toward the entrance hall; photographer and date unknown. Source: Pearson-Trumble Family Collection (Image courtesy of Angus Trumble, Canberra)



Figure 10 View of wedding party gathered on the front steps of 'Kilmany Park', c. 1912; photographer unknown. The Hon. William Pearson (Jnr.) stands, at right, immediately in front of the car; his wife Sophie Emily Pearson is seated fourth from right. The father of Sophie, George Cornelius Gooch, stands at left of William Pearson. The man in oilskins left of Gooch is the chauffeur 'Old Sock'. William and Sophie's only son and principal heir, William Roy Pearson, stands immediately left of the nearest column. Source: Pearson-Trumble Family Collection (Image courtesy of Angus Trumble, Canberra)



Figure 11 'Looking Across Kilmany', an extract from the photographic feature 'Kilmany Park Estate, near Sale'. External view across the gardens from the first-floor of the mansion house. The building in the foreground appears to be a shade house for the propagation of plants. Source: The Leader, 7th July 1906, p. 33.



Figure 12 'Stock Yard, Stables and Electric Power House', an extract from the photographic feature 'Kilmory Park Estate, near Sale'. External view of the rear yard of the 'Kilmory Park' homestead, looking north-east towards the Pearson racing stables. The electric power house is in the foreground, the stockyards are at right in the background of the stables. The height of the image indicates that it was taken from the first-floor verandah at the rear of the mansion. Source: The Leader, 7th July 1906, p. 33.



Figure 13 'Men's Quarters and Shropshire Ewes', an extract from the photographic feature 'Kilmory Park Estate, near Sale'. External view of the man's quarters, looking north-east. Note, the conical structure in the foreground is an underground water tank. Source: The Leader, 7th July 1906, p. 33.

William Roy Pearson (1891 – 1923)

Following William Pearson's death, the Pearson dynasty and its future at 'Kilmany Park' steadily began to unravel. The heir apparent, William (Roy) Pearson, despite his father's wishes, did not succeed to the estate.¹¹⁰ Having survived World War I, he returned a chronic alcoholic and made the decision to sell 'Kilmany Park' as a consequence of settling his father's estate.¹¹¹

Upon the estate's eventual sale to the Oser Settlement Board for further agricultural subdivision in 1920,¹¹² Sophie Pearson removed to the coastal town of Metung¹¹³ in south Gippsland where she eventually died in 1923.¹¹⁴ Roy Pearson would predecease his mother in 1923, dying at the age of 33 as a result of his alcoholism, at his property 'Commotion' (named by him after his grandfather's famous racehorse) at Kilsyth near Croydon.¹¹⁵ His young bride, Maude Frances Blood Dowling¹¹⁶ returned to her native Toowoomba, Queensland, childless, soon after.¹¹⁷

Pearson's sisters, Emily (Mim) and Helen, coincided their respective marriages with the disposal of 'Kilmany Park', both marrying at St. Paul's Cathedral, Sale in 1920, Mim in January¹¹⁸ and Helen in October. Helen's reception was one of the last events hosted by the Pearsons at the mansion.¹¹⁹

In death, Helen would eventually return to 'Kilmany Park', her ashes scattered 'under a pretty tree on the edge of what was originally the croquet lawn at the front of the house' in 1975.¹²⁰

¹¹⁰ 'Commotion' in *The Turnbull Diaries*, Angus Turnbull, published 20 May 2011, <http://angus Turnbull.blogspot.com.au/2011/05/commotion.html>

¹¹¹ 'Commotion' in *The Turnbull Diaries*, Angus Turnbull, published 20 May 2011, <http://angus Turnbull.blogspot.com.au/2011/05/commotion.html>

¹¹² *Gippsland's Lucky City: A History of Sale*, p. 146.

¹¹³ 'The Pearsons in London' in *The Turnbull Diaries*, Angus Turnbull, published 4 March 2009, <http://angus Turnbull.blogspot.com.au/2009/03/pearsons-in-london.html>

¹¹⁴ 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

¹¹⁵ 'Commotion' in *The Turnbull Diaries*, Angus Turnbull, published 20 May 2011, <http://angus Turnbull.blogspot.com.au/2011/05/commotion.html>

¹¹⁶ 'Pearson of Kilmany Park', Henderson's Australian Families, p. 28.

¹¹⁷ 'The Pearsons in London' in *The Turnbull Diaries*, Angus Turnbull, published 4 March 2009, <http://angus Turnbull.blogspot.com.au/2009/03/pearsons-in-london.html>

¹¹⁸ 'Weddings. Mr. Ray Lindsay Davidson to Mrs. Laura Emily Jackson, Table Talk, 22 January 1920, p. 25.

¹¹⁹ 'Wedding. Berwick - Pearson', *Traralgon Record*, 2 November 1920, p. 4.

¹²⁰ 'Kilmany Park' in *The Turnbull Diaries*, Angus Turnbull, published 24 December 2008, http://angus Turnbull.blogspot.com.au/2008/12/kilmany-park_24.html

4.2.3 Closer Settlement Board

In 1904, the Premier of Victoria, Thomas Bent, introduced the Closer Settlement Estates acts, the gesture representing the revival of previous land settlement acts in an attempt to install small landholders on their own properties following the hardships faced by those during the 1890s depression.¹²¹

In 1910, the Lands Purchase and Management Board made an approach to acquire the western half of the 'Kilmany Park' estate for subdivision into 73 closer settlement agricultural allotments, ranging from 20 acres to 276 acres.¹²² Representing 8,600 acres of the estate developed by his father, William Pearson initially refused the offer. However, the powers of the Closer Settlement Act, even for a sitting parliamentarian at that time, offered little recourse and Pearson sold, realising £12 per acre, approximately £103,200 in total.

Following World War I (1914-18), the influx of returned soldiers to the Sale district hastened the 'breaking up of the large estates'¹²³, the 'national obligation to rehabilitate them and make Australia a land fit for heroes' increasing the necessity for further closer settlement in the district.¹²⁴ Of these, the remnant eastern-portion of 'Kilmany Park' was considered a prize to disperse amongst those more deserving. These opinions were expressed early amongst the citizens of Sale, the decision not to purchase the estate on the advice of the valuer to the Closer Settlement Board, shortly after William Pearson's death in 1919, inoting the 'astonishment and anger of Sale'.¹²⁵ The decision by the Board galvanised the community to convince it (the Board) otherwise, inciting 'rallies, deputations, even speeches at half time at the football'.¹²⁶ In 1920, the Board succumbed to the demands of the Sale community, overlooking the ability for the estate to be subdivided into viable farms (as noted by the Board's valuer) and the further questions associated with what to do with the homestead's vast mansion. The estate was initially subdivided into 36 allotments in an attempt to evenly subdivide the property between low-lying morass and high ground. The subdivision was subsequently increased by 5 allotments following the Board's sale of the homestead and some adjacent land.¹²⁷

In 1923, the Closer Settlement Board sold the homestead and adjacent land to the Presbyterian Church of Victoria.¹²⁸ Prior to the church taking over the homestead, a clearing sale was held dispersing the remainder of the Pearson family's furniture that had presumably been left in the house following their departure.¹²⁹

¹²¹ Kilmany's Stories 1911-2011, p. 12.

¹²² Kilmany's Stories 1911-2011, p. 4.

¹²³ Gippsland's Lucky City: A History of Sale, p. 147.

¹²⁴ Gippsland's Lucky City: A History of Sale, p. 146.

¹²⁵ Gippsland's Lucky City: A History of Sale, p. 146.

¹²⁶ Gippsland's Lucky City: A History of Sale, p. 148.

¹²⁷ Gippsland's Lucky City: A History of Sale, p. 148.

¹²⁸ Gippsland's Lucky City: A History of Sale, p. 148.

¹²⁹ Kilmany's Stories 1911-2011, p. 4.



Figure 14 Kilmory Park Estate, Parishes of Denison and Warrak Warrak, County of Tanjil, 1923, by the Department of Lands and Survey. Plan of the original extent of the Kilmory Park estate showing the subdivision pattern of the property; the homestead block containing the mansion and outbuildings is indicated.
Source: Centre for Gippsland Studies, Monash University



Figure 15 Extract of the map Kilmory Park Estate, parishes of Denison and Warrak Warrak, county of Tanjil, 1923, by the Department of Lands and Survey. The extent of the homestead block is indicated. Note the original alignment of the driveway. The mansion (homestead) and stables are the only buildings indicated on the remnant property. The original Woolshed and Yards of the property (indicated by the red arrow) are shown on the neighboring property.
Source: Centre for Gippsland Studies, Monash University

4.2.4 The Kilmory Park Home for Boys (1924 – 1978)

In the early 1920s, the idea of repurposing the former Pearson homestead at 'Kilmory Park' as a boys' welfare home was initiated by local merchant and Presbyterian parishioner Mr. W.D. Leslie.¹³⁰ On 8th January 1923,¹³¹ the homestead and some 200 acres of land¹³² were subsequently purchased by the Rev. Donald A. Cameron M.A. on behalf of the Presbyterian Church of Victoria on the 8th January 1923 (refer Figure 14).

Opening in 1924¹³³ as the 'Kilmory Park Farm Home for Boys',¹³⁴ the Home was designed as a place 'to transplant city boys who were at social risk, to the wholesome atmosphere of a Gippsland farming property'.¹³⁵ The Home's farm, the 'McClelland Memorial Farm' was gifted to the institution in the memory of Thomas Hugh McClelland (1907-1924) by his parents Thomas and Elizabeth McClelland,¹³⁶ a plaque at the rear entrance to the homestead indicating the donation (refer Figure 66); a Mr. and Mrs. T. McClelland were members, respectively, of the Committee and Melbourne Ladies' Auxiliary of the Home at this time.¹³⁷ Overseen by a complicated management structure in both Melbourne and Sale, the management structure included: a Patron, Chairman, Hon. Secretary and Treasurer, Committee, Sale Advisory Committee, Melbourne Ladies' Auxiliary and a Sale Ladies' Auxiliary.¹³⁸ The first superintendent of the Home was Mr. H. Clyne.¹³⁹

By 1925, numbers increased at the Home, 44 boys having passed through, for both long and short stays, in that year.¹⁴⁰ At the time, the Home's farm ran 30 milking cows, 25 pigs and Ayrshire cattle for breeding in addition to growing wheat (5 acres), barley (15 acres), oats for hay (10 acres), potatoes (2 acres), and maize, sugar mangolds, and pumpkins (5 acres). The wheat grown was ground at the local mill for the Home.¹⁴¹ With constant pressure placed on the local school at Warrak, to which the boys would travel for their schooling, the Victorian Education Department opened a school in 1927, the Kilmory Park School No. 4240,¹⁴² at the rear entrance to the homestead; the school consisting of two buildings, a school house and a Sloyd (woodwork) room.¹⁴³ By 1944, average attendance at the school had increased to 40 boys and 3 girls.¹⁴⁴ Previously, in 1931, the numbers of students at the school had prompted discussions regarding the provision of a residence for the Head Teacher and the relocation of a vacant Closer Settlement Board house on 'O'Farrell's Block', a half mile away from the school, to facilitate this.¹⁴⁵ It is unclear whether the relocation of this residence occurred, however by the late-1930s a white weatherboard house had been constructed in the proximity of the school.¹⁴⁶ The original intended use of the house is uncertain.

In February 1944, significant grassfires in the East Kilmory – Rosedale area caused widespread damage, devastating the rural communities and causing significant livestock and infrastructure losses.¹⁴⁷ 'Kilmory Park' was not spared with significant damage caused to the Home and school. At the school, outhouses and the Sloyd room, with all its equipment, were destroyed with the school house escaping relatively unscathed, albeit for requiring repainting externally as a result of

¹³⁰ Pers. comm.: D. Page to S. Nichols, via email, 29 January 2018.

¹³¹ Public Records Office of Victoria, LS25857 Kilmory Park Farm Home for Boys Presbyterian Church of Victoria Warrak Warrak 1 E 11 11A 206—3—20, VPRS 5714P0000612, 1923-1942.

¹³² Gippsland's Lucky City: A History of Sale, p. 169.

¹³³ Gippsland's Lucky City: A History of Sale, p. 169.

¹³⁴ Public Records Office of Victoria, 'The Kilmory Park Farm Home for Boys', Sale, Gippsland, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹³⁵ Gippsland's Lucky City: A History of Sale, p. 169.

¹³⁶ Thomas Hugh McClelland, Find A Grave, accessed 19th February 2018 at <http://www.findagrave.com/cgi-bin/fg.cgi?page=g&GRid=114338488>.

¹³⁷ Public Records Office of Victoria, 'The Kilmory Park Farm Home for Boys', Sale, Gippsland, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹³⁸ Public Records Office of Victoria, 'The Kilmory Park Farm Home for Boys', Sale, Gippsland, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹³⁹ Public Records Office of Victoria, 'The Kilmory Park Farm Home for Boys', Sale, Gippsland, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹⁴⁰ Public Records Office of Victoria, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹⁴¹ Public Records Office of Victoria, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹⁴² Public Records Office of Victoria, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹⁴³ Gippsland's Lucky City: A History of Sale, p. 169.

¹⁴⁴ Public Records Office of Victoria, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹⁴⁵ Public Records Office of Victoria, 4240 Kilmory Park, Building Files: Primary Schools, VPRS795P0000/3004, 1924-67.

¹⁴⁶ Pers. comm.: D. Page to S. Nichols, via email, 29 January 2018.

¹⁴⁷ Devastating Grass Fires at Sale', Gippsland Times, 17 February 1944, p. 1.

the fire.¹⁴⁰ In comparison, the Home and its centre at the Pearson family's former homestead, which had been largely retained intact by the Presbyterian Church, saw significant damage. The architect-designed racing stables of William Pearson were largely left in ruins, albeit for the flanking wings either side of the central yard.¹⁴¹ 1,200 bales of meadow contained within the building fuelled the fire.¹⁴² The old woolshed of 'Kilmany Park', evident on 1923 maps of the property (refer Figure 15) was also destroyed during the fires, the building 'lled with hay'.¹⁴³ A series of timber outbuildings, dating from the Pearson era, which did survive the fires were subsequently demolished prior to 1949.¹⁴⁴

Following the fire, improvements to the school were slow. While replacement of the Sloyd room was considered urgent in 1944, a design for a replacement Sloyd room was not prepared by the Chief Architect of the Public Works Department, Percy Everett, until June 1949. Reconstruction of the room was undertaken by Reconstruction Trainees at the Sale Technical College, however by April 1949 the building had been left unfinished following the closure of the vocational training centre at the College.¹⁴⁵ The subsequent result was a building that did not adhere with the final design prepared by the Public Works Department. The Sloyd room was eventually completed by February 1955.¹⁴⁶

By mid-1956, the Kilmany Park School, albeit maintained by the Department of Education, had closed. As early as 1956, the Education Department discussed the removal of the school house from the site, however, for reasons unknown, this did not occur. In September 1959, the dormant state of the Sloyd room and its equipment raised the concern of then superintendent of the Home, J.C. Whimpey, to write to A.W. Woodhouse, Secretary of the Education Department indicating it had 'disturbed me for some time, to see the building and equipment out of use, and therefore deteriorating'. While Whimpey attempted to negotiate the rental of the Sloyd room, by the Home, to educate members of the local Scout Troop in woodwork, the Education Department had already negotiated the relocation of the timber furniture in the Sloyd room to the Sale High School for use in its new woodwork room.¹⁴⁷ In light of the removal of the furniture, it is unclear whether the Home proceeded with the lease of the Sloyd room for the Scout Troop.

During the 1960s, and despite the closure of the Kilmany Park School and the disbursement of its fixtures to the Sale High School, the continued investment in the Home's infrastructure continued. Under Superintendent Eric Frith's tenure during this period, significant attention was paid to the Home's grounds. These works included the realignment of the main driveway, constructed by the Pearson's, to accommodate a large oval on the east front of the house, the driveway skirting along its south-east edge. In addition to these works, an avenue of native trees was planted along the length of the drive, the avenue named Leslie Drive in honour of the philanthropic Leslie family of Sale, the family having served the Home for three generations.¹⁴⁸ The Home farm continued to operate with the institution providing a focus toward 'formal farm training'.¹⁴⁹ Construction was undertaken of several houses on the fringe of the homestead complex for various managers at the Home, including the 'William's House' in the mid-1960s, a red-brick house on the north-east edge of the homestead complex and the 'Spencer House' in the mid-1960s, an orange brick house (near the former Kilmany Park School) for share farmers on the property.¹⁵⁰

In 1962, further construction works came in the form of a significant bequest to the Home, the R.M. Ainslie Bequest, which enabled the construction of a brick Recreation Centre for the boys at the rear of the mansion. Somewhat reflecting the architectural language of the nearby Pearson-era racing stables, the Centre was, presumably, designed by Melbourne architect Keith Reid, the architect having undertaken previous alterations to the mansion's kitchen, in 1948, as a result of a bequest to the Home by Miss Janet Stewart, the kitchen works were undertaken by Sale builder Mr W. Stephenson.¹⁵¹ Undertaking another project for the Presbyterian Church in the Sale area at this time (St Columba's Presbyterian Church,

¹⁴⁰ Public Records Office of Victoria, 4240 Kilmany Park, Building Files: Primary Schools, VPRS795/P0000/0004, 1824-67.

¹⁴¹ Refer Figure 16.

¹⁴² 'Devastating Grass Fires at Sale', *Gippsland Times*, 17 February 1944, p. 1.

¹⁴³ 'Devastating Grass Fires at Sale', *Gippsland Times*, 17 February 1944, p. 1.

¹⁴⁴ Pers. comm.: D. Page to S. Nichols, via email, 29 January 2016.

¹⁴⁵ Public Records Office of Victoria, 4240 Kilmany Park, Building Files: Primary Schools, VPRS795/P0000/0004, 1824-67.

¹⁴⁶ Public Records Office of Victoria, 4240 Kilmany Park, Building Files: Primary Schools, VPRS795/P0000/0004, 1824-67.

¹⁴⁷ Public Records Office of Victoria, 4240 Kilmany Park, Building Files: Primary Schools, VPRS795/P0000/0004, 1824-67.

¹⁴⁸ Refer Figure 70.

¹⁴⁹ 'Kilmany Park House Presbyterian Home for Boys', Victoria, Care Leavers Australia Network, accessed 19 February 2016 at: <http://www.clan.org.au/home/sic?x=kilmany-park-house-presbyterian-home-for-boys>

¹⁵⁰ Pers. comm.: D. Page to S. Nichols, via email, 29 January 2016.

¹⁵¹ 'Kilmany Park Kitchen', *Gippsland Times*, 20 April 1948, p. 1.

Sale; 1966), the architect had also undertaken multiple ecclesiastical projects, mostly for the Presbyterian Church, since 1931.¹⁰⁰ The Centre was opened by Councillor John Leslie J.P., Mayor of Sale, on 25th August 1962, a brass dedication plaque at the south entrance to the Centre denotes this contribution (refer Figure 70). Further investment was undertaken in the construction of a 'Manager's House' in the mid-1970s, a cream brick house in the gardens of the homestead.

Despite the value of the Home as a valued alternative to many metropolitan-based institutions during the mid-1960s, by the mid-1970s the Kilmany Park Farm Home for Boys was seen as an outdated care model.¹⁰¹ In 1977, changes within the Church management hierarchy hastened decisions with regard to the Home, the responsibility of boys' homes and community organisations within Victoria having been transferred from the Presbyterian Church of Victoria to the Uniting Church in Australia (Synod of Victoria and Tasmania).¹⁰²

The Kilmany Park Farm Home for Boys closed in 1978.¹⁰³

Following the Uniting Church's decision to close the Home, the property was maintained as a dairy, the land being let to various tenant farmers during this period until the mid-1990s.

4.2.5 The Page Family (1996 – Present)

In 1996, the Uniting Church in Australia placed 'Kilmany Park' for sale by tender, the value of the property unknown in light of its former institutional use and the significant number of buildings that now constituted the homestead complex; the mansion and its size particularly problematic.¹⁰⁴

On December 18th 1996, 'Kilmany Park' was purchased by Dr. Daryl Page. Following his purchase of the property, significant restoration and repair works were undertaken to the mansion specifically and the homestead complex generally. Significant works to the homestead complex included the renewal of the formal gardens of the mansion, including their extension toward the east into what had previously been open paddocks. These works included the removal of existing trees and plantings, the establishment of the present east lawn and the installation of a water fountain, the fountain having been purchased by Dr. Page in East Melbourne in 2001.¹⁰⁵ Additional works included the demolition of the cream brick 'Manager's House', constructed during the mid-1970s in the final years of operation of the former Kilmany Park Farm Home for Boys.¹⁰⁶

In late 2006, Dr. Page commenced a subdivision of the homestead complex into a series of six individual titles.¹⁰⁷ This subdivision resulted in the former Kilmany Park School, men's quarters, multiple caretaker and labourer houses; and the remainder of the homestead complex, including the mansion, being divided into a separate titles. A road easement, forming an extension of Reid Drive, provides access to these smaller properties.

'Kilmany Park' is maintained by Dr. Page as his home, a bed and breakfast and wedding and reception venue.

¹⁰⁰ Built Heritage Pty Ltd, Keith Reid (1906-1999), *Dictionary of Uniting Architects*, accessed online 23 February 2018, http://www.builtheritage.com.au/bua_reid.html

¹⁰¹ Kilmany Park House Presbyterian Home for Boys', accessed 19th February 2016 at <http://www.ulan.org.au/homes/67/kilmany-park-house-presbyterian-home-for-boys>

¹⁰² Pers. comm.: J. Wilson, Clerk of Assembly for Presbyterian Church of Victoria, to S. Nichols, via email, 27 January 2016.

¹⁰³ Kilmany Park House Presbyterian Home for Boys', accessed 19th February 2016 at <http://www.ulan.org.au/homes/67/kilmany-park-house-presbyterian-home-for-boys>

¹⁰⁴ Pers. comm.: D. Page to S. Nichols, via email, 29 January 2016.

¹⁰⁵ Pers. comm.: D. Page to S. Nichols, via email, 29 January 2016.

¹⁰⁶ Pers. comm.: D. Page to S. Nichols, via email, 29 January 2016.

¹⁰⁷ *Proposed Subdivision 'Kilmany Park' Settlement Road, Wumuk*, p. 1.

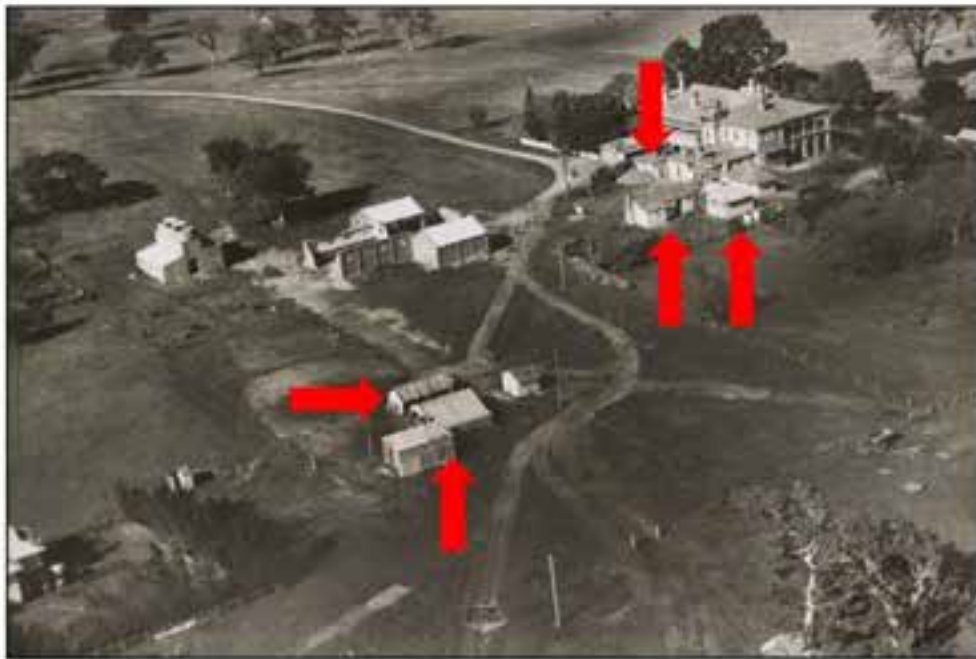


Figure 16 Image from the collection 'Kilmory Boys Home and typical farm in the Sale area', c. 1945, photographer: State Rivers and Water Supply Commission. Aerial view of the 'Kilmory Park' homestead, documenting damage following the c.1944 grass fire, including: the gutted Pearson racing stables, and charred trees along the boundary fence of the former Kilmory Park School. The buildings indicated by the red arrows have since been demolished.
Source: State Library of Victoria



Figure 17 'Kilmory Park Farm Home, Sale', c. post-1923; photographer unknown.
Exterior view of 'Kilmory Park' house, following its acquisition by the Presbyterian Church as the Kilmory Park Home for Boys. Note the shade-cloth on the first floor colonnade where these areas have been converted into dormitories for the boys. The original angled brick garden edging (c. 1906), dating from the original garden layout of the house, remains intact (refer Figure 8).
Source: Presbyterian Church of Victoria



Figure 18 Aerial view of Kilmany Park from an extract of an aerial view of the Sale District, c. 1978; photographer unknown. The aerial shows the property immediately prior to the closure of the Kilmany Park Farm Home for Boys in 1978. Note the visible lack of the avenue along the extent of the main driveway. The approximate extent of the heritage overlay has been overlaid across the image. Source: Beveridge Williams Development and Environment Consultants (Sale Office)



Figure 19 External view of the completed Recreation Centre at the Kilmany Park Farm Home for Boys, looking south-west, toward the rear entrance, c. 1962; photographer unknown. Source: Care Leavers Australasia Network website, accessed 19th February 2016 at: <http://www.clan.org.au/homes/vic/2/kilmany-park-house-pre-stylenen-home-for-boys>



Figure 20 External view of the Kilmany Park Farm Home for Boys, looking south toward the rear of the mansion; c.1962, photographer unknown. The presence of the Recreation Centre, at the right of the image, indicates the image was taken after the completion of the building. Source: Care Leavers Australia Network website, accessed 19th February 2016 at: <http://www.clan.org.au/homeid/vic7/enkilmany-park-house-pre-dryclean-home-for-boys>

5. Subject Property

5.1 Context

The south-east area of Wumuk is defined by broad acre subdivision, consisting of 1 acre allotments, bordered by open farm land. The remnant farm land on the edge of the subdivisions is typically higher level ground, dotted with single stands of old Eucalypt trees that are endemic to the area, that culminates in a promontory of sorts before descending into low-lying undulating ground and ultimately morass (marshes) on the southern side of Settlement Road. This natural topography is representative of the landscape quality of the 'Kilmany Park' property as defined by heritage overlay HO68 – hereafter referred to as the property. The homestead complex is located on the promontory.

The major thoroughfares in the area consist of a variety of major bitumen arterial roads, bitumen residential streets and gravelled rural roads. The major arterial roadway Settlement Road (a sealed road) runs the extent of the southern boundary of the property. In the north-east, Reid Drive (a sealed road) runs north-south, to the rear entrance to the property. Originally, Reid Drive was contained exclusively within the greater 'Kilmany Park' property, resulting in its straight alignment that does not deviate. The northern boundary of the property is bordered by Arnup Road (a gravelled road), the roadway surveyed as part of the closer settlement of 'Kilmany Park' in the 1920s. The odd alignment of the road, and its multiple deviations, are representative of it following the boundaries of the original allotments surveyed as part of the Closer Settlement scheme (refer Figure 15 and Figure 21).

The 'Kilmany Park' homestead is within the north-west corner of the property. The rear entrance to the property is defined by decorative concrete gateposts and plantings of Aloe Vera plants. The concrete posts are contemporary with the establishment of the Kilmany Park Farm Home for Boys in 1924 as seen in a dedication plaque; the planted borders of Aloe Vera are associated with beautification projects undertaken during the property's tenure as a boys' home (refer Figure 34). When viewed to the south, the location of the homestead on a promontory allows for uninterrupted views across the low lying farm land of the property to distant foothills. Below the promontory, the surrounding landscape is dotted with Eucalypts, of significant age, and remnant wind-break plantings of Macrocarpa and Silver Poplar (also of significant age), the wind breaks originally defining fence lines and the surrounding structure of paddocks. As one approaches the main entrance of the property, from the south along Settlement Road, continuous views of the homestead, and therefore its rear outbuildings, are obscured by established lines of old Macrocarpa cypress trees. At the end of the line of trees, the main entrance to the property is defined by two English Oak trees, of considerable age, and later horizontal paling fences with plantings of Aloe Vera. The driveway runs parallel with Arnup Road, the boundary line of the property extending between the two gravelled lanes. Views of the homestead complex, when travelling south along Settlement Road, are largely obscured due to the natural topography of the land and the established lines of Macrocarpa cypress.

As is the case with most rural properties, much of the aspect enjoyed by the homestead exists beyond the physical boundaries of the property. The majority of those important views from the homestead complex extend from the south-east, and the existing alignment of the main driveway to the property, to the north-west. To the north, and across the higher ground to the rear of the homestead complex, extensive residential subdivision on neighbouring properties has compromised views from the homestead. While regrettable, it is noted that in the 19th and early 20th century, views toward the rear of the homestead would have been considered of lesser significance as these areas represented the day to day operations of the property. The orientation of the mansion to the south, with views across the gardens and the countryside beyond, are representative of the significance of the southern view corridor from the property.



Figure 21 Aerial view of the property and surrounds; the extent of the property boundary, as defined by HO68, is indicated by the red outline. The homestead, consisting of the mansion, gardens and remnant outbuildings are visible. A wind break of *Macrocarpa cypripedium* along the driveway are indicated by the red arrow (refer Figure 27).
Source: Google Maps, 2016



Figure 22 View across 'Kilmory Park' toward the homestead complex, looking north-west, from Settlement Road. Note the prominence of the homestead is largely obscured by plantings. The mansion is indicated by the red arrow. The orange brick building to the right is the Recreation Centre (c.1962) of the former boys' home.
Source: Trethowan, 2016



Figure 23 View of the entrance to the main drive to 'Kilmory Park'.
Note how views of the property are obscured by the old plantings of *Macrocarpa cypress* along the roadside and the English Oak trees that frame the entrance. The road at left is Annap Road.
Source: Trethowan, 2016



Figure 24 View of the main entrance to 'Kilmory Park'. Note the established English Oak trees either side of the entry. The *Aloe Vera* plantings and paling fence are later additions. The avenue of indigenous tree varieties, Leslie Drive, is visible in the background.
Source: Trethowan, 2016



Figure 25 View from the corner of Arrup and Settlement Roads, looking along the northern boundary of the property; looking west. Note the deviation of the main driveway away from the property boundary. The paling fence is a later addition.
Source: Trethowan, 2016



Figure 26 View of the adjoining farmland to the north of the property, looking north-west. The rooflines of houses on the adjoining subdivision to the north of this farmland are indicated by the red arrow.
Source: Trethowan, 2016



Figure 27 View of the approach along the main drive, at the mid-point where a wind break of *Macrocarpa cypress* partially frame the approach; looking northwest. Note the sign on the fence indicating the name of the avenue as Leslie Drive.
Source: Trethowan, 2016



Figure 28 View of the approach along the driveway, beyond the wind break of *Macrocarpa cypress*; looking north-west.
Note the old stands of gum trees in the paddocks surrounding the homestead. The plants either side of the driveway (*Agapanthus*) were planted post-1996 by the Page family.
Source: Trethowan, 2016



Figure 29 View of the approach along the driveway, below the ascension toward the base of the oval embankment and realigned driveway. The silhouette of the mansion is indicated by the red arrow.
Source: Trethowan, 2016



Figure 30 View of the approach along the driveway, looking south-east, away from the homestead. Note the difference in the landscape either side of the driveway. The rooflines of houses in the nearby subdivision are indicated.
Source: Trethowan, 2016



Figure 31 View of the homestead complex from the top of the oval embankment, looking west.
Note the line of the realigned driveway to the right of the image. The men's quarters are indicated by the red arrow.
Source: Trethowan, 2016



Figure 32 View of the neighbouring residential subdivision from the top of the oval embankment, looking north.
The roofs of the houses in the subdivision are indicated by the red arrow. The dry appearance of the paddocks immediately above the oval indicate the change in boundary between the property and neighbouring farmland.
Source: Trethowan, 2016



Figure 23 View from the rear entrance of 'Kilmany Park' toward the junction of Reid Drive and Arrup Road, looking north. The roof lines of houses in the adjacent subdivision, bordered by Reid Drive and Arrup Road, are indicated by the red arrows. Source: Trethowan, 2016



Figure 24 View of the rear entrance to 'Kilmany Park', looking south-west. Note the original concrete gate posts dating from the establishment of the Kilmany Park Farm Home for Boys, s. 1924 (indicated by the red arrow). Source: Trethowan, 2016

5.2 Built Form

The homestead complex at 'Kilmany Park' consists of a variety of single and double-storey buildings of differing uses and construction typologies. These buildings date from the c. 1860s to the mid-1970s. All buildings and structures of significant size within the homestead complex are identified as subject buildings. In light of the age and contribution the formal gardens make toward the homestead complex, including the identified significance of the English Oak (planted by HRH The Duke of Cornwall and York), these have also been identified as subject buildings. In order to create a timeline and trace the development of the homestead, the subject buildings are numbered according to their age:

1. Meat House (c. 1847-70)
2. Men's Quarters (c. 1860 / alterations c. 1880-81)
3. Former Water Tower and Pump House (c. 1870-81)
4. In-ground water tanks (c. 1870-81)
5. Racing Stables (c. 1880-81)
6. English Oak (c. 1901)
7. Mansion (c. 1870-71 / additions and alterations c. 1905-06)
8. Gardens (c. 1870-1906)
9. Entrance Gates (c. 1906-08) and McClelland Memorial Farm dedication plaque (c. 1924)
10. Kilmany Park School No. 4240 – School house (c. 1927)
11. Kilmany Park School No. 4240 – Sloyd room (c. 1949)
12. Weatherboard house (c. 1930s)
13. Recreation Centre (c. 1962)
14. Spencer House (mid-1960s)
15. Williams House (mid-1960s)
16. Oval and Leslie Drive (mid-1960s).

The water retention basin, constructed during the property's tenure by the Kilmany Park Farm Home for Boys is not considered a significant feature that assists in interpreting the history or use of the property. As such, it has not been included in the legend or following analysis.



Figure 20 Aerial view of the homestead at 'Kilmany Park'. The legend is outlined in the body text above. The water retention basin is indicated by the red arrow. Image source: Google Maps, 2016

5.2.1 Meat House (c.1847-70)

Built after c. 1847, following the purchase of the homestead block by William Pearson, the Meat House would have been built in conjunction with the first 'Kilmory Park' residence; the close proximity of the Meat House to the residence is evident in an early photograph (refer Figure 5). The chimney is a potentially later addition to the building, the detail of the corbelled brickwork comparable with the chimneys of the c. 1870 house in the same early photograph.

Constructed from weatherboard and set low to the ground, the building has a hipped roof clad with galvanised corrugated metal sheet. A metal ridge vent is an early feature. Additional natural ventilation is achieved to the underside the eaves, which are open and lined with chicken wire.

The principal elevation has two door openings: a pair of early insulated timber doors open into the butchery or 'killing room' on the left, a single early insulated timber door opens into the remaining room on the right. Both rooms are naturally lit by small windows, originally lined with wire mesh. Early vents at the base of the principal elevation provide additional ventilation.

Internally, the building consists of two rooms with an open corridor at the mid-point of the building; the western most room is the 'killing room' as seen through suspended metal rails and meat hooks. Both rooms retain their Baltic pine internal linings.

Comment

The building is the oldest extant building within the homestead complex. The location and construction typology of the building, evident in early photographs, are indicative of its existence, probably prior to the construction of the second 'Kilmory Park house' (c. 1870-71) and certainly prior to the construction of the mansion (c. 1905-06).

While the location of the building within the main gardens is odd, given its status as a back of house function (preparation and storage of meat), it's apparent that the siting of the building was based on the location of the first 'Kilmory Park' house, demolished in c. 1905.



Figure 36 View of the front (south) elevation of the Meat House. The door at the left leads to the 'killing room'. The door at the right leads to a room with an open fire place. Source: Trethowan, 2016



Figure 37 View of the rear elevation of the Meat House, looking south-west. The details of the chimney are indicative of having been constructed c.1870. Source: Trethowan, 2016

5.2.2 Men's Quarters (c. 1860 / additions c. 1880-81)

Located in the north-east corner of the homestead complex, the men's quarters initially consisted of a brick cottage constructed in c. 1860.¹⁰¹ Between c. 1880 and c. 1894, the building was extended toward the north and west, by 1894 the building described as:

A little distance away are the men's quarters, not the usual hut, but a comfortable brick cottage, containing a large dining room and several bedrooms, the comfort of the employees being well attended to.¹⁰²

Vent details in the gables of the north and west elevations of the cottage are contemporary with those of the racing stables, suggesting their design by the same architect and/or construction during a similar period.

Constructed from overpainted face brick, the men's quarters consist of a gabled roofed cottage, with three transverse gables at the rear, clad with Colorbond corrugated metal sheet. Each gable is topped with an original turned timber finial. The principal elevation has three window openings with early double-hung timber sash windows; the rear elevation also has three windows of similar dimensions, design, style and age. The building is entered from a single door off the front verandah, presumably to the dining room described in 1894, with three doors off the rear verandah providing access to bedrooms (also described in 1894). The hipped roof verandahs, with turned posts, run the extent of the front and rear elevations and are paved with red brick in a stretcher bond.

Despite minor alterations, the building largely retains the same appearance documented in the historical image of c. 1906 (refer Figure 13). Alterations include the painting of the building and the rendering of the west elevation, evident in the visible lack of a raised surround to the vent opening. Other alterations include the removal of the corbelled brickwork from the east chimney of the building; a small skillion roofed addition and secondary chimney at this end of the building have also been removed.

The men's quarters are contained within a small cottage garden of recent origins, as indicated in the c. 1906 image of the building which shows the building surrounded by an open paddock. The earliest reference of the building being contained within a garden is in c. 1945 (refer Figure 18).

The building was not inspected internally in light of its status as a rental property.

Comment

Early images of the rear yard of the homestead complex indicate that views from the mansion to the men's quarters were free of visual obstructions, such as trees and fences.



Figure 28 View of the front (south) elevation of the men's quarters. The east end of the building is the earliest, with details indicating it was extended toward the west, c. 1880-81. The door at the left leads to what would have been the original dining room. Source: Tretlowan, 2016



Figure 29 View of the rear elevation of the men's quarters, looking south-east. The ocular vent details in the gables are contemporary with the ocular vent details in the gables of the racing stables, constructed in c. 1880-81. Source: Tretlowan, 2016

¹⁰¹ Helms, *Kilmany Park Sale, Review of heritage significance* – January 2009, p. 2.

¹⁰² 'Kilmany Park', *The Leader*, 18 August 1894, pp. 6-7.

5.2.3 Former water tower (c. 1870-81)

Located on the eastern most extremity of the homestead complex, the building was constructed as a water tower, originally supporting three raised water tanks (known as header tanks) above its central section (refer Figure 12 and Figure 16). The water tower was more than likely constructed during the same period of improvements to the homestead which saw the construction of the second 'Kilmany Park' house (c. 1870-71) and the racing stables (c. 1880-81). Water was supplied to the header tanks via an underground 5' pipeline, the 10 chain easement of which extended all the way to the Thomson River, north of the Princes Highway.¹⁷⁰ The raised nature of the tanks created sufficient gravity to provide a reticulated water supply to the main house. A large pump would have been located in the middle of the central hall at the base of the building, the hall accessed at either end via arched openings. The header tanks were removed from the building after c. 1945 (refer Figure 16).

Constructed from unpainted face brick, originally the building consisted of a raised central section with two skillion roofed flanking wings, the south wing having a brick parapet (refer Figure 16). The roofs of the flanking wings have been extended over the central section of the building following the removal of the header tanks and their associated structure. The former raised central section has two arched openings on both elevations, providing external access to the building. There is evidence that the flanking rooms were originally accessed externally, independently of the central room, however the original openings have been altered. Despite the alterations to the external openings of the building, a series of early double-hung timber sash windows remain.

The central and southern rooms of the building were inspected internally. The central hall retains an original unglazed terracotta biscuit tiled floor. The rectangular concrete slab in the centre of the room is indicative of the location of former plant or equipment, likely a large water pump. The southern room has a concrete slab floor.

Comment

While altered, the building retains significant built fabric to the extent that it could be reconstructed to its original built form. Its original function as a water tower, no doubt with a pumping mechanism located within the central room, combined with its age is indicative of potential technological significance. Early images of the rear yard of the homestead complex indicate that views from the mansion to the former water tower were free of visual obstructions, such as trees and fences.



Figure 40 View of the front (east) elevation of the former water tower. The openings either side of the central arch are alterations of earlier openings.
Source: Trethowan, 2010



Figure 41 View of the rear (west) elevation of the former water tower. The central arch is concealed behind a modern brick skillion addition.
Source: Trethowan, 2010

¹⁷⁰ Public Records Office of Victoria, 95/93 School Site No 2 - Kilmany Park Estate Warrak Warrak Land Files Extracts, Closer and Soldier Settlement, 1925-28: VPRS 15762P000294.

5.2.4 In-ground water tanks (c. 1870-81)

The homestead complex retains three in-ground water tanks of early date. Located within immediate proximity of the three major buildings in the homestead complex, the mansion (c. 1870-1906), racing stables (c. 1880-81) and men's quarters (c. 1870-81), the water tanks would have been constructed for the storage of water harvested from the rooves of these early buildings. In c. 1906, the water tanks possessed conical corrugated metal sheet roofs externally (refer Figure 12 and Figure 13).

The mansion water tank, located immediately behind the building, has a concrete slab roof that replaces the earlier conical corrugated sheet metal roof evident in c. 1906 (refer Figure 12). The current roof was installed after c. 1945 (Figure 15).

The stables water tank, located to the right of the entrance front of the building, retains a conical corrugated metal sheet roof. The details of this roof, comparable with earlier images of the structure (refer Figure 12), indicate that it was constructed prior to c. 1906.

The Men's Quarters water tank has a concrete slab roof that replaces the earlier conical corrugated sheet metal roof evident in c. 1906 (refer Figure 13). The current roof was likely constructed in line with the new roof installed to the mansion water tank.

The water tanks were not inspected internally.

Comment

While the majority of these structures have had their appearance altered above ground, the structures retain significant built fabric below ground with the ability for the altered elements above ground to be reconstructed to their original built form. Retaining their original function as water storage tanks, they represent an integral element of the homestead complex dating from the Pearson family's tenure.



Figure 42 View of the water tank on the entrance front of the racing stables. Note how the tank retains its early conical cover.
Source: Trethowan, 2016



Figure 43 View of the water tank at the rear of the mansion. The concrete cover to the tank is a later addition.
Source: Trethowan, 2016



Figure 44 View of the water tank on the west elevation of the Men's Quarters. The concrete cover to the tank is a later addition.
Source: Trethowan, 2016

5.2.5 Racing Stables (c.1880-81 / alterations c. 1945)

Built in 1880-81 to a design by local Sale architect J.H.W. Pettit, the building was commissioned by William Pearson (Senior) and constructed by local Rosedale builder William Allen. The central section of the building was destroyed by a grass fire in 1944; the structure remained in ruins by c.1945 (refer Figure 16).

Constructed from expressed red face brick, the building consists of three large gable roofed buildings arranged around, what was originally, a central forecourt (refer Figure 12). The roofs are clad with corrugated asbestos sheet. Alterations to the building include the reconstruction of the rear (north) elevation, infilling of the central forecourt, and the construction of a galvanised corrugated metal sheet skillion at the end of the east wing of the building. While a concrete trough, and associated sliding door, are later additions to the east wing of the building, the concrete trough is not evident in c.1906 (refer Figure 12) it does appear a structure of some age. While reputedly used for 'the servicing of carriages or vehicles',¹⁷¹ it is more probable the trough was utilised as a horse bath given its depth, raised edges and the building's continued utilisation as a thoroughbred horse stable by William Pearson (Junior).

The building was not inspected internally, however previous inspections have been undertaken by preceding consultants and have been described accordingly (refer David Helms Heritage Planning + Management, *Kilmany Park Sale: Review of heritage significance*, January 2009).

Comment

While significantly altered, the building retains integrity within those original sections of the building that remain. The previous arrangement of the building, around a central forecourt, combined with painted fencing, are indicative of the formal arrangement the building previously enjoyed with, albeit the rear, of the mansion. Later structures (in the old forecourt) and plantings, in the foreground, of the stables impact upon this formal relationship. Further additions, in the form of the corrugated metal sheet addition, are somewhat concealed from the principal elevation but none the less impact upon the appreciation of the building 'in the round'.

The building has architectural significance, in light of its design as a stables complex by a notable regional architect. However, there is the potential for considerable social significance in light of its early design specifically as a racing and thoroughbred stable and the notability of William Pearson (Senior) within the establishment years of the Melbourne metropolitan racing clubs, including the Victorian Racing Club (VRC).



Figure 45 View of the principal (south) elevation of the former Racing Stables, looking north. The forecourt between the two flanking wings has been infilled with a later structure. Source: Trethowan, 2016



Figure 46 View of the east elevation of the former racing stables. The concrete trough, and skillion roofed shed at left, are later additions. Source: Trethowan, 2016

¹⁷¹ Helms, *Kilmany Park Sale, Review of heritage significance* – January 2009, p. 3.



Figure 47 View of the rear (north) elevation of the former racing stables. The skillion roofed building at left is a later addition.
Source: Tretlowan, 2016



Figure 48 View of the west elevation of the central block (at left) and north elevation of the west wing of the former racing stables, looking south. Despite the early fire damage to the central block, the side elevations retain the integrity of the original structure.
Source: Tretlowan, 2016

5.2.6 'The Cornwall and York Oak' (c.1901)

The English Oak tree was planted by HRH The Duke of Cornwall and York, later King George V, in c. 1901 on the occasion of his visit to 'Kilmany Park'. The Duke's visit coincided with him opening the first Commonwealth Parliament at the Royal Exhibition Buildings, Melbourne in the same year. For the benefit of this analysis, the tree is referred to as 'The Cornwall and York Oak' to discern it from other Oak trees located elsewhere in the gardens.

A copper tablet at the base of the Oak, erected by representatives of the Victorian Bowling Association in February 1935, indicates 'This Oak Tree was planted by His Majesty King George V when visiting Kilmany Park as H.R.H. The Duke of York on 15th May 1901' (refer Figure 50).

Comment

The significance of 'The Cornwall and York Oak' tree has been previously identified, resulting in its inclusion within an individual heritage overlay on the Schedule to the Heritage Overlay of the Wellington Planning Scheme; HO151 – Oak Tree.



Figure 49 View of 'The Cornwall and York Oak', looking south.
Source: Tretlowan, 2016



Figure 50 View of the copper dedication tablet at the base of 'The Cornwall and York Oak'.
Source: Tretlowan, 2016

5.2.7 Mansion (c. 1870 / additions and alterations c. 1905-06 / minor alterations c. 1948)

The mansion at 'Kilmany Park' was commissioned by William Pearson (Junior) and constructed in c. 1905-06 to a design by pre-eminent Melbourne architects Harry B. Gibbs & Finlay Architects. The mansion involved the remodelling and extension of an earlier house, commissioned by William Pearson (Senior) and constructed in c. 1870-71 to a design by Sale architect J.H.W. Pettit. In 1948, during the mansion's tenure as the Kilmany Park Farm Home for Boys, minor alterations were undertaken to the mansion's kitchen to a design by Melbourne architect Keith Reid.

Retaining sections of the earlier 1870-71 house on the property, constructed from overpainted luck-pointed brick, the majority of the mansion consists of that built in c. 1905-06. Constructed from rendered brickwork with applied cement decoration, the mansion is a significant two-storey building with decorative chimneys and a galvanised corrugated metal sheet clad roof. Executed in a conservative interpretation of Classical style architecture, the principal elevations of the mansion consist of the south (entrance front) and east (garden front) elevations. The west elevation consists of a secondary garden front whereas the rear elevation (north) addresses a rear yard framed on the opposite side by the stables. The south elevation is defined by a central bay that is adorned with a series of decorative cement pediments at ground and first floor levels, the ground floor pediment surmounting a four-bay arrangement of decorative stained and leadlight windows; the first-floor pediment topping what appears an arcaded balcony, the whole arrangement in-turn surmounted by a monumental stepped parapet. From this central bay, an arcaded loggia at ground floor level and an upper level arcade, with segmental arches supported on cast iron columns, extend along the extent of the south elevation, continuing along the east and west elevations. On the garden front, attention is drawn to a large stained and leadlight glass bay window that is centred on the elevation at ground floor level.

Internally, the mansion presents as a unified interior containing multiple notable features, indicative of the Art Nouveau influence on its interior decoration. At ground floor level, the entrance vestibule opens into a double height stair hall, the two areas separated by decorative plasterwork columns with bas relief details to dado height. The columns support an entablature of equally detailed bas relief features, the decoration of which incorporates a cornice that extends the perimeter of both rooms. At the centre of the hall, an elaborate timber staircase with timber panelling extends through the middle of the house and is overlooked by a gallery at first floor level. At right, the stair hall opens into the drawing room through an elaborate door case and doors, the drawing room retaining significant features including a fretwork screen with decorative wrought iron lanterns that frame a leadlight bay window. At left of the stair hall, the current billiard room is entered through an equally elaborate door case and doors, the room containing early features including joinery and decorative ceilings. At the rear of the stair hall, a corridor provides access to the dining room and the remainder of rooms on the ground floor which retain significant features, including a fretwork screen and bay window with leadlight glass in the dining room; and joinery, marble and timber mantle pieces and decorative ceilings to the remainder of the rooms. At first floor level, the rooms incorporate bedrooms and retain early features including joinery, marble and timber mantle pieces, leadlight glass and decorative ceilings. There have been few significant alterations to the interior since its completion c. 1906, however no original bathrooms, kitchens or service areas survive intact.

Comment

The mansion is a significant country house, notable for its size rather than the skill of its architectural composition. Internally, the interiors are a complete and highly notable example of the Art Nouveau turn of the century style and taste. The significance of the interiors lie in the extent, quality and profusion of stained and leadlight glass, decorative plaster work ceilings and columns, timber joinery (including fretwork screens, stair case and decorative panelling, balustrade and gallery; and door cases and surrounds) and decorative metal work lanterns in the drawing room.



Figure 51 View of the garden and entrance fronts of the mansion, looking north-west.
Source: Trethowan, 2016



Figure 52 View of the entrance front of the mansion, looking north-west.
Source: Trethowan, 2016



Figure 53 View of the secondary garden (west elevation) and entrance front of the mansion, looking north-west.
Source: Trefhowan, 2016



Figure 54 View of the rear (north) elevation of the mansion, looking south. The concrete slab in the foreground replaces the conical cover of the in ground water tank visible in early images.
Source: Trefhowan, 2016



Figure 55 Internal view of the stair hall from the entrance vestibule, looking through to the entrance to the drawing room.
Source: Trefhowan, 2016



Figure 56 Internal view of the entrance vestibule from the stair hall. The original stained glass and plasterwork are of note.
Source: Trefhowan, 2016



Figure 57 Detail view of the Drawing Room bay window and fretwork screen, looking east. Note the original wrought iron lanterns.
Source: Trefhowan, 2016



Figure 58 Internal view of the Dining Room, looking east. The original timber mantle piece (at right) and plasterwork are of note.
Source: Trefhowan, 2016

5.2.8 Gardens (c.1870-1906) and landscape setting

The gardens of the homestead, in their current arrangement, were laid out in conjunction with the construction of the second 'Kilmany Park' house from c.1870.

In 1894, a feature on 'Kilmany Park', in *The Leader* newspaper, gave the following description of the homestead:

The homestead at Kilmany Park is a fine large brick building erected on one of the highest points of the estate and commanding a pretty and extensive view of the neighbouring country. It is surrounded by a fine old orchard and garden, containing some of the largest fruit trees I have ever seen, one cherry tree in particular having a trunk as large as an average sheak [sic]. Mr Pearson's [senior] old favourite, Commotion, one of the stoutest [sic] and best racehorses ever bred in Australia, is buried in this garden.¹⁷²

In c.1905-06, the current formal arrangement of the garden was established with the creation of the elliptical front lawn at the centre of the driveway. Surrounded by a roughcast render retaining wall, a small inset stair, framed with Arts and Crafts inspired cement spheres, align with the centre of the entrance front of the mansion. Cement curbing to the remainder of the garden paths replaced an earlier angled brick edging, apparent in c.1906 (refer Figure 8). The brick edging remained in place following the opening of the Kilmany Park Farm Home for Boys in 1923 (Figure 17). The internment of the famous racehorse 'Commotion' (d. October 1893) within the gardens, including the remains of Helen Pearson (1893-1975).

Sloping away from the house, the gardens, on the south front of the house in particular, have been designed to frame and therefore incorporate views of the surrounding landscape. This has largely been achieved through the placement of the elliptical front lawn framed by symmetrical plantings of Cedars (a Blue Atlas and a Himalayan Cedar) which would have originally drawn the eye of the viewer to the wider landscape and the former land holdings of the Pearson family, it is noted that this view is now partially obscured by low-lying branches of these trees. Elsewhere, the garden incorporates multiple plantings of exotic tree specimens, including: English Oak, Bunya Bunya Pine, Hoop Pine, Hazlenut, Monterey Cypress, Bhutan Cypress, Japanese Spindle-wood and Norfolk Island Hibiscus amongst others.¹⁷³ On the east front, the mansion was previously approached through open paddocks, however now incorporate a large lawn which also opens to the wider landscape.

Comment

The formal gardens retain a high degree of integrity. The central elliptical lawn with roughcast render retaining walls and cement curbing (c.1905-06) are a significant feature. Concrete curbing to the remainder of the garden, while constructed after 1923, are appropriate given the early use of cement curbing in the layout of the garden. While the majority of original and early plantings exist largely in established tree form, smaller plantings throughout the gardens (inc. roses, lavender and various succulents), while recent, are appropriate to the garden's setting.

Within the context of the wider landscape, the elevated location of the homestead above the surrounding plains results in the surrounding landscape making a significant contribution to the gardens. This is largely within the context as a backdrop to views framed by early plantings of trees. The wider landscape also provides a significant contribution to the sense of arrival at the homestead, and its location on the elevated promontory above the surrounding low-lying paddocks.

¹⁷² 'Kilmany Park', *The Leader*, 18 August 1894, pp. 6-7.

¹⁷³ John Hawker, Heritage Victoria, *Kilmany Park, Sak - Plant Survey*, 20th March 1997, p. 1.



Figure 59 View of the garden front of the house, looking across the east lawn developed by the Page family. The Oak trees, indicated at left, frame the driveway entrance into the formal garden area.
Source: Trethowan, 2016



Figure 60 View of the entrance front of the mansion, looking west. Note the formal arrangement of the original gardens with relation to the entrance front of the mansion.
Source: Trethowan, 2016



Figure 61 View from the formal garden between the two English Oak that frame the driveway, looking east. Note how the trees perform the dual purpose of framing views of the wider landscape, in addition to that of the formal garden.
Source: Trethowan, 2016



Figure 62 View from the circular driveway, at the west end of the elliptical lawn, looking south. Note how the wider landscape creates a backdrop to the formal garden.
Source: Trethowan, 2016



Figure 63 View of the wider landscape from the first floor colonnade of the mansion, looking east. Note how the arrangement of the trees frames wider views of the landscape from the mansion.
Source: Trethowan, 2016



Figure 64 View of the wider landscape from the first floor colonnade of the mansion, looking south. The terraced nature of the elliptical lawn would have enabled uninterrupted views to the wider landscape.
Source: Trethowan, 2016

5.2.9 Entrance Gates (c.1906-08) and McClelland Memorial Farm dedication plaque

Reid Drive would have originally formed an internal farm road, connecting the homestead at 'Kilmany Park' with the Princes Highway. The road served as a farm entrance while the main entrance off Settlement Road provided access to the mansion during its time as a residence.

Following the Closer Settlement of the greater property, the farm entrance became one of a network of multiple rural roads across the former estate that now serviced multiple smaller farms. The entrance to the homestead is demarcated by two roughcast render concrete posts with decorative cement cappings. The use of this entrance, in lieu of the main driveway, may have been necessitated following the opening of the Kilmany Park Farm Home for Boys in 1924 and the closer proximity of the entrance to the Kilmany Railway Station. In this instance, the construction of a more elaborate entry would have necessitated the erection of the piers by 1924, as detailed in the bronze dedication plaque denoting the name of the farm as the 'McClelland Memorial Farm' p

Comment

The gateposts and dedication plaque are significant. The posts demarcate the north-west extent of the homestead complex, while denoting the main entrance to the homestead during its tenure as the Kilmany Park Farm Home for Boys. The nature of the gateposts as a memorial is important in demonstrating the various financial bequests provided to the Home in its early years.



Figure 65 View of the rear entrance to the homestead, at the end of Reid Drive. The roughcast render and cement capital gate posts frame the entrance.
Source: Trethowan, 2016



Figure 66 McClelland Memorial Farm. Given by his parents in memory of Thomas Hugh McClelland 1907-1924. The bronze memorial plaque and concrete gateposts at the Reid Drive entrance to 'Kilmany Park', indicating the gift of the farm at the Home to the institution by a Mr and Mrs McClelland in memory of their son Thomas Hugh McClelland.
Source: Trethowan, 2016

5.2.10 Kilmany Park School No. 4240 – School house (c.1927) and Sloyd room (c.1949)

The Kilmany Park School No. 4240 was established at the entrance to the Kilmany Park Farm Home for Boys in c.1927. The school was established as a result of the number of boys accommodated at the Home, therefore justifying their own school. The school was not exclusively for the use of the children at the Home and as such, it is presumed, the school was located at the edge of the homestead complex within easy access of children from surrounding farms. The school included both a school house (refer Figure 67) and a Sloyd room. The original Sloyd, or woodwork, room was destroyed by fire in c.1944. The present Sloyd room, designed by prominent architect Percy Everett when Chief Architect of the Public Works Department, was designed in c.1949 and completed by c.1955 (refer Figure 68). Originally, the School was contained within its own fenced grounds, the south and west boundaries of the grounds bordered by a line of trees (refer Figure 16).

The school house consists of a symmetrical weatherboard clad building with a corrugated metal sheet roof with projecting eaves. The building has two unpainted brick chimneys at the north and south ends, further enforcing this symmetry. The end walls of the building, on the north, east and south elevations, retain large banks of original windows with hoppers. Unlike the school house, the Sloyd room is a simple rectangular building with a corrugated sheet metal clad roof. The principal (north) elevation consists of four bays, with one accommodating the entry and the other tall sets of windows. This fenestration arrangement is replicated on the south elevation, with a fourth window in lieu of a door.

The buildings are maintained amongst manicured grounds with garden beds to the base of the school house walls. All fencing and screen plantings associated with the earlier appearance of the School grounds have been removed.

The building was not inspected internally in light of its status as a rental property. Descriptions of the building interiors are provided in the previous heritage report *Kilmany Park Sale – Review of heritage significance – January 2009*, (David Hinds Heritage Planning + Management); refer Appendix C.

Comment

The former Kilmany Park School No. 4240 and its individual buildings are of contributory significance to the homestead complex. While providing an understanding of their use within the overall structure of the former boys' home, the somewhat displaced location of the buildings on the edge of the homestead complex, including evidence of their visual separation from the homestead using fencing and screen plantings, indicate that they did not form an integrated relationship with the boys' home, most likely a result of the school's status as a government-run state school.



Figure 67 View of the former school house, from the main entrance to homestead complex, looking south-east. The Sloyd room is visible to the left of the school house.
Source: Treflowan, 2016



Figure 68 View of the principal front of the Sloyd room, looking south.
Source: Treflowan, 2016

5.2.11 Recreation Centre (c.1962)

The Recreation Centre was constructed in c.1962. Presumably designed by notable Melbourne architect Keith Reid, in light of his previous work at the Home in the late 1940s and considerable catalogue of work for the Presbyterian Church of Victoria, including St. Columba's Church, Sale (1958). The building was opened in 1962 by Councillor John Leslie, J.P., Mayor of Sale; the Leslie family having a continuous involvement with the Kilmany Park Farm Home for Boys from its inception until its closure. A brass dedication plaque at the south entrance to the building indicates:

This Recreation Centre built from The R.M. Ainslie Bequest was opened on 25th August 1962 by Cr. John Leslie J.P. Mayor of Sale whose family has served the home for three generations (refer Figure 70)

The Recreation Centre is a simple unpainted expressed brick building with a central hipped roof section flanked by skillion roofed aisles that extend the length of the building. The roof of the buildings are clad with corrugated metal sheet. The building has low-level clerestory windows along the flanking skillions with high level clerestory windows above roof level of these skillions. The design of the east and west elevations of the building, include engaged brick pilasters with low parapets, drawing parallels with the design of the adjacent former racing stables (c.1880-81).

Comment

The building represents one of the last capital investments in the Kilmany Park Farm Home for Boys and makes a contribution toward understanding the philanthropy that informed the operations of the Home up until its closure. This is in light of a dedication plaque (refer Figure 70) detailing its construction as a result of a bequest (the R.M. Ainslie Bequest) and its opening by Councillor John Leslie. The documented role of the Sale-based Leslie family, from the inception of the school to its closure, is also worthy of note.

Attributed to architect Keith Reid, the design intent of the building, which includes blind walls with engaged pilasters, are reminiscent of the execution of the adjacent racing stables and an attempt to respond to the existing built context of the homestead complex, thereby suggesting the role of an architect. While attributed to Keith Reid, the building is not considered a work that is comparable with the successful designs achieved in many of his regional ecclesiastical buildings for the Presbyterian Church, predominantly churches, throughout Victoria.



Figure 68 View of the Recreation Centre, looking south-east. The canopy over the entrance on the left is a later addition. Note the engaged brick pilasters of the west elevation. Source: Trethowan, 2016



Figure 70 View of the dedication plaque of the Recreation Centre, next to the south entrance. Source: Trethowan, 2016

5.2.12 Oval and Leslie Drive avenue

The main driveway to the homestead was commissioned by William Pearson in May, 1903. The main entrance to the driveway off Settlement Road is framed by two English Oaks, the remainder of the drive extended on more or less a straight line, through open paddocks, toward the homestead.

During the mid-1960s, a concerted works campaign of improvements were undertaken at the Kilmany Park Farm Home for Boys by the Home's last superintendent, Eric Frith. This included the planting of the main driveway with assorted tree species, the new avenue named Leslie Drive in honour of the Sale-based Leslie family under whose philanthropy the Home had benefited. Further works included the construction of a large oval to north-east of the mansion, the earthworks requiring the diversion of the main drive around the southern edge of the new oval.

Given the instigation of these projects at the end of the Home's functional life, the avenue in particular appears not to have been maintained at a standard that would be typically associated with a continuously functioning institution. This is seen in the stunted growth and general condition of the trees along Leslie Drive. The oval is maintained as an extension of the large lawn on the east front of the mansion.

Comment

The oval provides insight into the life of the boys who resided at the home and the social activities undertaken by them during the homestead's tenure as the Kilmany Park Farm Home for Boys.

The main driveway and its entrance between the two English Oaks off Settlement Road is considered important. The driveway and Oak trees represent those works undertaken by William Pearson in 1903. While the age of the later avenue, Leslie Drive, and the indigenous nature of the plantings incorporated within do not conform to the early formality and European species of the initial design intent established by William Pearson in 1903, the avenue none the less defines the approach to the homestead complex at 'Kilmany Park'.



Figure 71 View along Leslie Drive, looking south-east.
Source: Tretlowan, 2016



Figure 72 View across the oval to the homestead, looking west.
Source: Tretlowan, 2016

5.2.13 Caretakers and labourers houses (c.1930s – mid-1960s)

The variety of free-standing houses located to the periphery of the homestead complex, from the Inter-war and Post-war periods, were constructed during the tenure of the Kilmany Park Farm Home for Boys. Two of these houses are individually known as 'Spencer House' and 'Williams House' (refer Figure 74 and Figure 75).

Subsequent subdivision has seen the houses incorporated on separate titles, resulting in separate addresses.

Comment

The houses are not considered significant. Architecturally, they are not significant as they represent a standard residential housing typology, examples of this type of housing are located throughout suburban Australia. In addition, the buildings show no indication of responding to the larger structure of the former Kilmany Park Farm Home for Boys or specific relationships with other buildings within the homestead / boy's home complex. Socially, the houses are not significant to understanding the function of the Kilmany Park Farm Home for Boys.



Figure 73 View of the weatherboard house, looking south, from the rear driveway into the homestead complex.
Source: Trefhowan, 2016



Figure 74 View of 'Spencer House', looking south-east, from the rear driveway into the homestead complex.
Source: Trefhowan, 2016



Figure 75 View of 'Williams House', looking north-east, from the rear driveway into the homestead complex.
Source: Trefhowan, 2016

6. Analysis

The Analysis consists of three components:

- Assessment of the ascribed significance of the heritage overlay
- Identification of significant elements within the heritage overlay
- Review of the extent of the heritage overlay, and
- Subdivision potential of the property with relation to the extent of the heritage overlay.

7. Assessment of Heritage Significance

7.1 Analysis of findings with relation to the ascribed significance of the heritage overlay

7.1.1 Current Statement of Significance

The current Statement of Significance indicates that 'Kilmany Park' is of historical and aesthetic significance to the Wellington Shire and the Gippsland region. Subsequently, it has been indicated as being of 'State' significance (refer Section 3 – Heritage Listings and Controls).

Historically, this significance is based on the associations of the property with the pastoral settlement of Gippsland in the mid-19th century and the property's ability to demonstrate the status of pastoralists within Gippsland society. These historic associations include those with the Pearson family and their influence in local and Victorian commerce and politics.

Aesthetically, the classically derived mansion on the property, with a multitude of external details being evidence of this architectural pretension, and a variety of Art Nouveau inspired plaster and decorative elements, is notable as one of 'the last conservative Classical mansions erected in Victoria'.¹¹

7.1.2 Analysis of findings

These findings have been analysed in accordance with the assessment criteria and guidelines endorsed by Heritage Victoria. The analysis is outlined below.

The property demonstrates importance to the course or pattern of Victoria's cultural history (Criterion A) for:

- Its status as one of the earliest pastoral properties established in the Gippsland region and formerly one of the largest in the State of Victoria, at its zenith in the early 20th century.
- Its associations with the Pearson family, one of the more important 'squattocratic' Victorian pastoral families of the late-19th and early 20th centuries.
- One of the earliest professional thoroughbred horse racing studs established in Victoria (c.1880-81), the centre piece being the stable block designed by architect J.H.W. Pettit.

The property demonstrates possession of uncommon, rare or endangered aspects of Victoria's cultural history (Criterion B) for:

- The stables as an early example of architect-designed horse racing facility (c.1880-81; architect J.H.W. Pettit), despite its altered state.

The property demonstrates importance in demonstrating the principal characteristics of a class of cultural places/objects (Criterion D) for:

- The classically derived mansion, being a substantial residential project completed by the pre-eminent Melbourne architecture firm of Gibbs and Finslay, being more widely known for their commercial architecture (predominantly banks).
- The classically derived mansion as one of the last and most outstanding examples, in scale and detail, of a Federation-era country house in Victoria.
- The significant Art Nouveau interiors of the mansion, the composition of the whole being to a high level of detail and retaining the vast majority of this detail.

¹¹ Wellington Shire Council, HERMES database record no. 12992, Place Citation Report 'Kilmany Park', p. 2.d

The property demonstrates importance in exhibiting particular aesthetic characteristics (Criterion E) for:

- The significant Art Nouveau interiors of the mansion, the composition of the whole being to a high level of detail and retaining the vast majority of this detail.
- The homestead complex and relationship within the wider landscape setting of parkland and surrounding pastoral land.

The property demonstrates strong or special association with a particular community or cultural group for social, cultural or spiritual reasons (Criterion G) including:

- Representation of the role of the squattocracy in Victorian society during the late 19th and early 20th century and their role, and perceived role, within community life, including as representatives within state parliament, local council and charitable work.
- Hosting of part of the official royal visit of HRH The Duke of Cornwall and York (later King George V) on the occasion of the opening of the first federal parliament at the Royal Exhibition Buildings, Melbourne, in 1901.
- Representative of the displacement of many large land owners during the early 20th century as a result of the Closer Settlement Scheme.
- The association of the property with the Presbyterian Church of Victoria and its adaptation as a boys' home, the Kilmany Park Farm Home for Boys, from 1923 until 1978.

Criterion C, F and H have been found to be not applicable in this case.

On the basis of this analysis, 'Kilmany Park' can be considered to be of historical, architectural, aesthetic and social significance to the State of Victoria.

7.2 Review of the extent of the existing heritage overlay

The following review of the extent of the heritage overlay relates to the extent of heritage overlay HO68 – Kilmany Park; no review of heritage overlay HO151 (Oak Tree) is proposed. The review of the extent of heritage overlay HO68 is based on an analysis of those elements identified as being significant and the grading of those elements accordingly. The grading utilised are:

- **Primary elements**, being those elements identified as being intrinsic to understanding the significance of 'Kilmany Park'.
- **Contributory elements**, being those elements that contribute to the understanding of the significance of 'Kilmany Park'.
- **No significance**, being those elements that do not form part of the understanding of the significance of 'Kilmany Park'.

7.2.1 Primary elements

Those elements considered of primary significance relate to the development of the homestead complex by the Pearson family from the mid-19th century, with further improvements undertaken during the early 20th century, and the setting of the property.

Elements of primary significance include:

- Various 19th and 20th century buildings and structures of the homestead complex, including:
 - o Federation-era mansion and interiors.
 - o Late-Victorian racings stables.
 - o Mid-Victorian meat house, with extant internal fittings and fixtures.
 - o Mid-Victorian men's quarters (with late-Victorian additions).
 - o Late-Victorian former water tower.
 - o Mid-Victorian in-ground water tanks.
- Visual connections between the mansion, outbuildings and various elements of the homestead complex, including:
 - o Service area at the rear of the mansion.
 - o Late-Victorian racings stables.
 - o Mid-Victorian meat house, with extant internal fittings and fixtures.
 - o Mid-Victorian men's quarters (with late-Victorian additions).
 - o Late-Victorian former water tower.

- Formal gardens, including:
 - o Victorian-era plantings, including sizeable exotic specimens.
 - o 'The Cornwell and York Oak' (HO151 – Oak Tree)
 - o Federation-era formal landscaping, including:
 - Elliptical lawn.
 - Visual relationship with the wider landscape which has been designed to form a backdrop to the elliptical lawn.
 - Symmetrical placement of cypress trees that frame the backdrop of views to the elliptical lawn.
- Visual connections between the homestead complex and the wider landscape, including:
 - o Views of the homestead on arrival from the driveway.
 - o Views from the homestead to the surrounding landscape.
- Main driveway (c. 1903) and the formal approach to the homestead from Settlement Road, a sense of arrival within the formal homestead complex, including:
 - o English Oak trees denoting the entrance to the driveway off Settlement Road.
 - o Remnant plantings of lines of *Macrocarpa* cypress, denoting the former structure of paddocks surrounding the homestead.
 - o Remnant stands of old Eucalypts, being a reminder of the indigenous vegetation of the area.

7.2.2 Contributory elements

Those elements of contributory significance relate to the subdivision of the 'Kilmany Park' estate for Closer Settlement from the early 1920s and the redevelopment of the homestead complex as the Kilmany Park Farm Home for Boys from 1923, until the Home's closure in 1978.

Elements of contributory significance include:

- Buildings associated with the Closer Settlement of the area, including:
 - o Kilmany Park School No. 4240, including the school house and the Sloyd room; the design of the Sloyd room is a variation of that designed by Chief Architect of the Public Works Department, Percy Everett.
- Buildings and structures associated with the former Kilmany Park School No. 4240, including:
 - o Early-20th century 'McClelland Gate Posts' and dedication plaque (c. 1924), at the rear entrance to the homestead complex, off Reid Drive.
 - o Kilmany Park School No. 4240, including the school house and sloyd room.
 - o Recreation Centre (c. 1962), attributed to modernist Melbourne architect Keith Reid.
- Leslie Drive (c. mid-1960s), being the avenue of trees along the main driveway, for its contribution to a sense of arrival at the homestead complex despite their later date.

While contributory elements do reflect the change and development of the property after its sale by the Pearson family, they do not directly contribute to the property's significance and need not necessarily be retained either in part or in full.

7.2.3 No significance

Elements that are of no significance to 'Kilmany Park' include:

- Views to the homestead from the surrounding landscape are not considered to be significant given the homestead is not highly visible from Settlement Road.
- Caretaker and labourers houses, associated with the Kilmany Park Farm Home for Boys and dairy farming activities undertaken by the Presbyterian Church of Victoria.



Figure T6 Analysis of significant view lines within the immediate context of the homestead complex. The red arrows denote view lines of primary significance, being those views between significant buildings in the homestead complex, views from the homestead to the wider landscape and views to the homestead from the main driveway. Source: Google Maps, 2016



Figure T7 Analysis of significant view lines within the boundaries of the larger property, including views along the main driveway and from the homestead to the wider landscape. The extent of the heritage overlay H208 is outlined in red. Source: Google Maps, 2016



Figure T8 Analysis of significant view lines overlaid with a potential realignment of the boundary to the heritage overlay.
Source: Google Maps, 2016

8. Concluding Comments

The 'Kilmany Park' estate at Wurruk, near Sale, constituting the area contained under heritage overlay HO68 on the Schedule to the Heritage Overlay of the Wellington Planning Scheme, is of significance to the State of Victoria.

'Kilmany Park' incorporates a substantial land area including the homestead complex, developed from the mid-1840s until the early 20th century by the Pearson family, a significant pastoral, horse racing and political family within the history of the State of Victoria. Following the disposal of the homestead by the Pearson family in the 1920s, the homestead was repurposed as a boys' home, the Kilmany Park Farm Home for Boys, with multiple buildings constructed in conjunction with this new function.

While the property is considered of significance to the State of Victoria, it is noted not all land and buildings within the heritage overlay contribute to the understanding of this significance. On this basis, it is recommended that the extent of the heritage overlay be reviewed to include only those elements that contribute to the significance of 'Kilmany Park'. Such a review should only be considered on the basis of specific guidelines being established to facilitate works both within the curtilage of the heritage overlay area and within the proximity of the heritage overlay area (refer Section 9. Recommendations).

9. Recommendations

9.1 Realignment of the boundary to heritage overlay HO68

It is recommended that the boundaries of the heritage overlay area be realigned to include only those elements identified as significant to heritage overlay HO68.

In light of the proposed realignment of the heritage overlay, it is recommended that the existing alignment of the main driveway from Settlement Road to the 'Kilmory Park' homestead be retained as a primary access road within any proposed subdivision. The primary access road could be planted with appropriate tree species to denote a continued sense of arrival at a new entrance to the main drive to the homestead complex. The primary access road would provide access to secondary access roads only; the secondary roads would provide access to residential properties of the subdivision.

The two English Oaks currently framing the entrance to the main drive should be retained as part of any subdivision proposal. This is in light of them constituting the only early formal planting associated with the construction of the drive.

9.2 Recommended guidelines for the development of land adjoining heritage overlay HO68

Given the impending subdivision of land in the immediate proximity of the heritage overlay area and the intrusive nature of the already existing subdivision development, it is recommended that a series of development controls be put in place to ensure that works related to any neighbouring subdivision do not have a negative impact on the heritage significance of HO68. Controls should include but not necessarily be limited to the following:

- Subdivision allotment sizes [0.5 acre (2000m²) or more]
- Boundary fences (should be rural in character with no standard paling fences)
- Building controls to houses and any outbuildings (houses to be single storey with attics only and/or with hipped or gabled roofs; outbuildings to have hipped or gabled roofs)
- Street lighting
- Landscaping

9.3 Recommended guidelines for the development of land within heritage overlay HO68

A series of guidelines should be put in place to retain the significance of the heritage overlay area.

In addition to applying the general heritage overlay controls and guidelines encapsulated within the Wellington Planning Scheme, guidelines should include but not necessarily be limited to the following:

- Subdivision within the heritage overlay area should be sensitively managed.
- Fences between properties located within the heritage overlay area.
- Roadways within the heritage overlay area.
- Street lighting
- Landscaping

10. Appendices

10.1 Appendix A – Citations for Statutory Listings

HERITAGE CITATION REPORT

Name	Kilmany Park	Significance Level	State
Address	Settlement Road Warruk		
Place Type	House		
Citation Date	2005		



Kilmany Park

Recommended VHR - HI - PS -
Heritage Protection

History and Historical Context

William Pearson, 'resolute Scot, successful pastoralist, politician and mining entrepreneur', took up Kilmany Park at Sale in September 1841 at a time when East Gippsland was virtually unoccupied and it became one of the first pastoral estates in this part of Victoria. Pearson built the original timber single storey homestead in the 1840s and his son William junior erected the substantial stucco rendered two storey mansion house adjacent to the original homestead in 1901-06 in a late conservative Classical style. (1)

The status of the Pearsons within Australian society was illustrated by the visit to Kilmany by the Duke of York (later King George V) on 15 May 1901. He planted an English Oak to mark the occasion (2). The Duke had come to Australia as the King's representative to open the first Federal Parliament in Melbourne.

'Kilmany Park' at Sale has been adapted as a home for boys and conducted by the Presbyterian church since 1923. The arcade has been almost completely enclosed and the interior converted to dormitory Accommodation. (1)

Kilmany Park
Hermes No 128082

Place Citation Report

24-Feb-2016

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Page 1

HERITAGE CITATION REPORT

Not inspected during the Wellington Heritage Study: Sale Review (2004). See also place record for the English Oak in this Study (Place ID 1468).

REFERENCES

- (1) Register of the National Estate, Place ID 004772
- (2) National Trust of Australia (Victoria) Register, T11099

REFERENCES

Context Pty Ltd, 2004. Wellington Heritage Study: Sale Review

Description

Physical Description

Scottish pastoralist William Pearson took up Kilmany Park at Sale in September 1841 at a time when East Gippsland was virtually unoccupied. Pearson built the original timber single storey homestead in the 1840s and his son William junior erected the substantial stucco rendered two storey mansion house adjacent to the original homestead in 1901-06 in a late conservative Classical style. (RNE 004772)

'Kilmany Park' at Sale has been adapted as a home for boys and conducted by the Presbyterian church since 1923. The arcade has been almost completely enclosed and the interior converted to dormitory Accommodation. (RNE 004772)

Not inspected during the Wellington Heritage Study: Sale Review (2004). See also place record for Quercus robur at Kilmany Park, place id. 1468.

Statement of Significance

Kilmany Park is of considerable historical and aesthetic significance to Wellington Shire and the Gippsland region. Historically, it has associations with the pastoral settlement of Gippsland in the mid-nineteenth century and illustrates the status of the pastoralists within Gippsland society. It has important associations with the locally important Pearson family who were influential in local and Victorian commerce and politics. Aesthetically, the present Classically derived mansion with the wide arcaded loggia at ground level and superimposed upper arcade with segmental arches and ponderous central pediment, is notable as one of the last of the conservative Classical mansions erected in Victoria. (RNE criteria A.4, B.2, D.2, E.1 & H.1)

(The Commission is in the process of developing and/or upgrading official statements for places listed prior to 1991. The above data was mainly provided by the nominator and has not yet been revised by the Commission.)

Notable for the variety of its art nouveau plaster decoration, the art nouveau timber screen in the drawing room, the imposing stair lobby and the great balcony, now partially built in. . (National Trust Register, B2969)

HERITAGE CITATION REPORT

Recommendations 2005

External Paint Controls
Internal Alteration Controls
Tree Controls
Fences & Outbuildings
Prohibited Uses May Be Permitted
Incorporated Plan
Aboriginal Heritage Place

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This information is provided for guidance only and does not supersede official documents, particularly the planning scheme. Planning controls should be verified by checking the relevant municipal planning scheme.

HERITAGE CITATION REPORT

Name English Oak (*Quercus robur*)
Address Settlement Road Wairarapa
Place Type Tree
Citation Date 2005



English Oak (*Quercus robur*)

Recommended VHR - HI - PS -
Heritage Protection

History and Historical Context

This English Oak commemorates King George V who planted the tree when visiting the property as the Duke of York on 15 May 1901 (1).

Please see the separate citation in this Study for further information about Kilmany Park.

REFERENCES

(1) National Trust of Australia (Victoria) Register, T11099

REFERENCES

Context Pty Ltd, 2004. Wellington Heritage Study: Sale Review

English Oak (*Quercus robur*)
 Hermes No 128012 Place Citation Report

24-Feb-2016

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 Page 1

HERITAGE CITATION REPORT

Description

Physical Description

This large English Oak (*Quercus robur* - family: Fagaceae) is located within Kilmany Park, Pearsondale Road, Sale, on the west side of the main residence. Estimated to be 100 years old, it has the following dimensions:

Spread: 24.40

Girth: 2.72

Height: 11.75

The condition and form are good.

It was not inspected during the Wellington Heritage Study: Sale Review (2004).

Recommended Management

On National Trust Significant Trees Register, therefore of sufficient significance to be protected under Planning Scheme.

Statement of Significance

This English Oak (*Quercus robur*) at Kilmany Park planted by King George V when visiting the property as the Duke of York on 15 May 1901 is of historical and scientific (horticultural) significance to Wellington Shire. Historically, it is significant for its associations with King George V and a reminder of his visit to Sale at the time of Federation. It demonstrates the importance of Sale as city and Kilmany Park. Scientifically, it is of horticultural significance as a fine mature specimen of this species. (RNE criteria A.4, D.2 and H.1)

Recommendations 2005

External Paint Controls

Internal Alteration Controls

Tree Controls

Fences & Outbuildings

Prohibited Uses May Be Permitted

Incorporated Plan

Aboriginal Heritage Place

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Other Recommendations

On National Trust Significant Trees Register, therefore of sufficient significance to be protected under Planning Scheme.

HERITAGE CITATION REPORT

This information is provided for guidance only and does not supersede official documents, particularly the planning scheme. Planning controls should be verified by checking the relevant municipal planning scheme.

10.2 Appendix B – Citations for Non-Statutory Listings



Australian Government
 Department of the Environment



Heritage
 Australian Heritage Database

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Place Details

[View Record](#)
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Basic Details

Place Name: Kilmory Park, Road Or, Warrus, VIC, Australia

Photographic	None
List	Register of the National Estate (Non-statutory website)
Class	Reserve
Legal Status	Registered (11/11/1976)
Place ID	6772
Place File No	1/1962/1/1962

Statement of Significance

Kilmory Park is one of the oldest established properties in eastern Victoria and largely founded by William Pearson. A notable site, successful pastoralist, politician and mining entrepreneur. The present (historically derived) residence with the wide arched - topped of ground level and superimposed upper arcade with segmented arches and pedimental central pediment, is one of the best of the conservative classical mansions erected in Victoria and notable for the fact, William Pearson junior was a member of the House of Representatives.

(The Commission is in the process of developing and/or upgrading official statements for places listed prior to 1980. The above data was merely provided by the nominator and has not yet been revised by the Commission.)

Official Values Not Available

Description:

William Pearson took up Kilmory Park at Sale in September 1861 at a time when land (pasture) was virtually unobtainable. Pearson built the original house single storey homestead in the 1860s and the present house added the substantial stone rendered two storey mansion house adjacent to the original homestead in 1881-86 as a late conservative classical style.

History Not Available

Condition and Integrity:

Kilmory Park 'W' hall has been adapted as a home for boys and conducted by the Presbyterian Church since 1923. The arcade has been almost completely enclosed and the interior converted by demolishing Accommodation.

Location

Road Or, Warrus, 10km south-west of Sale.

References

NATIONAL TRUST OF AUSTRALIA (VICTORIA) FILE NO. 1976.
 HENDERSON, ALFRED. HENDERSON'S AUSTRALIAN FAMILIES, HENDERSON, MELBOURNE, 1945, PP. 17-18.
 COMMON LAW COURT REPORTS, VICTORIA, 1976, VOL. 142, P. 243.
 BULL, A. V. AND DEAN, A. S. PARTIAL OWNERS OF PEARSON.
 STOCKLAND PRESS, MELBOURNE, 1974, PP. 14, 23.

Search Protocol: 10/11/16 at 10:00:00 AM

HERITAGE CITATION REPORT

Name	Kilmany Park Homestead	File No	B2969
Address	1613 Settlement Road SALE	Significance Level	Unknown
Place Type	Homestead building		



B2969 Kilmany Park Homestead

Recommended VHR - HI - PS -
Heritage Protection

Statement of Significance

A two-storeyed mansion on a particularly grand scale, built in 1901 for the major squatter William Pearson, and notable for the variety of its art nouveau plaster decoration, the art nouveau timber screen in the drawing room, the imposing stair lobby and the great balcony, now partially built in.

Classified: 07/12 1972

See also: T11099

HERITAGE CITATION REPORT

Recommendations

External Paint Controls
Internal Alteration Controls
Tree Controls
Fences & Outbuildings
Prohibited Uses May Be Permitted
Incorporated Plan
Aboriginal Heritage Place

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This information is provided for guidance only and does not supersede official documents, particularly the planning scheme. Planning controls should be verified by checking the relevant municipal planning scheme.

HERITAGE CITATION REPORT

Name	Quercus robur	File No	T11099
Address	'Kilmany Park' 1613 Settlement Road, SALE	Significance Level	Unknown
Place Type	Tree		



T11099 Quercus robur

Recommended VIHR - III - PS -
Heritage Protection

Statement of Significance

Historical value

This commemorative planting dominates the western side of the historic property. The sign reads "This oak was planted by His Majesty King George V when visiting the property as HRH the Duke of York on 15 May 1901. This tablet was erected by the representatives of the Victorian Bowling Association February 1935". 'Kilmany Park' was settled by William Pearson in September 1841 and is one of the oldest established properties in eastern Victoria. The imposing residence was built by Pearson in 1901 is classified by the National Trust.

Measurements: 21/03/1997
Spread (m): 24.4
Girth (m): 2.72
Height (m): 11.25
Estimated Age (yrs): 96

Quercus robur
Hermes No 70605

Place Citation Report

24-Feb-2016

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Page 1

HERITAGE CITATION REPORT

Condition: Good

Access: Restricted

Classified: 10/04/1997

Recommendations

External Paint Controls

Internal Alteration Controls

Tree Controls

Fences & Outbuildings

Prohibited Uses May Be Permitted

Incorporated Plan

Aboriginal Heritage Place

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This information is provided for guidance only and does not supersede official documents, particularly the planning scheme. Planning controls should be verified by checking the relevant municipal planning scheme.

10.3 Appendix C – Previous Heritage Studies



ANNE NAPIER
ARCHITECT

1st December 2005

John Traa
Town Planner
Wellington Shire Council
PO Box 506
Sale VIC 3850

Dear John

**RE: P313/2005
PROPOSED SUBDIVISION
"KILMANY PARK"
SETTLEMENT ROAD, WURRUK**

I refer to your recent correspondence regarding this planning application.

THE PROPOSAL

The proposal is to subdivide the "Kilmany Park" property to create six new lots, each containing an existing house or building/s. I inspected the property with the owner (Daryl Page) on Monday 14th November 2005 in fine conditions. Please note that this was an external inspection only, and that it does not constitute a structural assessment of any of the buildings on this property.

HERITAGE LISTINGS

The property is wholly contained in the Heritage Overlay (HO68) of the Wellington Planning Scheme.

The property was listed by The National Trust of Australia (Victoria) in 1972. The File No. is B2969 and the statement of significance reads:

"A two-storeyed mansion on a particularly grand scale, built in 1901 for the major squatter William Pearson, and notable for the variety of its art nouveau plaster decoration, the art nouveau timber screen in the drawing room, the imposing stair lobby and the great balcony, now partially built in."

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It was also included on the Register of the National Estate back in 1978. The citation is as follows:

"Kilmany Park is one of the oldest established properties in eastern Victoria and largely founded by William Pearson. Resolute Scot, successful pastoralist, politician and mining entrepreneur. The present Classically derived mansion with the wide arcaded loggia at ground level and superimposed upper arcade with segmental arches and ponderous central pediment, is one of the last of the conservative Classical mansions erected in Victoria and notable for this fact. William Pearson junior was a model of his father's career."

"Scottish pastoralist William Pearson took up Kilmany Park at Sale in September 1841 at a time when east Gippsland was virtually unoccupied. Pearson built the original timber single storey homestead in the 1840s and his son William junior erected the substantial stucco rendered two storey mansion house adjacent to the original homestead in 1901-06 in a late conservative Classical style."

"Kilmany Park' at Sale has been adapted as a home for boys and conducted by the Presbyterian Church since 1923. The arcade has been almost completely enclosed and the interior converted to dormitory Accommodation."

BACKGROUND HISTORY

In order to understand the likely cultural heritage significance of the existing buildings on this site, it is important to firstly examine the history of the property.

The following extract is taken from "Vision and Realisation Volume 3 – A Centenary of History of State Education in Victoria" (1973) by the Education Department.

"In 1841 W. Pearson settled on the land stretching from Sale in the E to Rosedale in the W and from the Latrobe River in the S to the Thomson River in the N. This enormous run needed many hands and Pearson began his own private school for his employees in the 1880s. The schoolhouse and attached residence still exist. After 1900 the station was slowly but surely subdivided by the Government and by private enterprise. In 1924 the Government bought the magnificent Kilmany Park Mansion and turned it into a home for orphaned boys. As many of these boys were emotionally disturbed and needed a special education, a special school was provided. On 29th April 1925 the school was opened in three rooms. Two rooms in one building were divided by a folding door and a separate third room was a sloyd room. Richard Costelloe was the first HT. The school is behind the Kilmany Park Mansion which is approximately 3 miles W of Sale. The initial enrolment

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of approximately 40 formed eight grades. The Committee was an unusual one. Throughout the history of the school it consisted of the HM, the Home Superintendent and one parent because some children from the district attended the school. Enrolment reached a peak of 53 but when the school was closed in 1956 the enrolment was 11. At this point it was decided the boys would lead a more normal life if they went to Sale schools. The school had an excellent Junior Young Farmer's Club which won many State prizes for cattle judging. The school gardens won the ANA prize for the most improved garden in 1929. the children showed particular skill in sloyd during the school. History. During the 1940s the boys made toys for children in other orphanages. The boys earned money fashioning garden tools making up to £90 per year. Of the boys at this school one became a bank manager in England (who has a standing invitation to any boy interested in banking for free passage to England and his support when he arrives) and Head of a Victorian country High School. Herbert Williams won a Sun Farmer trip to England in 1937"

Peter Synan's book "Gippsland's Lucky City – A History of Sale" also describes the educational aspects of Kilmany Park:

"In 1923 the Presbyterian Church bought the Kilmany Park mansion and some 200 acres around the homestead for the purpose of a welfare home for boys. The idea was to transplant city boys who were at social risk, to the wholesome atmosphere of a Gippsland farming property where they would have opportunities to continue their schooling. The first boys were welcomed to the home by supervisors Mr and Mrs J. Styne in early 1924. By 1925 numbers had built up to twenty-five. It was now apparent that Wurruk State School could not cope with the influx so the Education Department opened a school at the homestead in 1927."

The main building on the Kilmany Park property is the mansion-like homestead which has already been adequately described in the various heritage listings above. It has seen various uses over its life - as a private residence, as a home for disadvantage boys, and most recently as a bed and breakfast establishment and function centre. It is surrounded by many outbuildings, most notably splendid brick stables. These stables were devastated by bushfires c1940s with only the original brickwork remaining. New roofing timbers, a corrugated asbestos roof, and timber joinery were all re-built at this time.

The garden surrounding the homestead is also of interest. It was inspected by John Hawker (horticulturalist with Heritage Victoria) in 1997 and it contains many fine specimens including a Bunya Bunya Pine, Hoop Pine, Lilly Pilly, Flame Tree, Hazelnut, Blue Atlas Cedar, Himalayan Cedar, Monterey

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Cypress, Bhutan Cypress, Sugar Gum, Japanese Spindle-wood, Loquat, Liquidambar, Norfolk Island Hibiscus, Pear, Chinese Hawthorn, Tortured Willow, Weeping Elm and Purple Elm. Most notable of the trees is a large English Oak to the west of the homestead planted by King George V when visiting the property as the Duke of York on 15th May 1901. It is proposed that all these buildings and the significant garden remain together on the proposed Lot 1. Together, the mansion, outbuildings and surrounding gardens form a complex of high heritage significance.

Lot 2 contains a painted timber weatherboard-clad house with a tiled hipped roof. It is presumed that this house dates from the 1950s-1960s and is of little heritage significance.

Lot 3 contains a cream brick house with tiled hipped roof. This would appear to date from the 1960s and is also considered to be of little heritage significance.

Lot 4 contains two old weatherboard school buildings. The larger of the two has a gabled hip roof of corrugated iron with exposed rafters on the eaves. Windows are timber-framed and configured with three four-pane sashes. The double doors are solid timber planked. The two brick chimneys are without adornment and the steel flue in one of them is evidence of a later heating device having been inserted in the fireplace. This building was not inspected internally, but it is currently lived in by a tenant, so is presumably habitable and serviceable. Based on architectural style, it is estimated that this building may date from the period 1890-1915.¹ The second school building is of a simpler style, with a simple hipped roof of corrugated iron with a ventilated ridge. It too has painted timber weatherboard-clad walls and double-hung sash windows with hopper-style glazed windows above. The style of the windows and the enclosed eave may suggest that this building is from a later period than the other school building. It is believed that this building is currently used as a storage facility by one of the tenants. These buildings form an integral part of the history of the Kilmany Park property. It would be ideal if they could remain on the same Lot as the homestead and other outbuildings, however, the future significance of any of these buildings (most importantly the mansion) will not be diminished by the subdivision. However, it would be advisable for the heritage overlay to remain on this site so that future development is appropriately managed. Any future application to demolish these two school buildings should be refused.

Lot 5 contains an old style cottage with rendered brick walls and a steeply pitched corrugated iron roof. The timber vent detail on the gable is identical to

¹ *A Pictorial Guide to Identifying Australian Architecture - Styles and Terms from 1788 to the Present*, Richard Apperly, Robert Irving, Peter Reynolds, Angus & Robertson 1989

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that on the brick stables, indicating that it was probably constructed around the same time. Its previous use is not known, but it is assumed that it may have been a farm manager's cottage. It is currently rented out on a short-term basis as holiday accommodation or alternatively on a longer-term basis to visitors. It is anticipated that this arrangement will continue. Based on architectural style, it is estimated that this building dates from a period **pre-1890**. This building is integral to the complex of buildings that comprise Kilmany Park, and it would be ideal if it could remain on the same Lot as the homestead and other outbuildings. **However, the future significance of any of these buildings (most importantly the mansion) will not be diminished by the subdivision. However, it would be advisable for the heritage overlay to remain on this site so that future development is appropriately managed. Any future application to demolish this cottage should be refused.**

Lot 6 contains an orange brick house with a tiled hipped roof, thought to date from c1970s. It is of little heritage significance.

RELEVANT GUIDELINES

The following extract is from the Heritage Victoria document "Guidelines For The Assessment of Heritage Planning Applications":

"Subdivision and Consolidation of Land

Guideline basis

A permit is required for subdivision or consolidation of places listed in the Schedule to the Heritage Overlay of local planning schemes and for places on the Victorian Heritage Register.

Subdivision: Background

Subdivision, if approved, is not a readily reversible change, and should be approached with extreme care. While subdivision itself is merely lines on a map, the purpose of subdivision is generally to enable the sale or disposal of the separate lots. There is usually an expectation of the construction of either fencing and/or buildings on the separate lots created by the subdivision. It is often the impact of this future development rather than the subdivision itself which may prejudice the significance of the place.

It is important for decision makers when assessing a subdivision application to be mindful that while heritage controls may still apply to the subdivided

² *A Pictorial Guide to Identifying Australian Architecture - Styles and Terms from 1788 to the Present*, Richard Apperly, Robert Irving, Peter Reynolds, Angus & Robertson 1989

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property, it may be too late and too difficult to refuse a permit for new development once the subdivision has occurred. It is therefore desirable to understand as much as possible what development is proposed for the site at the time of the subdivision application. The outcome of the subdivision is crucial to the possible setting of the site and all possible development options should be explored.

The true significance of a place is often reliant upon it being seen in its original setting or context, with all its related elements including gardens, trees, grounds, surrounding pastures, outbuildings, fences, paths, gates or paving. If the place is isolated from its setting, its significance may be diminished or even lost. Cultural significance of a place may also relate to its visual prominence, in such a case setting is of special importance. Consequently the development that results on the subdivided or consolidated land has the potential to destroy or diminish the significance of a place.

This means that development on that land should be controlled to minimise any adverse impact. The physical relationship of separate structures to each other as well as the space between structures needs to be considered in assessing permit applications.

To assess an application to subdivide a heritage place information may be required as to:

- All significant elements of the place, including those elements that contribute to the setting (eg buildings, outbuildings, pathways, driveways, plantings etc)*
- Important views to and from the place (The placement of the features on a heritage place can be significant due to the views obtained from or to that place.); and*
- An appropriate curtilage to maintain the significance of the place*

In the urban context the issue of subdivision will more typically arise in relation to larger residential, commercial or industrial properties and institutional sites such as church complexes, schools or hospitals.

Subdivision may result in development that affects the consistent rhythm and pattern of buildings in the street where the property is located in an important streetscape characterised by consistent property sizes and building forms. For example, a historic commercial or residential street may be characterised by properties of a consistent width and buildings of a consistent scale and form.

In the rural context the issue is more likely to arise in relation to large

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acreages where there are economic pressures to subdivide. This may include coastlines and areas under pressure from expanding towns or resorts.

Depressed farm incomes may mean that subdivision will lead to an injection of capital necessary to maintain existence. For example, there may be an historical setting of open farm space between residential areas and coast lines.

Applicants often suggest that the need to subdivide is justified by the need to maintain financial viability of the place (ie the property is too large for the current owner to maintain). Consideration should be given to whether the subdivision is the only way of ensuring long term conservation of the most significant element(s) of the place or whether other options may exist. If no other options exist it may be beneficial to obtain a type of bond to ensure that the conservation works do occur. Subdivision may ultimately be seen as the only means of conserving a place, by providing funds for its long term conservation. In this case the gains from subdivision should outweigh any losses pertaining to significance in order to be justified.

The same principles apply to the realignment of property boundary lines."

Objectives of guidelines

- To ensure that the potential negative effects of subdivision on cultural heritage significance of a place are minimised
- To ensure that an appropriate setting and context for heritage places is maintained
- To ensure that an appropriate setting and context for heritage places is maintained
- To ensure that heritage places continue to be used and conserved

Guidelines: Subdivision

- Subdivision should not impact negatively on the significance of the place.
- Subdivision should be avoided or limited if it is detrimental to the associational or historical links which are essential to maintaining significance and understanding of the place (ie if it leads to the physical separation and isolation of important elements of the historic place - for example, the separation of a historic house from its stables or outbuildings, garden etc).
- Subdivision should be avoided or limited if resulting development, including boundary fences and buildings, will be detrimental to the

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visual appearance of the heritage place or be detrimental to the significant view lines to and from the heritage place. Maintenance of an appropriate visual setting is essential.

- *Subdivision should be avoided or limited if it, or any resulting development, will impact on the significance of an adjacent or surrounding heritage place.*
- *All applications for subdivision involving protected land should be accompanied by design guidelines that include proposals for building envelopes, materials, colours and fences for the subdivided lots*
- *Subdivision in the midst of an important group of buildings or streetscape should be avoided if it may result in development that affects the consistent rhythm and pattern of buildings. Subdivision should also be avoided in this situation where it adversely affects the historically important views and interrelationship of a group of buildings*
- *For larger properties such as homesteads and the "home paddock", all the main structures associated with the property which may include the homestead, stables, woolshed, barn, original fences, paths and dry stone walls should be retained in single ownership. This may also include parts of the site of archaeological significance such as the sites of earlier houses, underground water storage vessels etc. Plantings such as driveway avenues, an important garden associated with the place, walled gardens, hedges and the like should also be retained in the same ownership as the main building with which they are associated*
- *If subdivision is put forward as the only means of ensuring the long term preservation of a property, evidence of having examined the feasibility of other alternatives should be submitted with a permit application or conservation management plan*
- *The history of the property's boundaries should be taken into consideration. If, for example, the original property had increased in size over time, it may be appropriate to subdivide along original lines and return the property to its original size*

Where subdivision is permitted:

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- *Site new boundaries away from existing vegetation. Create new boundaries that are located in a way to develop the lot for the intended purpose without losing the existing significant vegetation*
- *The heritage place should be given visual prominence over potential development on the subdivided land. This should be shown on a planning application showing vistas to the settings that are to be retained to the place and the location of all significant features.*
- *An undeveloped space should exist between the heritage place and any potential development on the subdivided land. Landscaping may be appropriate where it does not alter the significance of the surrounding landscape*
- *Development envelopes (that is, areas in which development may occur on a site) should ensure a transition between potential new development and the significant building or structures in terms of scale, height and massing so that the heritage place is not overwhelmed or dominated by the new*
- *Provide adequate land and access for existing buildings and vegetation to protect their setting and possible options for future use**

RECOMMENDATIONS

Whilst it is unfortunate to see any historic property subdivided, it is believed that in this instance the proposed subdivision will not diminish the cultural heritage significance of the place. This is subject to the following conditions:

- That the heritage overlay remain on all six Lots so that inevitable future development on these Lots can be appropriately managed.
- That building envelopes be created on some or all of the Lots numbered 2, 3, 4, 5 and 6.
- That current and/or future owners of Lots 4 and 5 be encouraged to retain and enhance the existing buildings so that their cultural heritage significance is not diminished. In particular, any future development on these sites needs to be sensitive to the heritage significance of the existing buildings. Any future application to demolish these buildings should be refused.
- The Schedule to the Heritage Overlay does not include controls over internal alterations. This situation should remain for all Lots.
- The schedule to the Heritage Overlay includes external paint colours for this property. It is recommended that these need not apply to the

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newly created Lots 2, 3, and 6. External paint controls should remain on Lots 1, 4 and 5.

- The schedule to the Heritage Overlay includes tree controls, however, it is recommended that these need not apply to the newly created Lots 2, 3, 4 and 6. The tree controls should remain on Lots 1 and 5.

Please don't hesitate to contact me should you require any additional heritage advice regarding this planning application.

Yours sincerely

[original signed by Anne Napier]

Anne Napier
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KILMANY PARK SALE

Review of heritage significance – January 2009

Introduction

This report has been prepared for Jelaryl Pty Ltd and provides the initial findings of the review of significance of Kilmany Park at Sale in order to provide the basis for recommendations to change the extent of the Heritage Overlay that currently applies to the property.

A revised draft statement of significance has been prepared, which provides a more comprehensive understanding of the significant elements associated with the place.

This report has been prepared in accordance with the principles and procedures set out in the *Australia ICOMOS Charter for Places of Cultural Significance 1999* (the Burra Charter), and the assessment of significance has applied the Hercon criteria. Specifically, the investigation carried out has included a site inspection on 16 December 2009, a review of existing documentation in relevant studies including the Wellington Shire Heritage Study, and a review of relevant planning controls and policy in the Wellington Planning Scheme. The current owner provided further information about the history of the site. The scope of this study did not allow further research to be carried out and it is noted that further research into the history of this fascinating place would be beneficial.

History

William Pearson, 'resolute Scot, successful pastoralist, politician and mining entrepreneur', took up Kilmany Park at Sale in September 1841 at a time when East Gippsland was virtually unoccupied and it became one of the first pastoral estates in this part of Victoria. Pearson built the original timber single storey homestead in the 1840s and his son William junior erected his substantial stucco rendered two storey mansion house adjacent to the original homestead in 1901-06 in a late conservative Classical style (RNE).

Over time the Pearsons established a complex of buildings on the property, which included a large brick stables, and a small timber structure adjacent to the kitchen used for the killing and storage of animals.

The status of the Pearsons within Australian society was illustrated by the visit to Kilmany by the Duke of York (Later King George V) on 15 May 1901. He planted an English Oak to mark the occasion (NT). The Duke had come to Australia as the King's representative to open the first Federal Parliament in Melbourne.

In 1923 Kilmany Park was converted to a home for boys conducted by the Presbyterian Church. The Church made alterations to the house including enclosing the upper balconies to provide bedrooms for the boys and constructing a gabled brick extension extending from the north-west corner containing toilets and showers. Internally, much of the original detailing was covered over, but fortunately, it appears that little was removed.

In 1925 a school was established on part of the site. The predominance of boys was reflected in the addition of a Sloyd Room in the 1930s.

In the 1940s a fire partially destroyed the stables, which was rebuilt and extended. Further additions included the construction in the 1960s of a brick assembly hall by the Church.

The current owners purchased Kilmany Park in 1996. Since then they have carried out extensive restoration and renovation works, most significantly removing the enclosures to the upper balcony. Internally, ensuite bathrooms have been sensitively integrated, and some minor doorways closed (and others opened), but the overall form and layout and detailing remains largely intact. This is particularly true of the main downstairs rooms leading off the grand central hall.

Sources

Register of the National Estate (RNE), Site ID: 004772

National Trust of Australia (Victoria) (NT), B2969

Dr Daryl Page

Description

Kilmany Park is situated on the west side of Settlement Road, to the south-west of Sale. The entrance to the driveway is marked by a pair of semi-mature English Oaks (*Quercus robur*) and the driveway is lined with informal plantings of Eucalypts and Melaleucas.

The driveway leads to a complex of buildings set on a rise overlooking the Latrobe River plains, which includes the mansion, constructed in 1901-06, the original c.1860 cottage, the former Kilmany Park School, and a complex of outbuildings including the 'killing room' adjacent to the house and the former stables. There are also three post-war houses and a brick hall constructed by the Presbyterian Church.

The mansion is a substantial two storey building in the conservative Classical style. It has a wide arcaded loggia at ground level and superimposed upper arcade with segmental arches and a central pediment. Notable internal features include the variety of its art nouveau plaster decoration, the art nouveau timber screens in the drawing room and dining, the imposing stair lobby and the great balcony. The flora employed in the plaster decoration includes many Australian species such as gum leaves, reflected the nationalistic sentiments that were expressed in design around the time of Federation.

The mansion is in good condition and has a relatively high degree of integrity both internally and externally. The major change to the exterior of the mansion is the c.1920s single storey gabled addition extending from the north-east corner made by the Presbyterian Church to accommodate amenities including toilets and showers. Adjoining this addition is the brick 1960s Hall.

The mansion is set within the remnants of original gardens that include a number of magnificent exotic trees including a Bunya Bunya Pine, a Hoop Pine (close to the south-east corner of the mansion) and the English Oak (immediately to the west) planted by the Duke of York. Other notable trees include the pair of Cedars set within an elliptical shaped lawn framed by the carriage driveway on the south side of the Mansion, and a Norfolk Island Hibiscus just to the east of the Mansion. The elliptical Cedar lawn is enclosed by a concrete border, which features steps on the south side. Most of the other garden plants (which include acanthus, euphorbia, various succulents, roses, lavender etc.) are recent plantings, but are nonetheless appropriate for the era of the house.

To the north of the house is an open gravelled courtyard, which is partially enclosed on the east side by the c.1920s ablutions wing and the c.1960s hall. At the centre of courtyard is

an underground brick-lined well, now covered with a concrete cover. A second brick-lined well is situated close to the south-east corner of the former stables.

The 'Killing Room' is a small weatherboard building just to the west of the kitchen wing. It has a hip roof with a small 'rocket' shaped ventilator (apparently original, this appears in an early photograph in the possession of the current owner). It has small covered windows, and chicken wire under the eaves providing further ventilation. Internally, the walls and ceiling are lined with narrow tongue and groove pine boards, and the original frame and hooks for hanging animal carcasses is still intact.

The c.1860 cottage is constructed of brick with three stretcher courses alternating with one soldier course. The cottages comprises one long traverse gable oriented east-west, with three subsidiary gables extending at right angles to the north. There are skillion verandahs to both the north and south elevations verandah structures, which appear to be early, if not original, are supported by chamfered timber posts and have brick floors. There are external chimneys in either end wall. The front door and hallway is placed off-centre. Windows are six-pane double hung sash. The three gable ends have ocular vents

Significant outbuildings include the former stables, which appear to originally have been symmetrical in layout with a large central barn flanked by two wings containing accommodation for the stable hands. The flanking wings have double hung sash windows with an oculus vent above. The area to the south of the barn and between the flanking wings has now been enclosed, and a large new steel framed roof built over the barn. Internally, the barn retains its original brick floor - the stable bays have been removed but evidence of the divisions still exists in the walls and floors. An unusual feature at one side is a concrete 'trough', which reputedly was used for the servicing of carriages or vehicles.

Behind the stables is another very altered brick outbuilding, the original use of which is not known, though it was possibly a bakery for the house¹. Surviving original fabric includes the inner and out walls, which however, have been shortened and a new roof place above. Window and doorway openings have been altered, but some original arched doorway openings remain. The building was evidently used during the tenure of the Presbyterian Church as a workshop of sorts.²

The former Kilmanny Park School comprises the original two room school house and the adjacent Sloyd Room. The school house is symmetrical in plan, with two rooms separated by a folding bank of doors, which open off a porch on the west side of the building. Each room retains its original raised platform for the teacher in front of the chalkboard, with a fireplace set into opposite corners. These are marked by plain brick chimneys at either end of the building, which adds to the symmetry of the composition. In each end wall (including the north end, which is unusual) are large banks of multi-paned windows with hoppers above. The east side elevation features four high set multi-paned windows, which are also used in the porch. Alterations to the interior include the subdivision of the porch into two rooms, one now converted to an ensuite, and the installation of a kitchen in one part of the northern room.

The adjacent Sloyd Room is a simple rectangular building with a hip iron roof. It also is essentially symmetrical in plan with four tall windows in the south elevations and three windows and a door in place of the fourth in the north elevation. The windows have

¹ Daryl Page, pers. comm. 16 December 2009.

² *Ibid*

horizontal glazing bars, which illustrate the Moderne influence upon school design in the 1930s under the direction of Chief Architect, Percy Everett. Internally, the building retains a number of features that demonstrate its original function including the large bench along the south wall, the built in cupboards (once used for storing tools) and what appear to be large shelving units along the east end wall. Otherwise the interior is typical of schools of this period with vertical lining boards to the lower part of the wall and plasterboard above. A blackboard is set into the west end wall. The ceiling has been replaced.

Other buildings include three post-war houses of typical design.

Significance [Draft]

What is significant?

Kilmany Park at Settlement Road, Sale. The following elements contribute to the significance of the place:

- ▶ The c.1860 cottage.
- ▶ The mansion of 1901-06 excluding the later additions by the Presbyterian Church.
- ▶ The form and concrete border and steps to the elliptical lawn to the south of the mansion and the remnant mature trees including the *Quercus robur*, Bunya Bunya Pine, Hoop Pine, Norfolk Island Hibiscus and two Cedars.
- ▶ The two brick underground water tanks.
- ▶ The outbuildings associated with the Pearson ownership including the 'Killing Room', former stables (excluding the later additions and alterations), and the brick outbuilding immediately to the north of it (excluding the later additions and alterations).
- ▶ The former Kilmany Park School and the Sloyd Room. The interior of the Sloyd Room is also significant.

The three post-war houses on the property are not significant.

How is it significant?

Kilmany Park is of historical, architectural, aesthetic and social significance to the Gippsland region.

Why is it significant?

Historically, it is significant for its associations with the pastoral settlement of Gippsland in the mid-nineteenth century and illustrates the status of pastoralists within Gippsland society. It has important associations with the Pearson family who were influential in Victorian commerce and politics. (Criteria A & H)

It is also historically and socially significant for its long association with the Presbyterian Church and provides evidence of the facilities created by church organisations for the welfare of children in the twentieth century. This association is demonstrated by the school buildings, which also provide evidence of the closer settlement of this area in during the 1920s. The former Sloyd room is of particular significance as a rare example of its type, which is notable for the relatively high degree of external and internal integrity. (Criteria A, D G & H)

Aesthetically and architecturally, the mansion with a wide arcaded loggia at ground level and superimposed upper arcade with segmental arches and ponderous central pediment, is notable as one of the last of the conservative Classical mansions erected in Victoria and one of the finest private houses in the Gippsland region. Internally, the mansion is notable


for the variety of its art nouveau plaster decoration, the art nouveau timber screen in the drawing room, the imposing stair lobby and the great balcony, now partially built in. (Criteria D & F)

The mansion, garden and outbuildings is aesthetically significant as a fine example of a substantial Federation homestead complex in a picturesque rural setting. (Criterion E)

South Wurruk Stormwater Plan
Concept Stormwater Management Strategy

Date 04/07/2016

DOCUMENT CONTROL DATA

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- APPENDIX A. DRAFT PROPOSED SWMS PLAN
APPENDIX B. RATIONAL METHOD CALCULATIONS

Glossary of terms

Alphabetical list of terms and abbreviations used in report

AHD	Australian Height Datum A common national surface level datum approximately corresponding to mean sea level.
ARI	Average Recurrence Interval - <i>The average, or expected, value of the periods between exceedances of a given rainfall total accumulated over a given duration.</i>
Authorities	Organisations responsible for supply and management of sewer, water, gas, electricity and telecommunications, roads and transport
BPEMG	Best Practice Environmental Management Guidelines
BWCo	Beveridge Williams & Co Pty Ltd
WGCMA	West Gippsland Catchment Management Authority
Client	Jelaryl Pty. Ltd. Park Ridge Investments Pty. Ltd. Pearsondale Heights Pty. Ltd. Reyela Pty. Ltd.
Council	Wellington Shire Council
IDM	Infrastructure Design Manual
LSIO	Land Subject to Inundation Overlay
NTWL	Normal Top Water Level
Q ₁₀	Storm water flow generated from 10 year ARI storm event.
Q ₁₀₀	Storm water flow generated from 100 year ARI storm event.
Q _{diff}	Flow difference between Q ₁₀ and Q ₁₀₀ storm event.
SEPP	State Environment Protection Policy
WLRB	Wetland Retention Basin
WSUD	Water Sensitive Urban Design

1 INTRODUCTION

Beveridge Williams has been commissioned by Wellington Shire Council to prepare a Concept Stormwater Management Strategy (SWMS) for a South Wurruk Development Plan, based on the **Sale, Wurruk and Longford Structure Plan** (August, 2010). The total site area is approximately 122.85 ha and as stated in the Structure Plan, 'opportunity exists for establishment of urban residential and some rural residential development to form a complete neighbourhood that is integrated with the existing urban area and local facilities'.

This SWMS report is intended to provide a conceptual drainage strategy for the development plan. The strategy aims to retain post-development stormwater runoff to pre-development level, to meet stormwater quality Best Practice Environmental Management Guidelines (BPEMG) to the satisfaction of West Gippsland Catchment Management Authority (WGCMA), Wellington Shire Council (WSC) and other relevant authorities.

1.1 Site Overview

The proposed development plan is located in Wurruk, 1.3km west of Sale and predominantly bound by Settlement road on the south east and Princes highway on the north. There are currently two existing residential areas adjacent to the subject site, Sovereign Estate to the west and Park Ridge Estate on the eastern side. There is also an existing heritage site (Kilmany Park Heritage Estate) towards the southern west area of the site (which is excluded from the subject site area) (Refer to Figure 1 for the location plan and Figure 2 for the Site Analysis Plan).

The overall site is largely characterised by paddocks with scattered trees and plantings, and some flood prone land area to the south. There are some existing water bodies surrounding the site as shown in Figure 2.




Figure 1: Location Plan – Not to Scale (Source: Near Map)



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[illegible] Beveridge Williams

2 EXISTING CONDITIONS

2.1 Topography

The overall subject site is relatively flat, with varying topographical features throughout the area. The contours generally falls from north to south direction (Refer to Figure 3 below for Site Topography Plan).

On the northern part, a ridgeline extends through the centre of the site with a number of high points across the site. The land around this consists of undulating terrain, with areas of steep gradient as well as some flat open spaces further towards the middle section of the site.

The southern part of the site is much flatter with some low points and drainage basins, falling towards to the floodplains area on the further south, where the land is covered by a Land Subject to Inundation Overlay (LSIO).

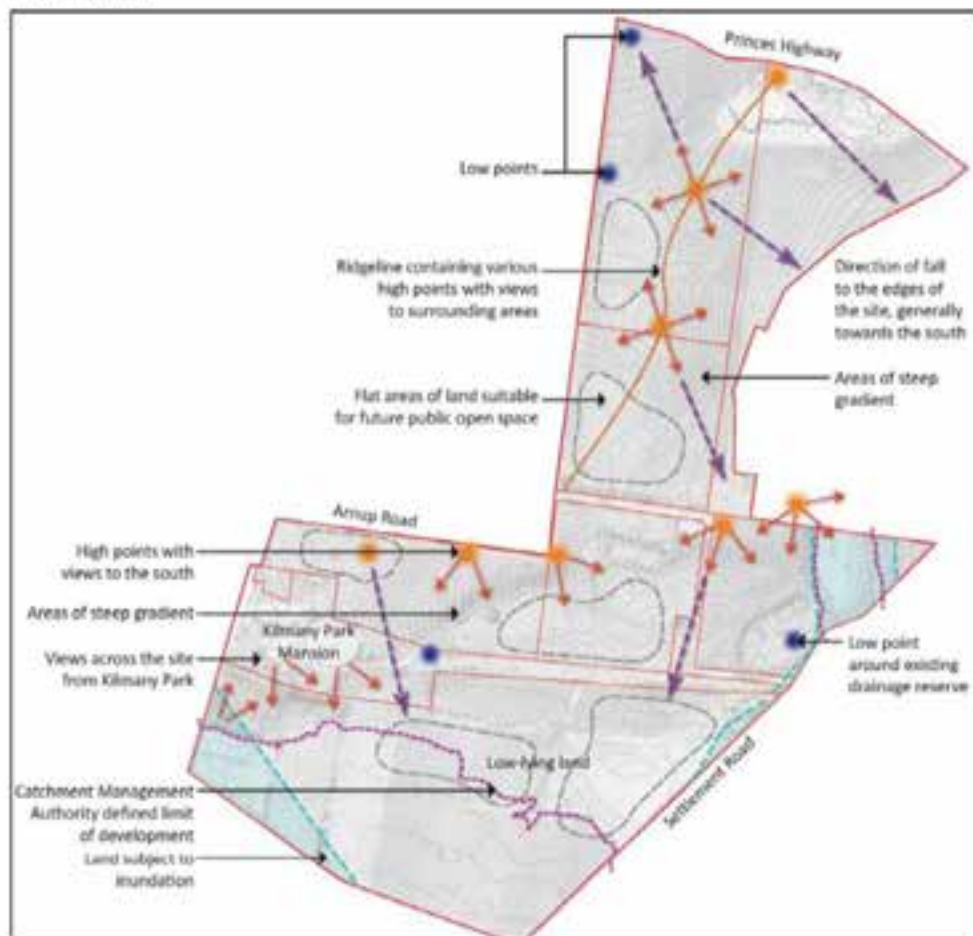


Figure 3: Site Topography Plan

2.2 Surface Water and Drainage

As previously mentioned, the site topographical map shows a series of highpoints that form a major ridge line through the middle of the northern part of the subject site. This resulting in two opposing drainage paths on either side of the ridge line. Surface drainage water on the western part of the ridgeline flows towards northwest direction while on the eastern part of the ridgeline flows towards east and south east directions (Refer to Figure 4 below).

Surface water on the middle part of the site generally flows towards to the southern direction where the low points are located. Drainage water on the southern part (south of Kilmany Park Mansion) generally runs towards to the south, where the floodplain (LSIO) area is located.

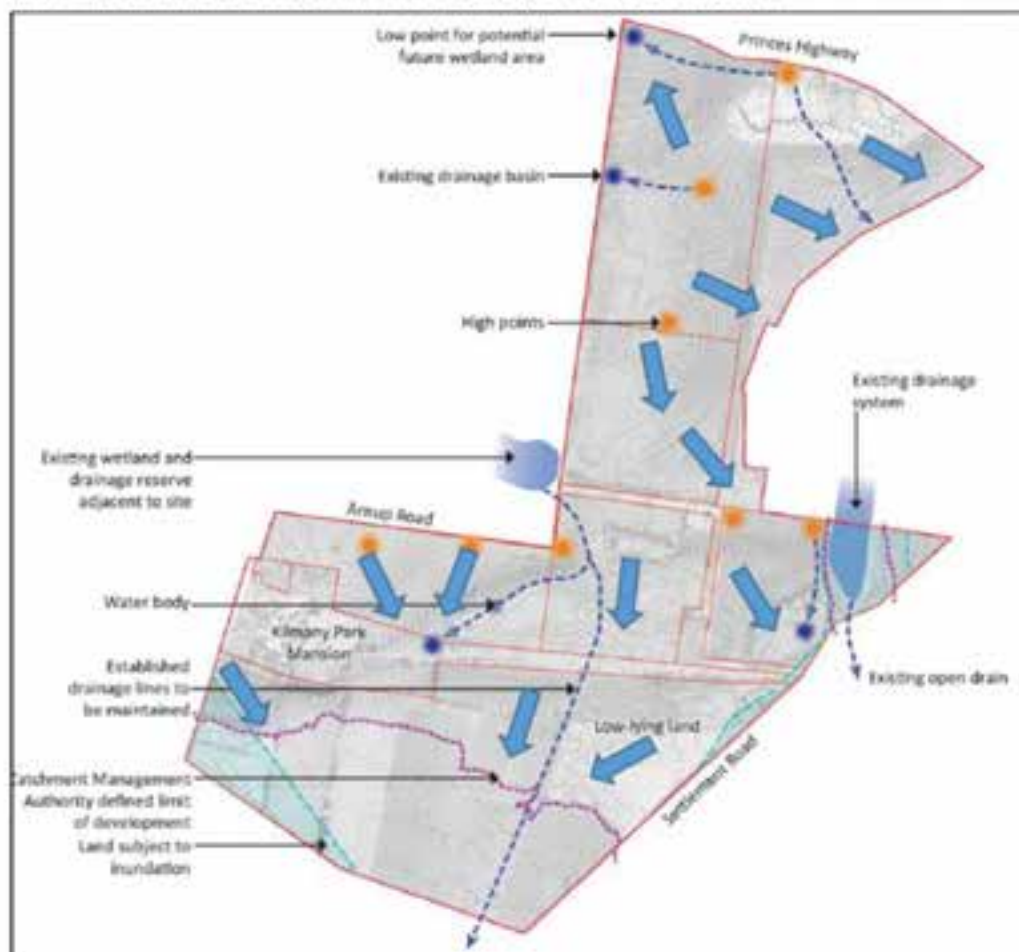


Figure 4: Existing Site Surface Water Plan

3 DESIGN INTENT

3.1 Proposed Development

The proposed indicative residential development plan, with total area of approximately 122.85 ha is to form high and medium residential density lots. The high density lots are predominantly located on the northern part and also the eastern part of the middle section. The low density lots are located on the western part of the middle section and southern part.

This preliminary development layout will also include an oval and a few reserve and drainage reserve areas. The proposed road network will be designed to minimise traffic flow whilst maintaining simple and direct access for local residents.

3.2 Proposed Stormwater Management Strategy

The main objectives of this SWMS are to satisfy the requirements from Council and CMA, which include controlling the rate of the 1 in 100 year ARI stormwater runoff for the post development peak flows to pre development levels and providing stormwater treatment to meet the best practice guidelines.

For stormwater quantity management, it is proposed to indicatively provide 7 stormwater detention basins throughout the subject site. Each of these basins will be located on the lowest point of each of the designated sub-catchment within the site.

For stormwater quality management, it is proposed to provide 7 wetlands located within the stormwater retardation basins.

Details of both stormwater quantity and quality management are discussed in Sections 4 and 5.

4 STORMWATER QUANTITY MANAGEMENT

As part of the West Gippsland CMA (WGCMA) and Council requirements, stormwater runoff for the 1 in 100 year ARI event will need to be retarded from the post development to pre development conditions. Details of stormwater detention are discussed in the following sections.

4.1 Sub-surface Drainage

The Legal Point of Discharges for the subject site will be to existing open channel on the east, existing floodplain area on the south and existing drainage system on the north-western corner (Refer to Figure 6).

The subsurface drainage networks for the development will convey all pipe flows to these discharge points, via the proposed water quality treatment facilities located within the proposed retarding basins throughout the site. The pipe networks will be adequately sized to convey the 1 in 5 year ARI flows through the network.

4.2 Subject Site Overland Flow

Overland flows from each of the sub-catchment area of the proposed development site will be directed via the road network or easements as required to proposed designated retarding basins.

The internal roads for the development, and associated lot finished surface levels, will be designed to ensure that the 1 in 100 year ARI overland flows through the site are within the safe hydraulic capacity of road floodway.

4.3 Rational Method Calculations

The total proposed development area of 122.85 ha was divided into 7 different sub-catchments based on the existing contours topography. The post-development catchment plan (the Concept Stormwater Management Plan) has been developed to indicate where the stormwater discharge within each of the sub-catchment area is channelled into the designated retarding basin (See Figure 7 below, also Appendix B).



Figure 5: Concept Stormwater Management Plan for South Wurruk Development Plan (Not to Scale)

The calculations for the 1 in 100 year ARI flows of the subject site were undertaken using Rational Method to determine the design flows for the pre-developed and post developed scenarios.

The parameters determined for the rational method calculation are shown in Table 1.

Parameters for Rational Method Calculations						
Catchment	Pre-Development Scenario			Post Development Scenario		
	T _r	Average C ₁₀₀	Rainfall intensity	T _r	Average C ₁₀₀	Rainfall intensity
A	20.11	0.282	95.38 mm/hr	10.30	0.64	137.51 mm/hr
B	22.90	0.282	88.38 mm/hr	10.02	0.67	139.44 mm/hr
C	16.94	0.282	105.23 mm/hr	9.56	0.72	142.75 mm/hr
D	27.26	0.282	79.65 mm/hr	10.33	0.67	137.31 mm/hr
E	20.88	0.282	93.30 mm/hr	9.50	0.35	143.19 mm/hr
F	31.18	0.282	73.41 mm/hr	10.56	0.54	135.78 mm/hr

G	20.46	0.282	94.41 mm/hr	9.56	0.72	142.75 mm/hr
----------	-------	-------	-------------	------	------	--------------

Table 1: Parameters for the Rational Method

Details of total catchment and sub- catchment areas for the pre and post development scenarios are also provided in Table 2 below.

Total Catchment and Sub-catchment Areas for the Rational Method Calculations	
Total Catchment Area	122.85 ha
Sub-catchment area A	11.59 ha
Sub-catchment area B	16.33 ha
Sub-catchment area C	7.38 ha
Sub-catchment area D	25.82 ha
Sub-catchment area E	12.81 ha
Sub-catchment area F	36.78 ha
Sub-catchment area G	12.14 ha
Fraction Impervious (Rural)	0.1
Fraction Impervious (Medium density lots)	0.6
Fraction Impervious (Low density lots)	0.2
Fraction Impervious (Reserve)	0.1

Table 2: Catchment Area and Fraction Impervious for the Rational Method Calculations

4.4 100 year ARI Peak Flows and Storage Volume Required

The results of 1 in 100 year ARI peak pre-development and post development flows from the Rational Method Calculations are shown in Table 3. The detention storage required was calculated using the Rational method. Details of both Rational Method and detention storage calculations are shown in Appendix C.

1 in 100 year ARI Peak Flows for South Wurruk Development			Volume of Detention Required
Sub-Catchment	Pre Development Peak Flow	Post Development Peak Flow	
A	0.87 m ³ /s	2.80 m ³ /s	1,746 m ³
B	1.13 m ³ /s	4.32 m ³ /s	2,922 m ³
C	0.61 m ³ /s	2.09 m ³ /s	1,291 m ³
D	1.61 m ³ /s	6.09 m ³ /s	4,182 m ³
E	0.94 m ³ /s	1.79 m ³ /s	609 m ³
F	2.12 m ³ /s	6.82 m ³ /s	4,331 m ³
G	0.90 m ³ /s	3.45 m ³ /s	2,260 m ³
Total			17,341 m³

Table 3: Pre & Post Development Peak Flows and Detention Storage Calculations Results for the 100 year ARI

The above peak flows results indicate that the 1 in 100 year ARI post development peak flows can be detained to the pre development level by providing a total combined detention storage of 17,341 m³.

4.5 Sizing of the Detention Storages

The sizing of the basins have mainly been governed by the required wetlands area to meet the Victoria best practice standard of stormwater quality treatment, in which are larger than the required RBs area in some cases. The calculations for the wetlands are further details in the next Section 5. Each of the basin has been sized with a 1 in 6 batter slope.

Details of the retarding basins for each of the sub-catchment is in Table 4 below. Plan of indicative locations of the WLRBs are provided in the previous Figure 7.

Indicative Details of Retarding Basins (RB) for South Wurruk Development			
Sub-Catchment	Storage Required (m ³)	RB Top Surface Area (m ²)	RB Depth (m)
A	1,746 m ³	3,631 m ²	1.0 m
B	2,922 m ³	4,786 m ²	1.3 m
C	1,291 m ³	2,434 m ²	1.1 m
D	4,182 m ³	6,351 m ²	1.2 m
E	609 m ³	3,264 m ²	0.6 m
F	4,331 m ³	8,884 m ²	1.1 m
G	2,260 m ³	3,993 m ²	1.1 m

Table 4: Indicative Details of Retarding Basins

The design of retarding basins will be in accordance with the specific technical details contained in the Council Infrastructure Design Manual and WGCMA Standards. Detailed designs of these stormwater detention devices have not yet been completed and these will be submitted to Council and WGCMA during detailed design phase.

5 STORMWATER QUALITY MANAGEMENT

It is a Victorian Government requirement that Quality of stormwater runoff from the proposed development meets the Urban Stormwater Best Practice Environmental Management Guidelines (BPEMG), which are required under Clause 56 of the Victorian Planning Provisions (VPP). The targets are:

- 70% removal of the Total Gross Pollutant Load (Litter);
- 80% removal of Total Suspended Solids (TSS);
- 45% removal of Total Phosphorus (TP); and
- 45% removal of Total Nitrogen (TN).

Stormwater quality modelling was conducted using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) for the proposed development site. The layout of the MUSIC Model is shown in Figure 8 below and results of the MUSIC model are shown in Table 5. The proposed treatment will be 7 wetlands (each with a sedimentation basin) located within the base of the RB for each of the 7 sub-catchment areas.

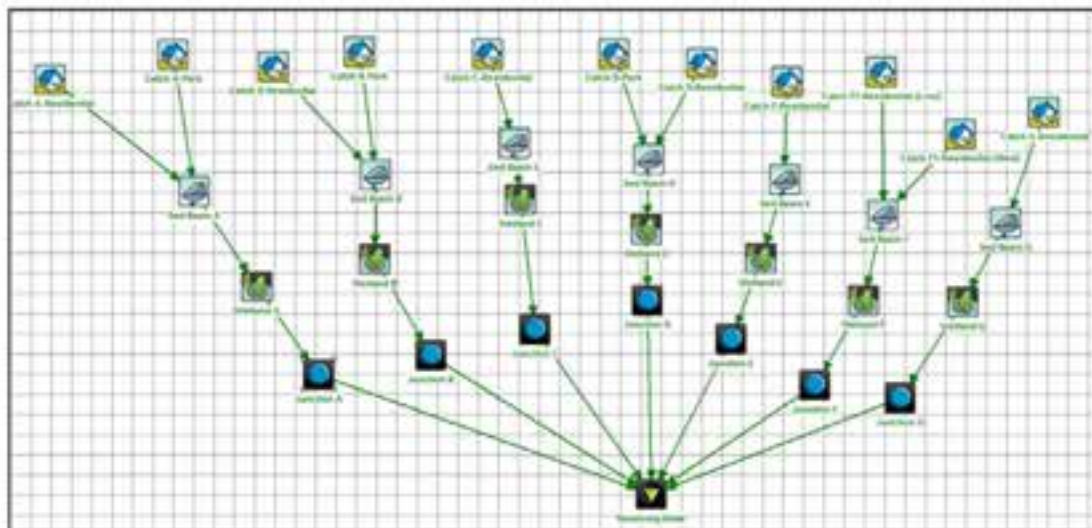


Figure 6: MUSIC Model Layout

Parameter	% Removal at Receiving Outlet	BPEMG Target % Removal
Gross Pollutants (Kg/yr)	100.0	70
Total Suspended Solids (Kg/yr)	89.9	80
Total Phosphorus (Kg/yr)	74.9	45
Total Nitrogen (Kg/yr)	45.8	45

Table 5: MUSIC Model Results – Compared with BPEMG Target

As shown in Table 5 the proposed wetlands and sedimentation basins can meet the best practice BPEMG standard. Details of the wetlands and sedimentation basins are shown in Table 6. Location of the wetlands are shown in the previous Figure 7 and Appendix B.

Indicative Details of Wetlands for South Wurruk Development			
Sub-Catchment	Sedimentation Basin Area (m ²)	Wetland Area (m ²)	Total Area Required (m ²)
A	230 m ²	1,800 m ²	2,030 m ²
B	330 m ²	2,600 m ²	2,930 m ²
C	151 m ²	1,200 m ²	1,351 m ²
D	450 m ²	3,900 m ²	4,350 m ²
E	180 m ²	2,300 m ²	2,480 m ²
F	600 m ²	6,000 m ²	6,600 m ²
G	250 m ²	2,300 m ²	2,550 m ²
Total			22,291 m ²

Table 6: Details of Wetlands and Sedimentation Basins

A total of approximately 22,291 m² of water surface area for the proposed wetlands (including sedimentation basins) will be required to provide stormwater treatment for the development site.

The design of the sedimentation basins and wetlands will be in accordance with the specific technical details contained in the design and construction WSUD Technical Manual. The detailed designs of these WSUD assets have not yet been completed and these will be submitted to Council and WGCMA during the detailed design phase of the project.

6 CONCLUSION

This report has provided a concept drainage management strategy for the proposed South Wurruk Development Plan. The strategy provides a methodology for the management of stormwater on the subject site, which would result in:

- Construction of drainage assets to meet the likely requirements of West Gippsland CMA and Council, including 1 in 100 year ARI capacity road reserves and underground drainage for the 1 in 5 year ARI storm event as required;
- Volumes of stormwater detention requirements of 17,341m³ will be required to detain the proposed development site. This volume will be contained within the proposed 7 retarding basins located throughout the site, to cater for the designated sub-catchment areas;
- Stormwater quality treatment system required to meet 8PMEG standard will be 7 wetlands and 7 sedimentation basins with total area of 22,291 m². The wetlands and the basins will be located within the proposed retarding basins; and
- Construction of WSUD assets and Retarding Basins to meet the retardation and overall water quality treatment.

The above strategy can be implemented and all of WGCMA and Council's development requirements can be achieved, with no net effect on the downstream properties.

BEVERIDGE WILLIAMS & CO PTY LTD

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Reviewed by

Lola Nurhalim

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Surface Water Engineer

Senior Surface Water Engineer

Approved for issue by

Chris Curnow

Project Manager



Beveridge Williams

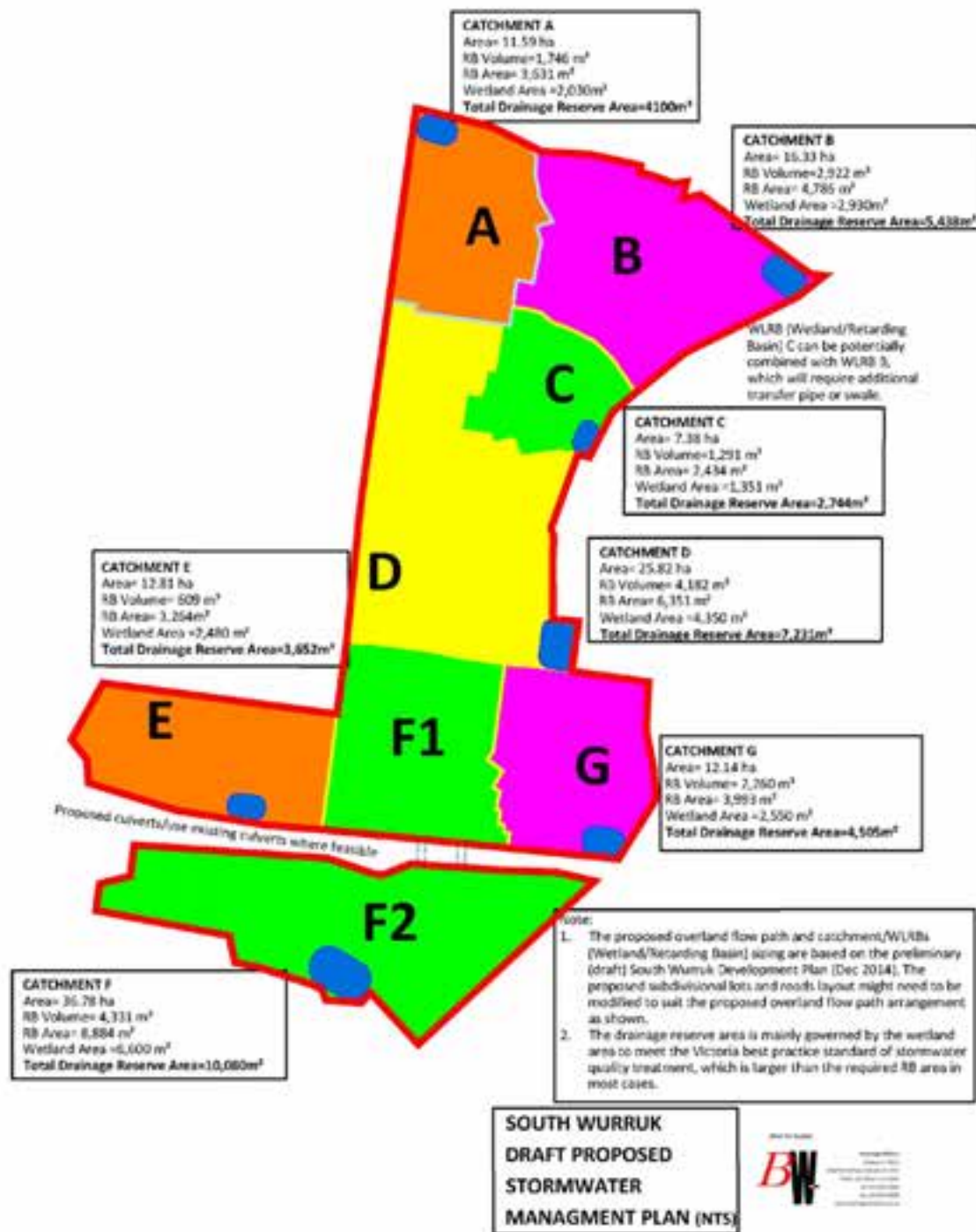
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**APPENDIX A.
Draft Proposed SWMS Plan**



Beveridge Williams

A



APPENDIX B.
Rational Method Calculations



Beveridge Williams

A



Detection Storage Calculator

SELECT LOCATION

PRE-DEVELOPMENT ARI

POST-DEVELOPMENT ARI

Coefficients						
0	1	2	3	4	5	6
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Client	Shropshire Water Council	Date	11/09/2016
Project	South Marston - Catchment A		
Purpose	Sewerflow, 1 hour peak with 100% detection independent catchment		
Job No	140147	No	1/1

PRE-DEVELOPMENT					
Total Catchment Area	CA	T ₁	T ₂	Input Manual Rainfall Rate Outflow	Calculated Rainfall Rate Outflow
ha	ha	min	min	m ³ /s	m ³ /s
12.190	3.325	21.305	45.34	0.000	0.87

Flow Interval Start	00	(min)
Storm Duration Time Interval (d)	1	(min)
Pump / Outflow Delay Duration (d)	0	(min)
Pump / Outflow Delay Duration (d)	0.00	(min)

Change only if required (check in 1)

Use 1 hour interval with 100% detection storage capacity to estimate the graph values

Change only if required

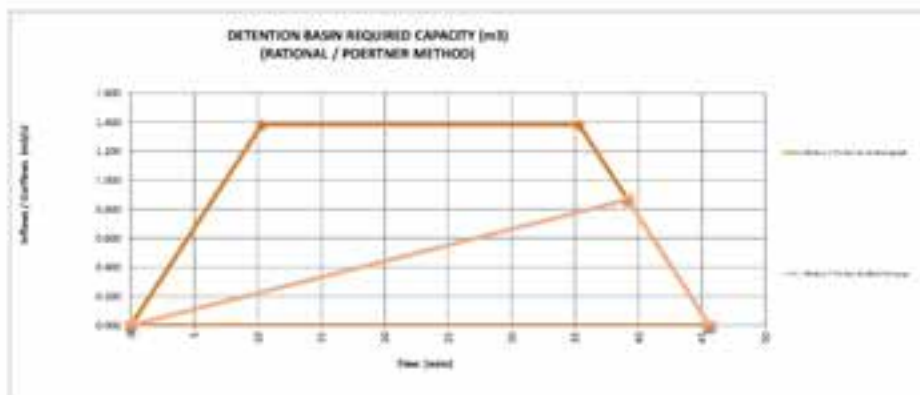
Change only if required

POST-DEVELOPMENT				
Total Catchment Area	CA	T ₁	T ₂	Q
ha	ha	min	min	m ³ /s
12.190	3.325	21.305	121.305	2.756

Stormflow (m³/s)

Q (m³/s)

$$C^{1.75}_{1.75} = 0.1 + 0.0133 \times \left(\frac{1}{f} - 2.5 \right) \quad C^{1.75}_{1.75} = 0.09 \times f + C^{1.75}_{1.75} \times (1 - f)$$



TOTAL DETENTION STORAGE REQUIRED (m ³)	Rational / Poertner Inflow Hydrograph			Rational / Poertner Outflow Hydrograph		
	Q (m ³ /s)	Time (min)		Q (m ³ /s)	Time (min)	
1.746	0.000	0.0		0.000	0.0	
1.746	1.364	10.0		0.868	39.3	20.0
1.746	1.364	24.0		0.868	45.0	20.0
1.746	0.000	45.0		0.000	45.0	
	0.000	0.0				

TOTAL STORAGE REQUIRED	
1.746 (m ³)	
RATIONAL / POERTNER METHOD	
1.746	



Post-Developed Flow Calculations

Client:	Wellington Storm Control	Date:	07/03/2016
Project:	South Muriwai - Catchment A		
Subject:	POST DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	Rev:	1/0

Location:
 BA Year:

Coefficients							
1	2	3	4	5	6	7	8
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Catchment	Area		Length (L)	Slope (S)	Surface	n (m ⁻¹)	A ₀ (m ²)	Calculated T ₀	Manual Input T ₀	Selected T ₀	Catchment Category (for P ₀)	Selected t _p	Weighted t _p	Calculated C	Manual Input C	Selected C	A ₀		I	Q
	ha	m															ha	m		
A0	2.47	271.00	0.01	Asphalt	0.013	18.33	7.00	5.21	5.21	5.21	Res/Medium Density	0.4	0.128	0.716	0.716	0.716	1.91	1.768	105.92	0.716
AF	1.26	121.00	0.01	Asphalt	0.013	48.96	7.00	5.26	5.26	5.26	Res/Medium Density	0.4	0.126	0.716	0.716	0.716	1.47	1.467	105.21	0.716
AL	1.39	166.00	0.01	Asphalt	0.013	40.88	7.00	5.43	5.43	5.43	Res/Medium Density	0.4	0.067	0.716	0.716	0.716	1.33	1.198	104.47	0.716
AM	1.98	181.00	0.01	Asphalt	0.013	10.10	7.00	6.08	6.08	6.08	Res/Medium Density	0.4	0.103	0.716	0.716	0.716	1.62	1.417	106.01	0.716
AO	1.17	111.00	0.01	Asphalt	0.013	14.21	7.00	10.30	10.30	10.30	Res/Medium Density	0.4	0.071	0.716	0.716	0.716	0.98	0.961	107.54	0.716
AO	1.13	111.00	0.01	Dense Grass	0.024	86.71	10.00	80.30	80.30	80.30	Public Park	0.1	0.048	0.240	0.240	0.240	0.53	0.100	107.54	0.100
TOTAL	11.30							101.00					0.588		0.44		7.428	107.140	2.708	

To Calculated using:

$$f = 6.54 \cdot \frac{(L \times n^2)^{0.167}}{L^{0.167} \times S^{0.167}}$$

Direction:

- 1
- 2
- 3

Enter longest length of Catchment
 Enter average slope of Catchment (Ridge to Ridge)
 Choose surface type of catchment from drop down list (See n input table)

CIS-Calculated using:

$$C_{00} = 0.1 + 0.0133 \left(\frac{1}{T_0} - 2 \right)$$

$$C_{00} = 0.9 \times f + C_{00} \times (1 - f)$$

Q-Calculated using:

$$Q = \frac{A \times f}{360}$$

- 1
- 2
- 3

Enter Area of Catchment (HA)
 Choose Catchment Category to determine Fraction Impervious
 Sum of Fraction area of catchments to determine Q

Weighted Fraction Impervious using:

$$f = \sum \left(f_{area_i} \times \frac{A_{area_i}}{A_{total}} \right) + \left(f_{area_j} \times \frac{A_{area_j}}{A_{total}} \right)$$

See Fraction Impervious Table



Pre-Developed Flow Calculations

Client:	Wellington Shire Council	Date:	17/03/2016
Project:	South Warrak - Catchment A		
Subject:	PRE-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	By:	EN

Location:

ARI Year:

Coefficients					
α	β	γ	δ	ϵ	ζ
0.0025	0.04107	0.00084	0.00104	0.00014	0.00007

INPUT: 500 0.002 0.015 1.289 0.4 0

Catchment	Area	Catchment Category	Catchment Type (for F _u)	Calculated T _c	Manual Input T _c	Selected T _c	Selected S _u	Weighted S _u	Calculated C	Manual Input C	Selected C	A _u	ΣA _u	I _u	Q _u
	ha			mins	mins	mins						ha	ha	mm/hr	m ³ /s
Sub-catchment A	11.590	RURAL2	Rural Zone	20.11		20.11	0.1	0.300	0.282		0.282	0.27	0.269	95.38	0.366
TOTAL	11.590	RURAL2		20.11		20.11		0.300	0.282				0.269	95.38	0.366

T_c Calculated using:

$$T_c = 0.76 \times A^{0.18}$$

Equation 5.4 AR&R

Weighted Fric Imperv using:

$$f = \sum \left(f_{\text{imperv}} \times \frac{A_{\text{imperv}}}{A_{\text{total}}} \right) + \left(f_{\text{non-imperv}} \times \frac{A_{\text{non-imperv}}}{A_{\text{total}}} \right)$$

C₁₀ Calculated using:

$$C_{10} = 0.1 + 0.013 A^{(1/3)} - 2.4$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Equation 14.11 and 14.12 AR&R

Q Calculated using:

$$Q = \frac{A_u \times I}{360}$$

Rational Method



Detection Storage Calculator

SELECT LOCATION

PRE-DEVELOPMENT ARI

POST-DEVELOPMENT ARI

Coefficients						
0	1	2	3	4	5	6
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Client	Shropshire Fire (Local)	Date	13/09/2016
Project	South Marston - Carlowood B		
Purpose	Determine, using the method described in the accompanying documents, the required capacity of the detention storage.		
Job No	10014	No	1/1

PRE-DEVELOPMENT					
Total Catchment Area	CA	T ₁	T	Input Manual Rainfall Rate Outflow	Calculated Retention Outflow
ha	ha	min	min/hr	m ³ /s	m ³ /s
16.330	4.007	22.500	68.38	0.000	3.33

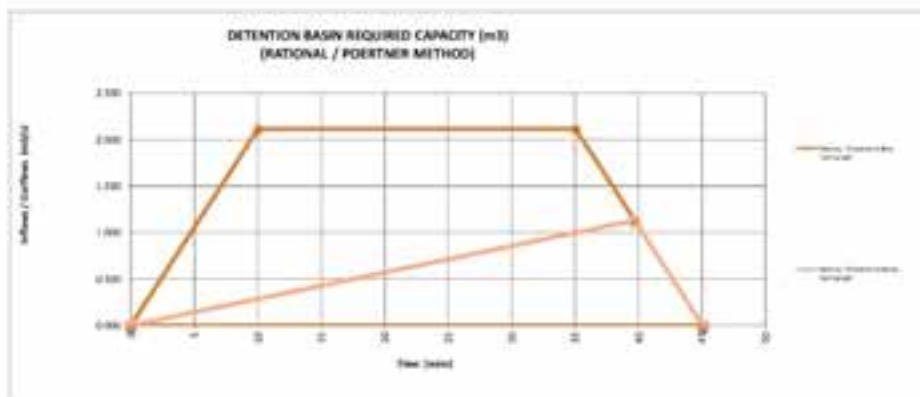
Time Interval Start	00	min
Storm Duration Time Interval (s)	1	min
Pump / Outflow Detention Duration (s)	0	min
Pump / Outflow Detention Duration (s)	0.00	min

Change only if required (check in 1)

Use 1 min interval with maximum storage volume to determine the graph value

Change only if required

Change only if required



POST-DEVELOPMENT				
Total Catchment Area	CA	T ₁	T	Q
ha	ha	min	min/hr	m ³ /s
16.330	11.870	22.500	129.430	4.321

Retention used

0.000

$$C_{1,1} = 0.1 + 0.0133 \times \left(\frac{1}{f_1} - 2.5 \right) \quad C_{1,2} = 0.0 \times f_2 + C_{1,1} \times (1 - f_2)$$

TOTAL DETENTION STORAGE REQUIRED (m³)	Rational / Poertner Inflow Hydrograph			Rational / Poertner Outflow Hydrograph		
	Q	Time		Q	Time	
0.000	0.000	0.0		0.000	0.0	
2.332	2.332	10.0	10.0	1.667	30.0	30.0
0.000	0.000	40.0	40.0	0.000	40.0	40.0
0.000	0.000	40.0		0.000	40.0	
	0.000	0.0				

TOTAL STORAGE REQUIRED	
1 x 100 Year Storm (100 Yr 100 Yr Storm)	
RATIONAL / POERTNER METHOD	
m³	
3,622	

Post-Developed Flow Calculations

Keywords:

189

All Year 11

100

Client:	Wellington (Ina Control)	Date:	27/02/2014
Project:	South Wymba - Catchment B		
Subject:	POST DEVELOPMENT FLOW CALCULATIONS		
Job No:	140014	Rev:	1/0

	Coefficients						
SN	0	1	2	3	4	5	6
SN	1.84000E	-2.61107E	-2.00000E	-3.40000E	-1.20000E	-5.00000E	-4.00000E

Catchment	Area	Length (L)	Slope (S)	Surface	a (m²)	AS A	Calculated T ₁	Manual Input T ₂	Selected T ₃	Catchment Category (Per Foot)	Selected T ₄	Weighted T ₅	Calculated C	Manual Input C	Selected C	A ₁	ΣA ₁	I ₁	Q
	sq	in	%/ft			min	min	min	min			min	min	sq	sq	acres			
A10	1.84	191.00	0.01	Asphalt	0.061	15.87	7.00	5.36	5.16	Res-Medium Density	0.6	0.062	0.716	0.704	1.87	1.170	145.76	0.170	
A11	1.88	179.00	0.01	Asphalt	0.061	81.54	7.00	5.30	5.20	Res-Medium Density	0.6	0.060	0.716	0.704	1.85	1.046	147.94	0.156	
A14	1.88	193.00	0.01	Asphalt	0.061	15.30	7.00	5.11	5.11	Res-Medium Density	0.6	0.060	0.716	0.704	1.85	1.146	146.17	0.156	
A15	1.12	97.00	0.01	Asphalt	0.061	40.26	7.00	5.08	5.00	Res-Medium Density	0.6	0.051	0.716	0.706	1.02	1.004	137.80	0.141	
A16	1.00	114.00	0.01	Asphalt	0.061	42.07	7.00	5.51	5.61	Res-Medium Density	0.6	0.058	0.716	0.704	0.74	0.707	147.40	0.100	
A2	1.55	161.00	0.01	Asphalt	0.061	43.87	7.00	5.80	5.80	Res-Medium Density	0.6	0.057	0.716	0.704	1.13	1.039	149.45	0.150	
B1	1.17	130.00	0.01	Dense Grass	0.051	51.48	7.00	5.28	5.18	Public Park	0.1	0.007	0.260	0.300	0.89	0.100	151.33	0.100	
B8	1.00	101.00	0.01	Asphalt	0.061	12.56	7.00	5.16	5.16	Res-Medium Density	0.6	0.007	0.716	0.704	0.73	0.730	145.50	0.100	
B11	1.18	194.00	0.01	Asphalt	0.061	95.67	7.00	5.16	5.16	Res-Medium Density	0.6	0.051	0.716	0.704	0.99	0.994	145.70	0.100	
B12	0.56	271.00	0.01	Asphalt	0.061	16.18	7.00	10.01	10.01	Res-Medium Density	0.6	0.123	0.716	0.704	1.40	2.400	149.11	0.040	
TOTAL	16.120							10.078				0.343		0.67		10.105	149.636	4.111	

^a To Calculated using

$$f = 6.94 \cdot \frac{(L \times \pi)^{1/4}}{f^{1/4} \times S^{1/2}}$$

Group members

1

1

9

-CH₃ Calculated using:

$$C_{\text{iso}} = 0.1 + 0.0133(T_{\text{e}} - 24)$$

$$C_{\text{f}} = 0.9 = f \times C_{\text{iso}} + (1 - f)$$

*100% longest length of 1.25 mm only

From average value of *Cantharellus (Hyphus/Hymus)*

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② Calculated using

$$Q = \frac{I_{\text{avg}} \cdot t}{m}$$

1

1

1

Weighted Fraction Error: $\frac{1}{N} \sum_{i=1}^N w_i |f(x_i) - y_i|$

$$f = \sum \left(f_{m+1} + \frac{f_{m+1}}{f_m} \right) + \left(f_{m-1} + \frac{f_{m-1}}{f_m} \right)$$

On the Fractional Program as Tails

United States of California 1990.

Please Contact Us at info@wiley.com or <http://www.interscience.wiley.com>

Some effective ways of identifying a disease are:



Pre-Developed Flow Calculations

Client:	Wellington Shire Council	Date:	17/03/2016
Project:	South Warrak - Catchment B		
Subject:	PRE-DEVELOPMENT FLOW CALCULATIONS		
Job No:	140014	By:	EN

Location:

ARI Year:

Coefficients					
α	β	γ	δ	ϵ	ζ
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

INPUT: 500 0.002 0.015 1.289

0.4 0

Catchment	Area	Catchment Category	Catchment Type (for F _u)	Calculated T _c	Manual Input T _c	Selected T _c	Selected T _u	Weighted T _u	Calculated C	Manual Input C	Selected C	A _u	ΣA _u	I _u	Q _u
	ha			mins	mins	mins						ha	ha	mm/hr	m ³ /s
Sub-catchment B	16.130	RURAL	Rural Zone	22.90		22.90	0.1	0.100	0.282		0.282	4.01	4.007	88.38	1.131
TOTAL	16.130	RURAL		22.90		22.90		0.100	0.282				4.007	88.38	1.131

T_c Calculated using:

$$T_c = 0.76 \times A^{0.18}$$

Equation 5.4 AR&R

Weighted Fric Imperv using:

$$f = \sum \left(f_{imp} \times \frac{A_{imp}}{A_{tot}} \right) + \left(f_{unimp} \times \frac{A_{unimp}}{A_{tot}} \right)$$

C₁₀ Calculated using:

$$C_{10} = 0.1 + 0.013 A^{0.75} - 2.5$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Equation 14.11 and 14.12 AR&R

Q Calculated using:

$$Q = \frac{A_c \times I}{360}$$

Rational Method



Detection Storage Calculator

SELECT LOCATION

Date

PRE-DEVELOPMENT ARI

100

POST-DEVELOPMENT ARI

100

Coefficients						
0	1	2	3	4	5	6
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Client	Shropshire Water Council	Date	11/09/2016
Project	South Warwick - Grafton D		
Purpose	Sewerflow, 1 hour peak with 100% detection independent catchment		
Job No	100147	No	1/1

PRE-DEVELOPMENT					
Total Catchment Area	CA	T ₁	f	Input Manual Rainfall Rate Outflow	Calculated Rainfall Outflow
ha	ha	min	mm/hr	m ³ /s	m ³ /s
1.000	1.000	10.000	0.000	0.000	0.000

Time Interval Start	00	00:00
Storm Duration Time Interval (s)	1	00:00
Pump / Outflow Delay Duration (s)	0	00:00
Pump / Outflow Delay Duration (s)	0.00	00:00

Change only if required (check in 1)

100% Time interval with maximum storage volume to prevent the graph below

Change only if required

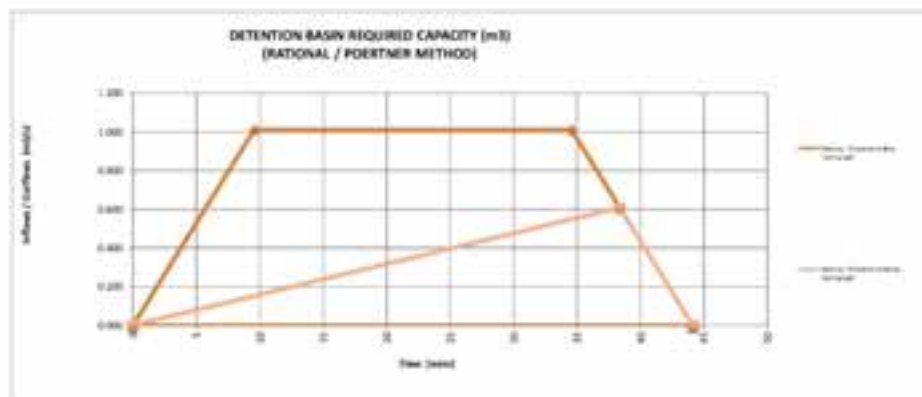
Change only if required

POST-DEVELOPMENT				
Total Catchment Area	CA	T ₁	f	Q
ha	ha	min	mm/hr	m ³ /s
1.000	1.000	10.000	0.000	0.000

Stormflow (m³/s)

Q (m³/s)

$$Q_{100} = 0.1 + 0.0133 \times \left(\frac{1}{f} - 2.5 \right) \quad Q_{100} = 0.1 + 0.0133 \times \left(\frac{1}{f} - 2.5 \right)$$



TOTAL DETENTION STORAGE REQUIRED (m ³)	Rational / Poertner Inflow Hydrograph			Rational / Poertner Outflow Hydrograph		
	Q (m ³ /s)	Time (hrs)		Q (m ³ /s)	Time (hrs)	
1.00%	0.000	0.0		0.000	0.0	
1.00%	1.000	10.0		0.500	10.0	
1.00%	1.000	20.0		0.800	20.0	
1.00%	0.000	30.0		0.000	30.0	

TOTAL STORAGE REQUIRED	
1.00%	1.000
RATIONAL / POERTNER METHOD	
m ³	
1.000	



Post-Developed Flow Calculations

Client:	Wellington Storm Control	Date:	27/03/2016
Project:	South Muriwai - Catchment C		
Subject:	POST-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	Rev:	1/0

Location:

RAI Year:

Coefficients							
1A	2	3	4	5	6	7	8
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Catchment	Area		Length (L)	Slope (S)	Surface	n (m ^{1/3})	RAI A	Calculated T ₁	Manual Input T ₂	Selected T ₃	Catchment Category (for F ₁)	Selected t ₄	Weighted t ₅	Calculated C	Manual Input C	Selected C	A ₆		I	Q
	m ²	ha															m ²	ha		
08	2.25	0.275	171.00	0.01	Asphalt	0.012	54.71	7.00	8.50	8.50	Best Medium Density	0.8	0.275	0.716		0.716	1.54	0.389	151.54	0.000
05	1.76	0.215	164.00	0.01	Asphalt	0.012	55.89	7.00	9.11	9.11	Best Medium Density	0.8	0.208	0.716		0.716	1.40	0.350	146.17	0.000
07	2.67	0.265	203.00	0.01	Asphalt	0.012	57.54	7.00	9.16	9.16	Best Medium Density	0.8	0.217	0.716		0.716	1.51	0.375	142.75	0.000
TOTAL	7.58	0.955								9.16			0.699				4.45	1.114	540.46	0.000

T₁ Calculated using:

$$T_1 = 6.94 \cdot \frac{L^{0.75} \cdot n^{0.4}}{S^{0.5}}$$

Direction:

0

1

2

C10 Calculated using:

$$C_{10} = 0.1 + 0.0133 \cdot (T_1 - 2.5)$$

$$C_{10} = 0.9 \cdot f + C_{10} = (1 - f)$$

Enter length of Catchment

Enter average slope of Catchment (m/m)

Choose surface type of catchment from drop down list (See n value table)

C Calculated using:

$$C = \frac{A_{10} + 1}{360}$$

0

1

2

Enter Area of Catchment (m²)

Choose Catchment category to determine fraction impervious

Use a fraction group of catchments to determine Q

Weighted Fraction Impervious using:

$$f = \sum \left(f_{w1} \cdot \frac{A_{w1}}{A_{tot}} \right) + \left(f_{w2} \cdot \frac{A_{w2}}{A_{tot}} \right)$$

See Weighted Impervious Table



Pre-Developed Flow Calculations

Client:	Wellington Shire Council	Date:	17/03/2016
Project:	South Warrak - Catchment C		
Subject:	PRE-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	By:	EN

Location:

ARI Year:

Coefficients					
ϕ	ψ	λ	α	β	γ
0.84205	0.84107	0.01084	0.05194	0.00014	0.00000

INPUT 500 0.002 0.015 1.289 0.4 0

Catchment	Area	Catchment Category	Catchment Type (for F _u)	Calculated T _c	Manual Input T _c	Selected T _c	Selected S _u	Weighted S _u	Calculated C	Manual Input C	Selected C	A _u	ΣA _u	I _u	Q _u
	ha			mins	mins	mins			mm		mm	ha	ha	mm/hr	m ³ /s
Sub-catchment C	7.380	RURAL	Rural Zone	15.94		15.94	0.1	0.300	0.282		0.282	7.08	7.082	105.11	0.406
TOTAL	7.380	RURAL		15.94		15.94		0.300	0.282				7.082	105.11	0.406

T_c Calculated using:

$$T_c = 0.76 \times A^{0.18}$$

Equation 5.4 AR&R

Weighted Fric Imperv using:

$$f = \sum \left(f_{imp} \times \frac{A_{imp}}{A_{tot}} \right) + \left(f_{unimp} \times \frac{A_{unimp}}{A_{tot}} \right)$$

C₁₀ Calculated using:

$$C_{10} = 0.1 + 0.013 A^{0.75} - 2.4$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Equation 14.11 and 14.12 AR&R

Q Calculated using:

$$Q = \frac{A_c \times I}{360}$$

Rational Method



Detection Storage Calculator

SELECT LOCATION

Date

PRE-DEVELOPMENT ARI

100

POST-DEVELOPMENT ARI

100

Coefficients						
0	1	2	3	4	5	6
0.0000	0.0001	0.0004	0.0009	0.0016	0.0025	0.0037
0.0000	0.0001	0.0004	0.0009	0.0016	0.0025	0.0037

Client	Shropshire Fire (Local)	Date	13/09/2016
Project	South Marish - Carlowood II		
Purpose	Detention, 1 hour fire with 100% detection independent catchment		
Job No	140147	No	3/1

PRE-DEVELOPMENT					
Total Catchment Area	CA	T ₁	f	Input Manual Retention Outflow	Calculated Retention Outflow
ha	ha	min	mm/hr	m ³ /s	m ³ /s
21,820	1.284	27.210	75.00	0.000	0.00

Flow Interval Start	00	(min)
Store Duration Time Interval (s)	1	(min)
Pump / Outflow Delay Duration (s)	0	(min)
Pump / Outflow Delay Duration (s)	0.00	(min)

Change only if required (check in 1)

Use 1 hour interval with 100% detection to determine the graph values

Change only if required

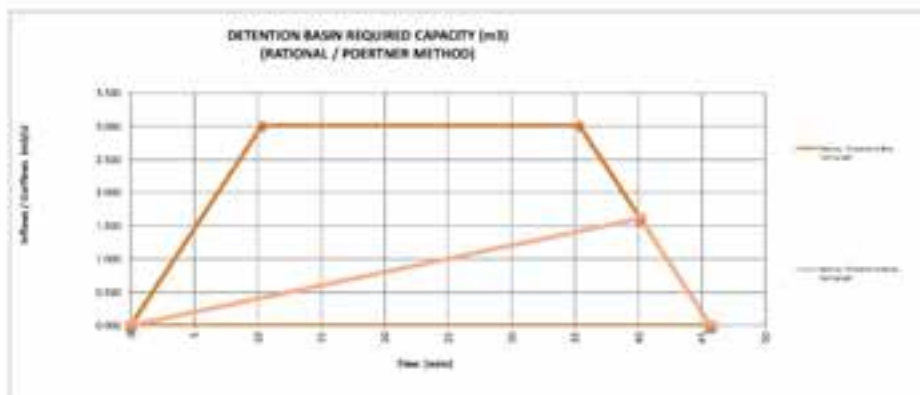
Change only if required

POST-DEVELOPMENT				
Total Catchment Area	CA	T ₁	f	Q
ha	ha	min	mm/hr	m ³ /s
21,820	11.942	30.780	127.308	4.188

Retention used

0.000

$$C_{100} = 0.1 + 0.0133 \times \left(\frac{1}{f} - 2.5 \right) \quad C_{100} = 0.09 \times f + C_{100} \times (1 - f)$$



TOTAL DETENTION STORAGE REQUIRED (m ³)	Retention / Poertner Inflow Hydrograph			Retention / Poertner Outflow Hydrograph		
	Q	Time		Q	Time	
4.188	0.000	0.0		0.000	0.0	
4.188	0.004	0.1	ha	0.000	40.7	0.000
4.188	0.019	0.5	ha	0.000	40.7	0.000
4.188	0.000	45.7		0.000	45.7	
0.000	0.0					

TOTAL STORAGE REQUIRED	
Retention used	4.188
RATIONAL / POERTNER METHOD	
m ³	
4.188	



Part-Developed Flow Calculations

Client:	Wellington Storm Control	Date:	27/03/2016
Project:	South Murrumbidgee Catchment D		
Subject:	POST-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	Rev:	1/1

Location:

RAI Year:

Coefficients				
1	2	3	4	5
0.0	0.0000	0.0000	0.0000	0.0000

Catchment	Area	Length (L)	Slope (S)	Surface	n (m ^{1/3})	RAI	Calculated T ₁	Manual Input T ₂	Selected T ₃	Catchment Category (for P ₁)	Selected t ₄	Weighted t ₅	Calculated C	Manual Input C	Selected C	A ₆	ΣA ₆	I	Q
	ha	m	m/m			km ²	min	min	min				min		min	ha	ha	m/sec	m ³ /s
AQ	2.42	216.00	0.01	Asphalt	0.012	52.92	7.00	9.78	9.78	Best Medium Density	0.8	0.061	0.716		0.716	1.48	0.875	101.54	0.716
AP	1.97	221.00	0.01	Asphalt	0.012	50.84	7.00	9.50	9.50	Best Medium Density	0.8	0.048	0.716		0.716	1.40	0.410	101.09	0.716
AB	2.35	344.00	0.01	Asphalt	0.012	42.08	7.00	10.33	10.33	Best Medium Density	0.8	0.055	0.716		0.716	1.48	0.662	107.31	0.716
AC	2.00	194.00	0.01	Asphalt	0.012	51.99	7.00	9.78	9.78	Best Medium Density	0.8	0.046	0.716		0.716	1.39	0.493	101.50	0.716
AD	1.19	171.00	0.01	Asphalt	0.012	42.53	7.00	9.44	9.44	Best Medium Density	0.8	0.040	0.716		0.716	1.23	0.217	101.44	0.716
AE	1.19	197.00	0.01	Asphalt	0.012	46.26	7.00	9.37	9.37	Best Medium Density	0.8	0.042	0.716		0.716	1.27	0.274	101.08	0.716
AF	2.11	336.00	0.01	Asphalt	0.012	46.20	7.00	9.68	9.68	Best Medium Density	0.8	0.050	0.716		0.716	1.31	0.339	105.01	0.716
AG	5.53	370.00	0.01	Asphalt	0.012	65.86	8.00	9.94	9.94	Public Park	0.1	0.021	0.260		0.260	1.99	1.408	100.08	0.716
AM	2.72	429.00	0.01	Asphalt	0.012	55.89	7.00	9.54	9.54	Best Medium Density	0.8	0.063	0.716		0.716	1.89	0.967	100.80	0.716
AO	3.00	301.00	0.01	Asphalt	0.012	69.06	7.00	10.37	10.37	Best Medium Density	0.8	0.070	0.716		0.716	2.07	0.217	109.28	0.716
Total	25.420					50.535			10.537			0.489		0.67		15.962	157.506	0.688	

T₁ Calculated using:

$$T_1 = 6.54 \cdot \left(\frac{L \times n^{1.49}}{S^{1.49}} \right)^{0.78}$$

Parameters:

- 1
- 2
- 3

C₁₉ Calculated using:

$$C_{19} = 0.1 + 0.0133 \left(\frac{L}{S} - 2 \right) \\ C_{19} = 0.9 \cdot f + C_{19a} \cdot (1 - f)$$

- 1 Enter (optional) length of catchment
- 2 Enter weir-edge slope of catchment (optional/define)
- 3 Choose top/bottom type of catchment from drop-down list (Set it to bottom)

Q₁ Calculated using:

$$Q_1 = \frac{A_{19} \times I}{360}$$

- 4
- 5
- 6

Weighted Fraction Impervious using:

$$f = \sum \left(f_{imp,i} \times \frac{A_{imp,i}}{A_{tot}} \right) + \left(f_{imp,t} \times \frac{A_{imp,t}}{A_{tot}} \right)$$

Go to Fraction Impervious Table

- 7 Enter Area of Catchment (ha)
- 8 Choose Catchment category to determine Fraction Impervious
- 9 Sum a Fraction area of catchments to determine f



Pre-Developed Flow Calculations

Client:	Wellington Shire Council	Date:	17/03/2016
Project:	South Warrak - Catchment D		
Subject:	PRE-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	By:	EN

Location:

ARI Year:

Coefficients					
α	β	γ	δ	ϵ	ζ
0.0025	0.04107	0.00084	0.00104	0.00014	0.00005

INPUT 500 0.002 0.015 1.289 0.4 0

Catchment	Area	Catchment Category	Catchment Type (for F _u)	Calculated T _c	Manual Input T _c	Selected T _c	Selected T _u	Weighted T _u	Calculated C	Manual Input C	Selected C	A _u	ΣA _u	I _u	Q _u
	ha			mins	mins	mins			mm			ha	ha	mm/hr	m ³ /s
Sub catchment D	25.820	RURAL	Rural Zone	27.36		27.36	0.1	0.300	0.282		0.282	7.28	7.284	79.65	1.012
TOTAL	25.820	RURAL		27.36		27.36		0.300	0.282				7.284	79.65	1.012

T_c Calculated using:

$$T_c = 0.76 \times A^{0.18}$$

Equation 5.4 AR&R

Weighted Fric Imperv using:

$$f = \sum \left(f_{imp} \times \frac{A_{imp}}{A_{tot}} \right) + \left(f_{unimp} \times \frac{A_{unimp}}{A_{tot}} \right)$$

C₁₀ Calculated using:

$$C_{10} = 0.1 + 0.013 A^{0.75} - 2.4$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Equation 14.11 and 14.12 AR&R

Q Calculated using:

$$Q = \frac{A_u \times I_u}{360}$$

Rational Method



Detection Storage Calculator

SELECT LOCATION

Date

PRE-DEVELOPMENT ARI

100

POST-DEVELOPMENT ARI

100

Coefficients						
0	1	2	3	4	5	6
0.0000	0.00010	0.00040	0.00090	0.00160	0.00250	0.00360
0.0000	0.00010	0.00040	0.00090	0.00160	0.00250	0.00360

Client	Shropshire Water Council	Date	11/09/2016
Project	South Marston - Catchment 2		
Purpose	Sewerflow, 1 hour peak with 100% detection independent catchment		
Job No	140147	No	1/1

PRE-DEVELOPMENT					
Total Catchment Area	CA	T ₁	f	Input Rational/Rainfall Outflow	Calculated Retentive Outflow
ha	ha	mins	mm/hr	m ³ /s	m ³ /s
12,810	3.684	20.880	81.30	0.000	0.00

Flow Interval Start	00	0000
Storm Duration Time Interval (s)	1	0000
Pump / Outflow Delay Duration (s)	0	0000
Pump / Outflow Delay Duration (s)	0.00	000

Change only if required (check in 1)

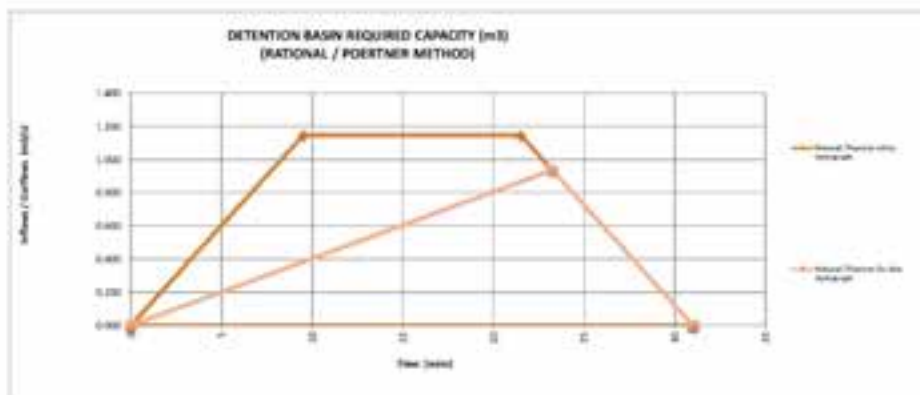
Use 1 hour peak with 100% detection independent catchment

Change only if required

Change only if required

POST-DEVELOPMENT				
Total Catchment Area	CA	T ₁	f	Q
ha	ha	mins	mm/hr	m ³ /s
12,810	4.500	5.500	140.100	1.701

$$C_{100} = 0.1 + 0.0133 \times \left(\frac{1}{f} - 2.5 \right) \quad C_{100} = 0.09 \times f + C_{100} \times (1 - f)$$



TOTAL DETENTION STORAGE REQUIRED (m ³)	Rational / Poertner Inflow Hydrograph			Rational / Poertner Outflow Hydrograph		
	Q	Time		Q	Time	
	m ³ /s	mins		m ³ /s	mins	
400	0.000	0.0		0.000	0.0	
400	1.147	9.7	100	0.500	21.7	1000
400	1.147	21.8	100	0.000	31.0	10000
400	0.000	31.0		0.000	31.0	
	0.000	31.0				

TOTAL STORAGE REQUIRED	
1,701,000 (m ³)	
RATIONAL / POERTNER METHOD	
m ³	
609	



Post-Developed Flow Calculations

Client:	Wellington Storm Control	Date:	27/03/2016
Project:	South Muriwai - Catchment E		
Subject:	POST-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	Rev:	1/0

Location:
RAI Year:

Coefficients							
1	2	3	4	5	6	7	8
0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Catchment	Area	Length (L)	Slope (S)	Surface	n (m ²)	40.4	Calculated T ₁	Manual Input T ₂	Selected T ₃	Catchment Category (for F ₁)	Selected t ₄	Weighted t ₅	Calculated C	Manual Input C	Selected C	A ₆	ΣA ₆	I	Q
	ha	m	m/m				min	min	min				min	min	min	ha	ha	m ³ /s	m ³ /s
1	0.08	220.00	0.01	Asphalt	0.012	40.47	7.00	5.50	5.50	Best Low Density	0.2	0.061	0.015		0.015	1.08	0.364	101.05	0.007
2	0.24	171.00	0.01	Asphalt	0.012	34.90	7.00	6.40	6.40	Best Low Density	0.2	0.052	0.015		0.015	1.04	0.109	101.09	0.003
6	2.54	857.00	0.01	Asphalt	0.012	62.40	7.00	8.21	8.21	Best Low Density	0.2	0.040	0.015		0.015	0.89	0.891	151.54	0.004
5	0.15	70.00	0.01	Asphalt	0.012	14.88	7.00	6.67	6.67	Best Low Density	0.2	0.049	0.015		0.015	1.01	0.107	109.72	0.006
TOTAL	3.01								5.50			0.200				4.50	114.604	1.794	

T₁ Calculated using:
$$T = 6.54 \cdot \frac{(L \times n^2)^{1/3}}{S^{1/2}}$$

Directions:

- 1
- 2
- 3

Enter longest length of Catchment
Enter average slope of Catchment (m/m)
Choose surface type of catchment from drop down list (See n value table)

C₁₀ Calculated using:
$$C_{10} = 0.1 + 0.0133 \left(\frac{1}{T_1} - 2 \right)$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Q Calculated using:
$$Q = \frac{A \times I}{360}$$

- 4
- 5
- 6

Enter Area of Catchment (ha)
Choose Catchment Category to determine fraction impervious
Sum of fraction areas of catchments to determine Q

Weighted Fraction Impervious using:
$$f = \sum \left(f_{mi} \times \frac{A_{mi}}{A_{tot}} \right) + \left(f_{m6} \times \frac{A_{m6}}{A_{tot}} \right)$$

[Go to Fraction Impervious Table](#)



Pre-Developed Flow Calculations

Client:	Wellington Shire Council	Date:	17/03/2016
Project:	South Warrak - Catchment E		
Subject:	PRE-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	By:	EN

Location:

ARI Year:

Coefficients					
α	β	γ	δ	ϵ	ζ
0.84205	0.84107	0.00084	0.00084	0.00014	0.00007

INPUT: 500 0.002 0.015 1.289 0.4 0

Catchment	Area	Catchment Category	Catchment Type (for F _u)	Calculated T _c	Manual Input T _c	Selected T _c	Selected T _u	Weighted T _u	Calculated C	Manual Input C	Selected C	A _u	ΣA _u	I _u	Q _u
	ha			mins	mins	mins						ha	ha	mm/hr	m ³ /s
Sub-catchment C	11.830	RURAL	Rural Zone	20.88		20.88	0.1	0.100	0.282		0.282	0.01	1.824	95.30	0.100
TOTAL	11.830	RURAL		20.88		20.88		0.100	0.282				1.824	95.30	0.100

T_c Calculated using:

$$T_c = 0.76 \times A^{0.18}$$

Equation 5.4 AR&R

Weighted Fric Imperv using:

$$f = \sum \left(f_{imp} \times \frac{A_{imp}}{A_{tot}} \right) + \left(f_{unimp} \times \frac{A_{unimp}}{A_{tot}} \right)$$

C₁₀ Calculated using:

$$C_{10} = 0.1 + 0.013 A^{0.75} - 2.5$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Equation 14.11 and 14.12 AR&R

Q Calculated using:

$$Q = \frac{A_u \times I}{360}$$

Rational Method



Detection Storage Calculator

SELECT LOCATION

Date

PRE-DEVELOPMENT ARI

100

POST-DEVELOPMENT ARI

100

Coefficients						
0	1	2	3	4	5	6
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Client	Shropshire Water Council	Date	13/09/2016
Project	South Marston - Catchment T1 & T2		
Purpose	Sewerflow, 1 hour peak with 1000 detection dependent catchment		
Job No	100147	No	1/1

PRE-DEVELOPMENT					
Total Catchment Area	CA	T ₁	T ₂	Input Manual/Retentive Outflow	Calculated Retentive Outflow
ha	ha	min	min	m ³ /s	m ³ /s
36.780	10.075	12.160	71.40	0.000	2.12

Flow Interval Start	2.5	min
Wave Duration Time Interval (s)	1	min
Pump / Outflow Delay Duration (s)	0	min
Pump / Outflow Delay Duration (s)	0.00	min

Change only if required (check in 1)

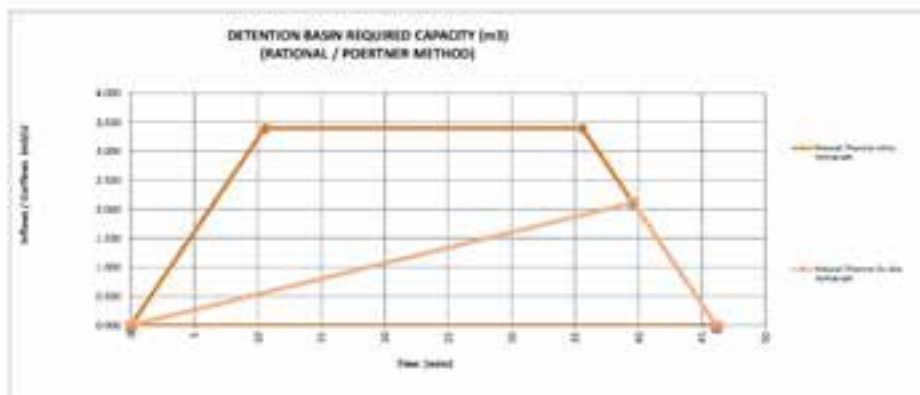
Use 1000 m³ for 1000 m³ storage capacity to prevent the graph from

Change only if required

Change only if required

POST-DEVELOPMENT				
Total Catchment Area	CA	T ₁	T ₂	Q
ha	ha	min	min	m ³ /s
36.780	10.075	12.160	101.778	4.331

$$C_{100} = 0.1 + 0.0133 \left(\frac{1}{f} - 2.5 \right) \quad C_{100} = 0.09 \times f + C_{100} \times (1 - f)$$



TOTAL DETENTION STORAGE REQUIRED (m ³)	Rational / Poertner Inflow Hydrograph			Rational / Poertner Outflow Hydrograph		
	Q	Time		Q	Time	
4.331	0.000	0.0		0.000	0.0	
4.331	1.000	10.0	10.0	1.100	10.0	10.0
4.331	1.000	15.0	15.0	0.000	46.1	10.0
4.331	0.000	46.1		0.000	46.1	
	0.000	0.0				

TOTAL STORAGE REQUIRED	
1 in 100 Year Peak Flow (m ³ /s) 100 Year Peak Flow	
RATIONAL / POERTNER METHOD	
m ³	
4,331	



Post-Developed Flow Calculations

Client:	Wellington Storm Control	Date:	07/03/2016
Project:	South Murrumbidgee Catchment F3 & F2		
Subject:	POST-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	Rev:	1/0

Location:
 ARI Year:

Coefficients				
1	2	3	4	5
0.0	0.0000	0.0000	0.0000	0.0000

Catchment	Area	Length (L)	Slope (S)	Surface	n (m ²)	40.4	Calculated T ₁	Manual Input T ₂	Selected T ₃	Catchment Category (for F ₁)	Selected t ₄	Weighted t ₅	Calculated C	Manual Input C	Selected C	A ₆	T ₇ A ₈	I	Q
	ha	m	m/m				km ²	km ²	km ²				mm	mm	mm	ha	ha	mm/hr	m ³ /s
A	1.84	302.00	0.01	Asphalt	0.042	10.10	7.00	8.00	8.00	Best Low Density	0.2	0.000	0.010		8.000	0.02	0.000	101.71	0.000
B	1.88	38.00	0.01	Asphalt	0.042	10.10	7.00	7.88	7.88	Best Low Density	0.2	0.000	0.010		8.000	0.02	0.000	106.99	0.000
C	1.89	99.00	0.01	Asphalt	0.042	10.64	7.00	8.07	8.07	Best Low Density	0.2	0.000	0.010		8.000	0.05	0.000	151.89	0.000
D	1.39	113.00	0.01	Asphalt	0.042	10.52	7.00	8.23	8.23	Best Low Density	0.2	0.000	0.010		8.000	0.04	0.000	103.56	0.000
E	3.48	213.00	0.01	Asphalt	0.042	48.98	7.00	9.22	9.22	Best Low Density	0.2	0.000	0.010		8.000	1.02	1.000	340.02	0.000
F	5.76	213.00	0.01	Asphalt	0.042	48.79	7.00	9.58	9.58	Best Low Density	0.2	0.000	0.010		8.000	1.67	1.670	242.75	0.000
G	1.09	126.00	0.01	Asphalt	0.042	10.40	7.00	10.23	10.23	Best Low Density	0.2	0.000	0.010		8.000	1.08	1.080	108.00	0.000
H	8.06	271.00	0.01	Asphalt	0.042	11.87	7.00	20.58	10.58	Best Low Density	0.2	0.001	0.010		8.000	1.62	1.620	120.76	0.000
I	1.39	97.00	0.01	Asphalt	0.042	10.36	7.00	8.08	8.08	Best Medium Density	0.8	0.001	0.710		8.700	1.62	1.620	104.80	0.000
J	2.02	298.00	0.01	Asphalt	0.042	10.41	7.00	9.58	9.58	Best Medium Density	0.8	0.000	0.710		8.700	1.05	1.050	109.88	0.000
K	2.02	118.00	0.01	Asphalt	0.042	11.09	7.00	9.21	9.21	Best Medium Density	0.8	0.002	0.710		8.700	1.49	1.490	102.77	0.000
L	1.52	171.00	0.01	Asphalt	0.042	12.82	7.20	9.84	9.84	Best Medium Density	0.8	0.001	0.710		8.700	1.06	1.060	108.02	0.000
M	1.12	211.00	0.01	Asphalt	0.042	10.21	7.00	9.23	9.23	Best Medium Density	0.8	0.000	0.710		8.700	0.98	0.980	101.07	0.000
N	1.11	236.00	0.01	Asphalt	0.042	10.40	7.00	9.78	9.78	Best Medium Density	0.8	0.001	0.710		8.700	0.94	0.940	101.04	0.000
O	1.10	125.00	0.01	Asphalt	0.042	10.10	7.00	8.67	8.67	Best Medium Density	0.8	0.001	0.710		8.700	0.98	0.980	108.72	0.000
P	1.34	149.00	0.01	Asphalt	0.042	12.08	7.00	9.00	9.00	Best Medium Density	0.8	0.000	0.710		8.700	1.02	1.020	107.04	0.000
Q	1.18	16.00	0.01	Asphalt	0.042	10.70	7.00	9.44	9.44	Best Medium Density	0.8	0.000	0.710		8.700	0.94	0.940	101.00	0.000
TOTAL	46.780							10.140				0.004			0.04	18.000	105.700		4.400

T₁ Calculated using:

$$T_1 = 6.94 \cdot \frac{L \cdot S^{0.5}}{f^{0.5} + S^{0.5}}$$

f (m²/s):

- 1
- 2
- 3

C₁₀ Calculated using:

$$C_{10} = 0.1 + 0.0133 \left(T_1 - 2 \right)^2$$

$$C_{10} = 0.09 + f + C_{10} \cdot (1 - f)$$

- Enter longest length of Catchment
- Enter average slope of Catchment (Meters/Run)
- Choose surface type of catchment from drop down list (See n value table)

C₁₀ Calculated using:

$$Q = \frac{A \cdot C \cdot I}{360}$$

- 4
- 5
- 6

Weighted Fraction Impermeable using:

$$f = \sum \left(f_{imp,i} \cdot \frac{A_{imp,i}}{A_{tot}} \right) + \left(f_{imp,t} \cdot \frac{A_{imp,t}}{A_{tot}} \right)$$

See n Fraction Impermeable Table

- Enter area of Catchment (ha)
- Choose Catchment category to determine Fraction Impermeable
- Sum of Fractional areas of catchments to determine f



Pre-Developed Flow Calculations

Client:	Wellington Shire Council	Date:	17/03/2016
Project:	South Warrak - Catchment F1 & F2		
Subject:	PRE-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	By:	EN

Location:

ARI Year:

Coefficients					
α	β	γ	δ	ϵ	ζ
0.58205	0.64117	0.01084	0.05168	0.00214	0.00070

INPUT: 500 0.002 0.015 1.289 0.4 8

Catchment	Area	Catchment Category	Catchment Type (for F ₁)	Calculated T _c	Manual Input T _c	Selected T _c	Selected S _x	Weighted S _x	Calculated C	Manual Input C	Selected C	A _u	ΣA _u	I _{av}	Q _{av}
	ha			mins	mins	mins			mm		mm	ha	ha	mm/hr	m ³ /s
Sub-catchment C	36.780	RURAL	Rural Zone	31.18		31.18	0.1	0.300	0.282		0.282	38.38	10.375	73.41	2.118
TOTAL	36.780	RURAL		31.18		31.18		0.300	0.282				10.375	73.41	2.118

T_c Calculated using:

$$T_c = 0.76 \times A^{0.18}$$

Equation 5.4 AR&R

Weighted Fric Imperv using:

$$f = \sum \left(f_{imp} \times \frac{A_{imp}}{A_{tot}} \right) + \left(f_{unimp} \times \frac{A_{unimp}}{A_{tot}} \right)$$

C₁₀ Calculated using:

$$C_{10} = 0.1 + 0.013 A^{0.75} - 2.4$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Equation 14.11 and 14.12 AR&R

Q Calculated using:

$$Q = \frac{A_u \times I}{360}$$

Rational Method



Detection Storage Calculator

SELECT LOCATION

Date

PRE-DEVELOPMENT ARI

100

POST-DEVELOPMENT ARI

100

Coefficients						
0	1	2	3	4	5	6
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Client	Shropshire Fire (Local)	Date	1/10/2016
Project	South Marston - Gloucestershire		
Purpose	Determine, using the method, the required detection storage capacity		
Job No	1001-01	No	1/1

PRE-DEVELOPMENT					
Total Catchment Area	CA	T ₁	f	Input Manual Retention Outflow	Calculated Retention Outflow
ha	ha	min	mm/hr	m ³ /s	m ³ /s
12.140	3.425	20.40	14.40	0.000	0.00

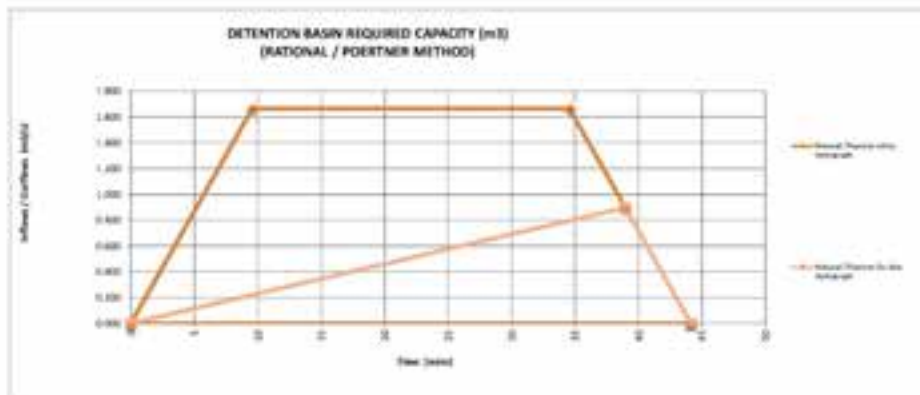
Flow Interval Start	00	min
Flow Interval End	1	min
Pump / Outflow Delay Duration (s)	0	min
Pump / Outflow Delay Duration (s)	0.00	min

Change only if required (check in 1)

Use 100% retention with maximum storage capacity to prevent the graph below

Change only if required

Change only if required



POST-DEVELOPMENT				
Total Catchment Area	CA	T ₁	f	Q
ha	ha	min	mm/hr	m ³ /s
12.140	3.425	20.40	14.40	0.00

$$C_{100} = 0.1 + 0.0133 \left(\frac{1}{f} - 2.5 \right) \quad C_{100} = 0.100 \quad C_{100} = 0.100$$

TOTAL DETENTION STORAGE REQUIRED (m ³)	Rational / Poertner Inflow Hydrograph			Rational / Poertner Outflow Hydrograph		
	Q	Time		Q	Time	
1.400	0.000	0.0		0.000	0.0	
1.400	1.400	10.0	10.0	0.000	10.0	10.0
1.400	1.400	14.4	14.4	0.000	14.4	14.4
1.400	0.000	14.4		0.000	14.4	
	0.000	0.0				

TOTAL STORAGE REQUIRED	
1.400 (from Inflow Hydrograph) + 0.000 (from Outflow Hydrograph)	
RATIONAL / POERTNER METHOD	
m ³	
1.400	

Fast-Developed Flow Calculations

Conclusions

Save

2005 Year 11

100

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100

Source: *Author's calculations*.

	Coefficients						
	(0)	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.00000	-0.00007	-0.00000	-0.00001	-0.00002	-0.00001	-0.00002

Catchment	Area	Length (L)	Slope (S)	Surface	A (m ²)	40.8	Calculated T ₁	Manual Input T ₂	Selected T ₃	Catchment Category (for P ₁)	Selected t ₄	Weighted t ₅	Calculated C	Manual Input C	Selected C	A ₆	T ₆ A ₆	t	Q
	ha	km	%/‰			mm	mm	mm	mm				mm	mm	mm	mm	mm	mm	mm
1	1.70	100.00	0.01	Asphalt	0.041	15.88	7.00	9.22	9.22	Best Medium Density	0.8	0.088	0.716		0.704	1.26	1.191	109.52	0.504
16	2.08	80.00	0.01	Asphalt	0.041	27.96	7.00	9.56	9.56	Best Medium Density	0.8	0.096	0.716		0.704	1.64	1.438	163.75	0.676
3	2.15	100.00	0.01	Asphalt	0.041	30.62	7.00	9.86	9.86	Best Medium Density	0.8	0.105	0.716		0.704	1.52	1.525	146.56	0.421
9	1.60	113.00	0.01	Asphalt	0.041	19.32	7.00	7.84	7.84	Best Medium Density	0.8	0.081	0.716		0.705	1.37	1.167	158.86	0.503
2	2.24	110.00	0.01	Asphalt	0.041	43.38	7.00	8.97	8.97	Best Medium Density	0.8	0.112	0.716		0.704	1.62	1.818	167.28	0.662
66	2.37	150.00	0.01	Asphalt	0.041	36.01	7.00	8.21	8.21	Best Medium Density	0.8	0.117	0.716		0.704	1.38	1.696	254.51	0.706
Total	11.140								8.260			0.600					8.889	213.701	8.889

^a T_p Calculated using

$$f = 6.94 \cdot \frac{(L \times \sigma^2)^{1/2}}{f^{1/2} \times S^{1/2}}$$

Dennis Bruns

1

1

1

4 max longest length of L attachment

Average average slope of Catchment (Nelson, Rhine)

Display will be type of card found from string (0-10) (44 is value 0000)

C12-Calculated using:

$$C_{10} = 0.1 + 0.133(T_1 - 24)$$

$$C_{10} = 0.9 \times f + C'_{10} \times (1 - f)$$

^a Calculated using

$$Q = \frac{A_s \cdot v \cdot t}{100}$$

Weighted Fraction Experiment using

$$f = \sum \left(f_{m+1} \times \frac{d_{m+1}}{A_{m+1}} \right) + \left(f_{m+2} \times \frac{d_{m+2}}{A_{m+2}} \right)$$

[Go to First Page From index & Table](#)

First Army of Landwehr (1st)

Change Callendar category to intermediate. The first suggestion

type effective means of punishment to determine []



Pre-Developed Flow Calculations

Client:	Wellington Shire Council	Date:	17/03/2016
Project:	South Warrak - Catchment G		
Subject:	PRE-DEVELOPMENT FLOW CALCULATIONS		
Job No:	1400147	By:	EN

Location:

ARI Year:

Coefficients					
α	β	γ	δ	ϵ	ζ
0.84205	0.84107	0.00084	0.00084	0.00014	0.00007

INPUT 500 0.002 0.015 1.289 0.4 0

Catchment	Area	Catchment Category	Catchment Type (Per Fz)	Calculated T_c	Manual Input T_c	Selected T_c	Selected T_c	Weighted T_c	Calculated C	Manual Input C	Selected C	A_c	$\sum A_c$	I_{adj}	Q
	ha			mins	mins	mm			mm	mm					
Sub-catchment C	11.140	RURAL	Rural Zone	20.46		20.46	0.1	0.300	0.282		0.282	3.43	3.425	96.41	0.098
TOTAL	11.140	RURAL		20.46		20.46		0.300	0.282				3.425	96.41	0.098

T_c Calculated using:

$$T_c = 0.76 \times A_c^{0.18}$$

Equation 5.4 AR&R

Weighted Fric Imperv using:

$$f = \sum \left(f_{imp} \times \frac{A_{imp}}{A_{tot}} \right) + \left(f_{unimp} \times \frac{A_{unimp}}{A_{tot}} \right)$$

C_{10} Calculated using:

$$C_{10} = 0.1 + 0.013 A_c^{0.75} - 2.5$$

$$C_{10} = 0.9 \times f + C_{10} \times (1 - f)$$

Equation 14.11 and 14.12 AR&R

Q Calculated using:

$$Q = \frac{A_c \times I}{360}$$

Rational Method

Vegetation Assessment for Rezoning Application – Wurruk



**Prepared For: Beveridge Williams and D. Page, B.Hollonds &
D.Hollonds, S.Bailey & M.Bailey**

June 2014

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**ENVIRONMENTAL, PLANNING & NATURAL RESOURCE MANAGEMENT
CONSULTANTS**

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Cover Photo: Scattered Tree (Red Gum) at the Study Site

Ethos NRM Pty Ltd				
Document Control				
Client	Beveridge Williams and D. Page, B. Hollonds & D. Hollonds, S. Bailey & M. Bailey			
Title	Preliminary Vegetation Assessment - Wurruk			
Author	Amie Hill			
Manager	Eric Sjerp			
Version	Final			
Electronic File Name	14013 bw wurruk scattered tree assessment report_final.docx			
Date Last Saved	10/06/2014 2:29 PM			
Date Last Printed	10/06/2014 2:36 PM			
Distribution:	Sean Phillipson – internal review	1	Word – draft v1.1	23/5/14
	Sean Phillipson – internal review	1	Word – draft v1.2	25/5/14
	Chris Cumow – Beveridge Williams	1	Pdf draft v1.3	30/5/14
	Chris Cumow – Beveridge Williams	1	PDF Final	10/06/2014

EXECUTIVE SUMMARY

Ethos NRM has undertaken a vegetation assessment of the following land parcels (comprising the study site) which are the subject of a rezoning application to develop the land for residential use:

- Lots 6 and 7 on PS702630;
- Lot 1 on PS410216;
- CA21, Section E, Parish of Wurruk Wurruk;
- Lot 2 on PS610634;
- CA19, Section E, Parish of Wurruk Wurruk; and,
- Lots 1 & 2 on PS415183.

The land has historically been cleared and is currently used for agricultural purposes. On-site assessment of vegetation at the study site recorded:

- Native Vegetation
 - 44 Scattered Trees representative of the EVC *Plains Grassy Woodland*.
 - Remnant vegetation does not meet the definition of the EPBC listed *Gippsland Red Gum Grassy Woodland* ecological community.
 - No particular significant vegetation values were recorded, however many of the scattered trees are very large with hollows that may provide habitat for native fauna.
- Planted Vegetation
 - Exotic and native tree species are planted along roadsides, in shelterbelts along fences, and in paddocks.
- Introduced pasture species dominate the groundcover across the entire study site, reflecting the current and past agricultural land use (grazing and cropping).

No rare or threatened flora or fauna species were recorded by Ethos NRM during the site visit. It is not expected that there will be any significant impacts on Commonwealth Matters of National Environmental Significance identified from the desktop search.

Potential implications of native vegetation removal under the *Guidelines* include:

- Removal of any of the identified Scattered Trees will require a permit from Wellington Shire Council and a commensurate Offset under the *Guidelines*.
- Two native trees on Lot 7 PS702630 are protected by a Section 173 Agreement and cannot be removed (excluded from the Scattered Trees assessment).
- The study site is entirely within **Location A** for determining the risk-based pathway for an application to remove native vegetation.
- The removal of less than 15 trees will result in the **low-risk pathway** requiring:
 - No detailed Habitat Hectares Assessment required
 - General offset required only
 - Simpler reporting requirements
- The removal of 15 or more trees will result in the **moderate-risk pathway** requiring:
 - Habitat Hectares Assessment required
 - General and/or Specific offset required
 - More complex reporting requirements
 - Increasing Offset requirement

- Calculation of the extent of native vegetation removal for determination of the risk-based pathway must include any permitted vegetation removal on any of the properties contributing to the study site within the previous five years.
- Total impacts on native vegetation from the development and use of the land that must be offset needs to consider any indirect impacts such as:
 - Changes to hydrology
 - Effluent discharge
 - Stormwater runoff
 - Excessive shading of vegetation
 - Adequacy of protection of retained vegetation during construction and use

The DEPI Online NVIM tool was used to compare the relative value of Scattered Trees across each land parcel under a **low-risk pathway**. This indicated that:

- the removal of trees from Lots 6 and 7 on PS702630 and Lot 1 PS410216 would result in the lowest offset requirement per tree removed,
- the highest offset requirements will most likely be generated by the removal of trees from Lot 1 PS415183 and Crown Allotment 19 Section E.

It is recommended that vegetation removal is avoided as far as practicable, and both direct and indirect impacts on native vegetation are minimised through subdivision design, in order to reduce the complexity of further vegetation assessment and offset requirements and inherent costs associated with these.

1 INTRODUCTION

Ethos NRM has been engaged by Beveridge Williams on behalf of the landowners of eight parcels of land (the Study Site) located between the Princes Highway and Settlement Road in Wurruk, to undertake an assessment of vegetation quality and significance. The land is the subject of a proposal to rezone and develop the land for residential use.

Where possible the proposed development is intended to retain most of the native vegetation through subdivision design, however complete avoidance may not be practicable.

A preliminary assessment of vegetation at the study site has been undertaken by Ethos NRM, to identify the presence of, and map the location of, native vegetation, and to categorise native vegetation in accordance with the *Permitted Clearing of Native Vegetation - Biodiversity Assessment Guidelines* (DEPI, 2013a) herein referred to as the 'Guidelines'.

This report provides an outline of the legislative requirements for potential native vegetation removal and likely Offset Requirement in Biodiversity Equivalence Units (BEUs).

1.1 Objectives

The broad objectives of this Vegetation Assessment are to:

- identify and map any native vegetation (remnant patch or scattered trees) across the study site,
- identify any areas of significant vegetation,
- provide advice on the potential approval requirements for any vegetation removal and likely offset requirements.

1.2 Site Location and Description

The study site is located approximately 4km east of Sale, and comprises the following eight parcels of land in Wurruk:

- Lots 6 and 7 on PS702630;
- Lot 1 on PS410216;
- CA21, Section E, Parish of Wurruk Wurruk;
- Lot 2 on PS610634;
- CA19, Section E, Parish of Wurruk Wurruk; and,
- Lots 1 & 2 on PS415183.

The site is accessible from The Ridge, Arnup Road, Kilmany Park Track and Settlement Road, see Figure 1. The properties are currently utilised for agricultural use (cropping/grazing).

The site has historically been cleared of most native vegetation, with remnant scattered trees throughout all but one of the land parcels. Grasses are dominated by a mixture of introduced pasture species, reflective of current and prior agricultural land use. The adjacent roadside vegetation is also comprised predominantly of introduced pasture species, other weed species or planted vegetation (exotic and native species).

1.3 Planning Context

The study site is located within the Wellington Shire Council area, with the current zoning of land either in Low Density Residential Zone (LDRZ) or Farming Zone (FZ), as

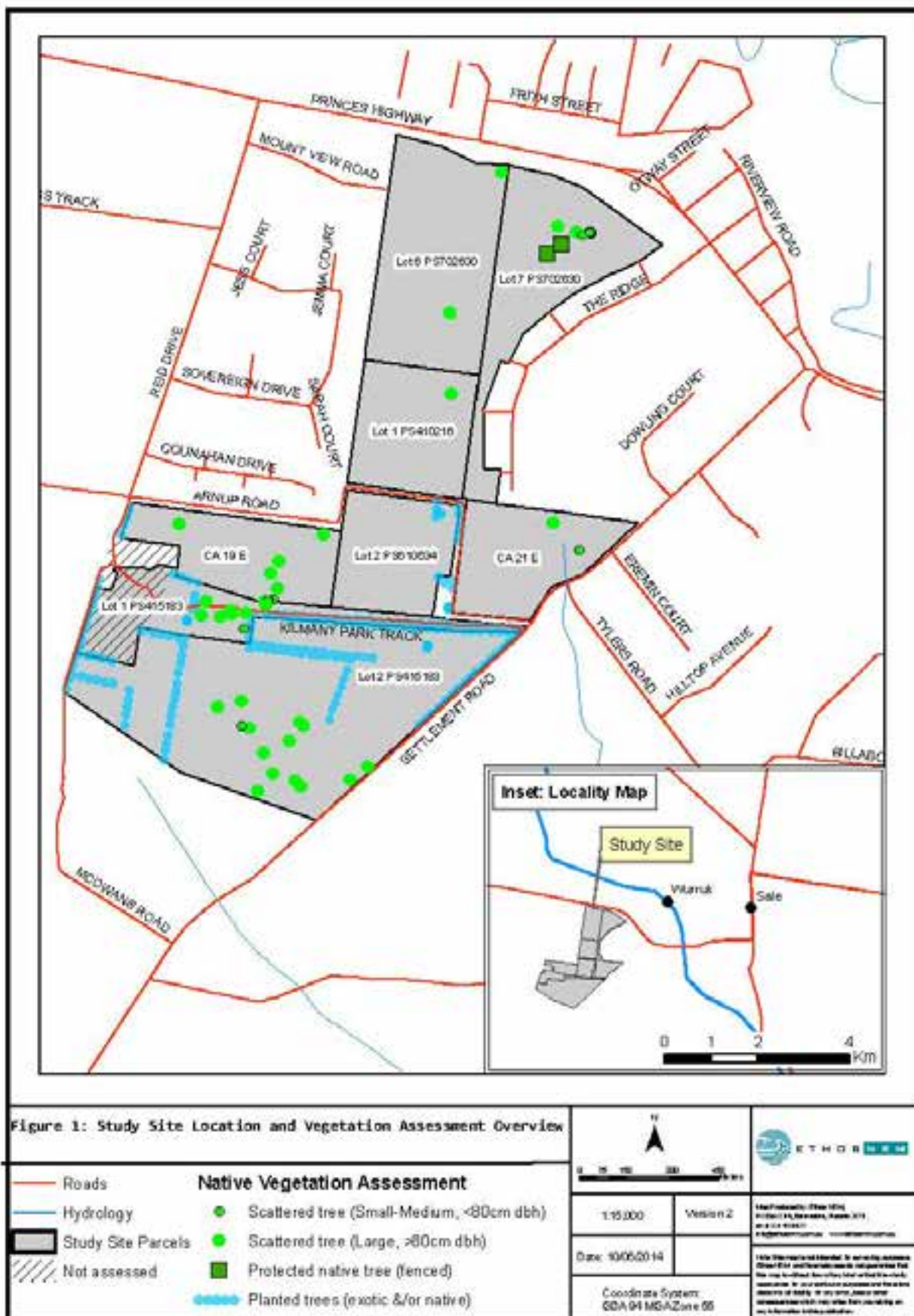
summarised for each lot in Table 1 below. Planning Zones and Overlays were sourced from Planning Maps Online (DTPLI, 2014).

There are existing planning controls related to vegetation across Lots 1 & 2 on PS415183 under the Heritage Overlay, which includes non-native planted vegetation around Kilmary Park.

The study site is entirely within a Designated Bushfire-prone Area, which requires certain Building Standards to be met, but does not trigger specific planning controls in relation to native vegetation.

Table 1: Summary of Planning Zones and Overlays

Land parcel/lot	Zoning		Overlays	Notes
	Current	Proposed		
Lot 6 PS702630	LDRZ	R1Z	DDO6 DPO1 PAO1	The portion of land excised under PAO1 was excluded from the assessment.
Lot 7 PS702630	LDRZ	R1Z	DDO6 DPO1	This parcel is within, or affected by, one or more areas of cultural heritage sensitivity as described in the Aboriginal Heritage Regulations 2007.
Lot 1 PS410216	LDRZ	R1Z	DDO6 DPO1	
CA21, Section E, Parish of Wurruk Wurruk	FZ	R1Z	DDO6 DPO1 FO LSIO	FO and LSIO applies to eastern half of parcel. This parcel is within, or affected by, one or more areas of cultural heritage sensitivity as described in the Aboriginal Heritage Regulations 2007.
Lot 2 PS610634	FZ	R1Z	DDO6	
CA19, Section E, Parish of Wurruk Wurruk	FZ	LDRZ	DDO6	
Lot 1 PS415183	FZ	LDRZ	DDO6 FO LSIO HO151 HO68	FO and LSIO applies to eastern extent of parcel at Settlement Rd. HO68 applies tree controls at Kilmary Park, and HO151 refers specifically to an Oak Tree.
Lot 2 PS415183	FZ	LDRZ	DDO6 FO LSIO HO68	FO and LSIO applies to eastern extent of parcel at Settlement Rd and southwest corner near Moowans Rd. HO68 applies tree controls at Kilmary Park.



2 ASSESSMENT METHODOLOGY

The following steps have been undertaken to assess potential vegetation values on the 8 land parcels comprising the study site:

- Desktop Investigation
- Field Survey – Identification of native vegetation and assessment of significance of vegetation
- Provide advice regarding the Risk-based Pathway and approval of native vegetation removal and offsetting under the *Guidelines*

Results of the desktop and field investigations are detailed Sections 3 and 4 of this report.

2.1 Desktop Investigation

Desktop investigation of flora data was initially used to gather information on the site prior to undertaking vegetation assessments and preparation of this report. Ethos NRM has obtained data for the occurrence and description of bioregions, EVCs, Rare or Threatened flora and Threatened Ecological Communities from a number of sources, including:

- Planning Maps on-line (DTPLI, 2014)
- EPBC on-line Protected Matters Search Tool (SEWPAC, 2014)
- DEPI Interactive Maps – Biodiversity Interactive Maps (DEPI, 2014a)
- DEPI Ecological Vegetation Class Benchmark Descriptions (DEPI, 2014b)
- DEPI Bioregion Descriptions (DEPI, 2014b)
- DEPI Native Vegetation Information Management Tool (DEPI, 2014c)

2.2 Field Survey

Vegetation on-site was assessed as planted (exotic and/or native species), pasture or 'native vegetation' in accordance with the *Guidelines* (DEPI, 2013a). Any native vegetation identified was mapped and categorised as a remnant patch or scattered trees. Diameter at Breast Height (DBH¹) of trees was measured where possible.

The sites were surveyed by a DEPI Accredited Native Vegetation Assessor on the 6th May 2014.

2.3 Taxonomy

Common and scientific names for terrestrial vascular plants within this report follow the Victorian Biodiversity Atlas (VBA) of the Department of Environment and Primary Industries (DEPI).

2.4 Survey Limitations

The survey effort combined with information gathered from other sources is considered adequate to assess the significance of vegetation and flora values within the study site, to meet the objectives in Section 1.3.

¹ DBH – Diameter at Breast Height of a tree, which is measured at 1.3m off the ground.

3 RESULTS

3.1 Desktop Investigation

A desktop investigation was conducted to identify potential significant biodiversity values at the study site, with regard to relevant Commonwealth and State legislation and policies.

3.1.1 Commonwealth Biodiversity Values

The *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* is the Australian Government's environmental legislation which provides a legal framework to protect and manage nationally and internationally significant flora, fauna, ecological communities and heritage places, defined in the EPBC Act as Matters of National Environmental Significance.

If a proposed action has the potential to have a significant impact on a Matter of National Environmental Significance, then an EPBC Referral is required to determine whether approval will be required to undertake the activity (i.e. controlled action).

An online EPBC Protected Matters Search was undertaken and the results identified the following Matters of National Environmental Significance within 5km of the study site (see Appendix 1). Results of the EPBC Protected Matters Search included:

- 1 Wetland of International Importance (RAMSAR – Gippsland Lakes)
- 1 Listed Threatened Ecological Communities
- 1 Threatened Flora Species
- 12 Threatened fauna species
- 11 Listed Migratory Species

3.1.2 State Biodiversity Values

Legislation relevant to native vegetation conservation and management in Victoria include the *Flora and Fauna Guarantee Act 1988*, *Planning and Environment Act 1987* and *Catchment and Land Protection Act 1994*. Relevant policy documents include the '*Permitted Clearing of Native Vegetation Biodiversity Assessment Guidelines*' (DEPI, 2013a).

DEPI databases (Biodiversity Interactive Maps) were reviewed to identify rare and threatened species and communities that are modelled to occur or have been previously recorded at the study site. There are no previous records of rare or threatened flora or fauna species within the study site on DEPI databases (DEPI, 2014a).

DEPI Ecological Vegetation Class (EVC) mapping (see Appendix 2) at the study site indicates small areas of Plains Grassy Woodland (EVC 55) within each property, and small patches of Deep Freshwater Marsh on Crown Allotment 21 Section E and Lot 2 PS415183. The majority of the study site is mapped as being devoid of native vegetation.

Impacts of native vegetation removal on State biodiversity values, such as rare and threatened species and communities, are integrated into the provisions of the *Guidelines*.

3.2 Field Survey

On-site assessment of vegetation was conducted to identify the presence and significance of any native vegetation present at the site, as well as other potential biodiversity values identified through the desktop assessment.

3.2.1 Native Vegetation Assessment

The field assessment of the study site undertaken by Ethos NRM identified that native vegetation is present, as defined by the *Guidelines* (see below). All native vegetation

met the definition of **Scattered Trees**, representative of the EVC *Plains Grassy Woodland*.

Native vegetation is defined in the Victoria Planning Provisions as:
‘plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses.’

A **remnant patch** of native vegetation is either:
- an area of vegetation where at least 25% of the total perennial understorey plant cover is native
- any area with three or more native canopy trees* where the canopy foliage cover is at least 20% of the area

A **scattered tree** is:
- a native canopy tree* that does not form part of a remnant patch

*A **canopy tree** is a mature tree that is greater than 3 meters in height and is normally found in the upper layer of the relevant vegetation type.

Definitions from Section 2.2, page 5 of the Guidelines

A total of 44 scattered canopy trees (living) were recorded across the study site (Refer to Figure 1 and Appendices 3 and 4), predominantly Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*), River Red Gum (*Eucalyptus camaldulensis*), or hybrids between the 2 species. Due to recent cropping and grazing, flowering material was difficult to find, absent, or out of reach. Some of the flower buds appeared intermediate between the two Red Gum species, and hence may be hybrids.

There are an additional two native trees (Red Gums) in Lot 7 PS702630 which are fenced off and protected by an existing Section 173 Agreement. These trees were excluded from the native vegetation assessment, but their locations are indicated in Figure 1 and Appendix 4a.

DBH was measured for 41 of the scattered trees and estimated for 3 trees (see Appendix 3), and ranged from 19cm to 158 cm. Large old trees in the EVC *Plains Grassy Woodland* in the Gippsland Plains are classified as 80cm or larger; 32 Scattered Trees had a DBH of 80cm or larger. Most of the very large trees had several hollows, which may provide habitat for some native fauna species including birds and possums. While none of the trees are rare or threatened species, they do have values associated with their age and size.

3.2.2 Planted Vegetation and Exotic Species

There is planted vegetation (predominantly exotic with some native species) along Arnup Road, Kilmany Park Track and Settlement Road, as well as shelterbelts between paddocks and scattered pine trees in paddocks within Lots 1 and 2 on PS415183. There was no native vegetation recorded on Lot 2 PS610634, only shrubs of the weed species Boxthorn (*Lycium ferocissimum*) and pasture species were recorded within this parcel.

There are also several planted trees in the grounds immediately surrounding the buildings at Kilmany Park, comprising mostly exotic species, with some native tree species, although these were not assessed (see Figure 1).

Under Clause 52.17 of the Planning Scheme, removal of planted native vegetation (which has not been government funded) is exempt from a permit and hence does not need to meet the requirements of the Guidelines (and thus does not need an offset).

It should be confirmed with the landowners that planted vegetation has not been planted as part of a government funded project before assuming that it is exempt under Clause 52.17 of the Planning Scheme from requiring a planning permit and offset.

Some of the exotic trees within the Kilmany Park grounds are protected by Heritage Overlays; hence it should not be assumed that non-native trees in this area are exempt from a planning permit.

3.3 Native Vegetation Description

3.3.1 Bioregion

The study site is located within the Gippsland Plain bioregion which consists of flat low lying coastal and alluvial plains with gently undulating terrain dominated by barrier dunes and floodplains and swampy flats. The soils associated with the upper terrain support Lowland Forest vegetation types, and while the dunes are predominantly sandy soils supporting Heathy Woodland and Damp Sands Herb-rich Woodland vegetation types. The fertile floodplains and swamps support Swamp Scrub, Plains Grassy Woodland, Plains Grassy Forest, Plains Grassland and Gippsland Plains Grassy Woodland/Gilgai Wetland Mosaic vegetation types (DEPI, 2014b).

3.3.2 Ecological Vegetation Classes

Remnant vegetation, soil and site characteristics indicate that the DEPI EVC mapping is reasonably accurate, and the site is consistent with Plains Grassy Woodland (EVC 55). However the DEPI mapping overestimates the occurrence of native vegetation at the study site.

The freshwater marsh in CA21E appears to be a freshwater wetland which has been modified through past land use and development of the adjacent subdivision, and is currently grazed. The single pixel mapped in Lot 2 PS415183 did not correspond to a wetland.

Bioregional Conservation Status describes how threatened or rare an EVC is within a Victorian bioregion, by comparing the current extent of an EVC compared to the predicted extent pre-European settlement (pre-1750). Plains Grassy Woodland (EVC 55) is listed as Endangered, the highest rating, and Deep Freshwater Marsh is listed as Vulnerable in the Gippsland Plains bioregion.

3.4 Native Vegetation Significance

No rare or threatened flora or fauna species were recorded during the field survey.

3.4.1 Commonwealth Legislation

The study site is located within the catchment of the Gippsland Lakes Ramsar site. While it is unlikely that the scale of development of the site would have a significant impact on the Ramsar site, it should be considered in subdivision design.

The EVC *Plains Grassy Woodland* is recognised as contributing to the Commonwealth listed ecological community *Gippsland Red Gum Grassy Woodland and Associated Native Grassland*, however native vegetation at the study site did not meet the definition of the EPBC listed community.

The landscape within and surrounding the study site is largely cleared of vegetation and utilised for either agriculture or housing; the remaining vegetation is scattered and isolated with highly modified structure. It is not likely that the study site provides important habitat for threatened flora or fauna species, or migratory species.

Hence, it is not expected that any of the Protected Matters with potential to occur at the study site, as listed in Appendix 1, will be impacted upon by removal of Scattered Trees at the study site.

3.4.2 State Legislation

Removal of any of the identified Scattered Trees will require a permit to remove native vegetation from the Wellington Shire Council. Impacts of native vegetation removal on State biodiversity values, such as rare and threatened species and communities, are integrated into the provisions of the *Guidelines*. The *Guidelines* are described in more detail in Section 4 below.

4 IMPLICATIONS OF NATIVE VEGETATION REMOVAL

4.1 Victoria's Native Vegetation Permitted Clearing Regulations

State Policy for vegetation removal requires that the impacts on biodiversity from proposals to remove native vegetation, including scattered trees, are assessed according to the *Guidelines* (DEPI, 2013a). Application requirements for a permit to remove native vegetation are determined by the relevant risk-based pathway, low, moderate and high risk, as defined by the *Guidelines*. The risk-based pathway is identified from a combination of extent risk (the amount of vegetation proposed to be removed) and location risk (DEPI modelled strategic landscape value) of a site.

The risk-based pathway dictates the detail of information required, including the need for detailed on-site vegetation condition assessment (Habitat Hectares), and the decision guidelines for assessment of that application (DEPI, 2013b).

4.1.1 Identification of the Risk-based Pathway and Application Requirements

Preliminary examination of the online DEPI *Native Vegetation Information Management (NVIM) Tool* (DEPI, 2014c) *Location Risk Map* indicated the entire study site to be within Location A. The Location Risk is then combined with the number of scattered trees proposed to be removed (Extent Risk), which would result in an application to remove vegetation to follow either the Low- or Moderate-risk pathway, as defined in Table 3 in the *Guidelines*.

For determination of the risk pathway, the extent includes the total amount of approved native vegetation removal on the same property under the same ownership within the previous five years (from the date an application to remove native vegetation is lodged).

The Study Site is entirely within Location A.

The risk-based pathway for removal of Scattered Trees in Location A will be either:

<15 trees removed = Low-risk pathway OR

≥15 trees removed = Moderate-risk pathway.

There are substantial differences between the requirements for applications under the low and moderate pathways. Applications under the low-risk pathway can essentially be completed as a desktop assessment, whereas the moderate-risk pathway requires more detailed on-site assessment and mapping of vegetation extent using GIS, and more involved reporting.

4.1.2 Direct and Indirect Loss of Native Vegetation

The total loss of native vegetation resulting from land development includes both direct removal, and indirect impacts on native vegetation, such as; changes to hydrology, effluent discharge, stormwater runoff and excessive shading on vegetation (DEPI, 2013b).

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All retained vegetation must be adequately protected during construction, due to potential impacts from compaction and excavation close to tree roots. The measure used to protect retained vegetation are *Tree Retention Zones*, which are defined as a radius around a Scattered Tree based on the size (diameter) of the tree, and must be demonstrated in an application to remove vegetation. Any retained trees which cannot be adequately protected during construction resulting from the proposed development must be assumed to be lost.

Tree Retention Zones are calculated as a radius of 12 times the diameter at breast height, from a minimum of 2 metres up to a maximum of 15 metres (DEPI, 2013b). These zones have been calculated for all recorded Scattered Trees (except for fenced protected trees) across the study site based on measured or estimated DBH of each tree, and are indicated in Appendices 3 and 4.

4.2 Offsetting Native Vegetation Losses

Where vegetation removal cannot be avoided, provision of offsets is required to compensate for the impacts on biodiversity; the purpose of an offset is to achieve a 'no net loss' in the contribution made by native vegetation to Victoria's biodiversity.

Offsets are achieved through the long-term protection, enhancement and management of the quality and quantity of native vegetation. Offsets can be achieved on private land owned by the proponent or a third party, or sourced as Native Vegetation Credits through accredited native vegetation Offset Brokers.

A formal agreement is required in all instances to secure the ongoing protection and management of the nominated offset site.

4.2.1 Calculating offset requirements for scattered trees

Offset requirements cannot be calculated for the proposed development of the study site without knowing which vegetation may be removed, as the location and extent of vegetation proposed for removal must be accurately mapped. The general process for calculating offsets is described below. In addition, an example of potential offset requirements for the study site under the low-risk pathway is provided in Section 4.2.4.

Native vegetation losses for Scattered Trees are calculated by using a purpose-built *Native Vegetation Information Management Tool* developed by DEPI, which attributes each Scattered Tree with a standard area of loss of 0.071 hectares. The tool assesses the mapped area of vegetation proposed to be removed against DEPI models to determine the type, quantity and attributes of the offset required.

Offsets under the *Guidelines* comprise two types:

- general biodiversity equivalence units (GBEUs) and/or
- specific biodiversity equivalence units (SBEUs)

Vegetation removal under the low-risk pathway comprises only general units (GBEUs), whereas under the moderate-risk pathway may comprise one or both of general units (GBEUs) and/or specific units (SBEUs). Specific units may be more difficult to source than general units.

At the time of preparing this report, all vegetation loss data for moderate and high risk-based pathway applications are processed by DEPI to provide the offset calculations under the *Guidelines*, in the form of a *Biodiversity impact and offset requirements report*. DEPI requires the proponent to provide a GIS Shapefile of the Scattered Trees proposed for removal. A report covering the vegetation removal is then supplied by DEPI which defines the offset requirements.

4.2.2 Offset Attributes

When a general offset is required the offset secured must meet the *minimum strategic biodiversity score* and *vicinity* attributes.

Any general offsets required for the removal of Scattered Trees at the Study Site must:

- be located within the West Gippsland Catchment Management Authority boundary, or Wellington Shire boundary, AND
- have a minimum strategic biodiversity score as stated in the *Biodiversity assessment report* generated by the NVIM tool (not yet known; will depend on the individual trees proposed for removal, refer to Table 2 for indicative values).

When a specific offset is required the offset secured must meet the number of *Specific Biodiversity Equivalence Units* for each species listed in the *Biodiversity impact and offset requirements report*.

4.2.3 Timing

A compliant offset must be secured, to the satisfaction of the responsible or referral authority, before the native vegetation is removed (DEPI, 2013a), by either:

- A security agreement for the site including an onsite (Offset) management plan, or
- Evidence of a secured third party offset, e.g. Native Vegetation Credit Register extract.

4.2.4 Example of potential offset requirements for scattered tree removal

The DEPI NVIM tool (DEPI, 2014c) was used to obtain indicative values (offset units) of scattered trees within each land parcel, to enable a relative comparison between trees across the study site (see Table 2) under the **low-risk pathway** (assumes total loss of less than 15 scattered trees). The 2 protected trees in the north-east of the site (Lot 7 PS702630) have not been included in the table below.

Table 2: Summary of Potential Offset Requirements for Scattered Tree Removal (low-risk)

Land parcel	No. Scattered Trees	Risk-pathway for application	Maximum offset for removal of all trees/ parcel (GBEUs)	Average minimum Strategic Biodiversity Score	Average offset (GBEUs) per tree removed
Lot 6 PS702630	2	LOW	0.017	0.322	0.009
Lot 7 PS702630	8	LOW	0.017	0.080	0.002
Lot 1 PS410216	1	LOW	0.002	0.080	0.002
CA21, Section E	2	LOW	0.023	0.222	0.012
Lot 2 PS610634	0	LOW	n/a	n/a	N/A
CA19, Section E	5	LOW	0.066	0.497	0.013
Lot 1 PS415183	12	LOW	0.183	0.572	0.015
Lot 2 PS415183	14	LOW	0.138	0.370	0.010
ALL	44	MODERATE	To be determined		

The summary in Table 2 suggests that the removal of trees from Lots 6 and 7 on PS702630 and Lot 1 PS410216 would result in the lowest offset requirement per tree removed, whereas the highest offset requirements will be generated by the removal of trees from Lot 1 PS415183 and Crown Allotment 19 Section E. Individual trees may have higher or lower offset requirements than the average shown in Table 2.

If it is anticipated that 15 or more Scattered Trees will be removed for development of the land (including any permitted clearing within the previous 5 years), which would trigger an

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application under the moderate-risk pathway, it is recommended that spatial data is submitted to DEPI early in the subdivision design phase to obtain indicative offset requirements for the removal of native vegetation.

5 CONCLUSION

Ethos NRM has been engaged by Beveridge Williams on behalf of the landowners of eight parcels of land (the Study Site) located between the Princes Highway and Settlement Road in Wurruk, to undertake an assessment of vegetation quality and significance. The land is the subject of a proposal to rezone and develop the land for residential use.

The study site is currently utilised for agricultural purposes, and has been historically cleared of most native vegetation, with the understorey dominated by a mixture of introduced pasture species, and several areas of planted vegetation.

Native vegetation was identified by Ethos NRM to be present at the study site during the site assessment. The native vegetation comprised 44 Scattered Trees (*Eucalyptus* spp.), which were observed to be representative of the Ecological Vegetation Class (EVC) *Plains Grassy Woodland*, which is endangered in the Gippsland Plain bioregion. The native vegetation at the study site did not meet the definition of the EPBC listed *Gippsland Red Gum Grassy Woodland and Associated Native Grassland* ecological community.

No threatened species were recorded by Ethos NRM at the study site during the site assessment, and it is not expected that the native vegetation provides important habitat for threatened species (flora or fauna) which are known or likely to occur within 5km of the study site.

Removal of any of the Scattered Trees for the proposed development of the study site will require approval to remove native vegetation from Wellington Shire Council, and commensurate native vegetation offset, in accordance with the *Permitted clearing of native vegetation – biodiversity assessment guidelines* (DEPI, 2013a). Two additional native trees on Lot 7 PS702630 are fenced and protected by an existing Section 173 Agreement, and cannot be removed.

Subdivision design will be important in avoiding and minimising the quantity of native vegetation removal from the proposed development of the land. The number of trees to be removed will impact on the risk-based pathway determination for an application to remove native vegetation, and the resulting offset requirements to compensate for any proposed loss of native vegetation (resulting from direct and indirect impacts).

The DEPI *Native Vegetation Information Management (NVIM)* on-line tool (DEPI, 2014c) identifies the entire study site as being in **Location A** for determining the risk-based pathway. Therefore if less than 15 Scattered Trees are proposed for removal, an application to remove native vegetation will follow the **low-risk pathway**, whereas more than 15 Scattered Trees would require the **moderate-risk pathway** to be followed.

The **low-risk pathway** has far less onerous and costly assessment and reporting requirements associated with the application to remove native vegetation than the **moderate-risk pathway**. The **low-risk pathway** also requires offsets to be only in **General Biodiversity Equivalence Units**, whereas the **moderate-risk pathway** may require threatened species to be protected as part of the offset requirement (known as **Specific Biodiversity Equivalence Units**).

Offset requirements can also be minimised by ensuring that the highest quality vegetation is retained. The DEPI NVIM tool (DEPI, 2014c) identified that vegetation located in Lot 1 PS415183 and Crown Allotment 19 Section E have, on average, the highest modelled Habitat Scores and Strategic Biodiversity Scores, and hence would result in the highest offset requirements. Conversely, the removal of trees from Lots 6 and 7 on PS702630 and Lot 1 PS410216 would result in the lowest offset requirement per tree removed.

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6 REFERENCES

- DEPI, 2013a. *Permitted clearing of native vegetation Biodiversity Assessment Guidelines*. Victorian Government Department of Environment and Primary Industries, Melbourne, May 2013.
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- SEWPAC 2014. EPBC on-line Protected Matters Search Tool, EPBC Protected Matters Report. Report created 5/5/2014.

7 APPENDICES

7.1 Appendix 1: EPBC Protected Matters Search Report



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 20/05/14 14:24:01

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	13
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As [heritage values](#) of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	26
State and Territory Reserves:	2
Regional Forest Agreements:	1
Invasive Species:	36
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (RAMSAR)	[Resource Information]
Name	Proximity
Gippsland Lakes	Within Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Gippsland Red Gum (Eucalyptus tereticornis subsp. mediana) Grassy Woodland and Associated Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poeciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat known to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species

Name	Status	Type of Presence
habitat known to occur within area		
Frogs		
<i>Litoria raniformis</i> Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
<i>Dasyurus maculatus maculatus</i> (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
<i>Potorous tridactylus tridactylus</i> Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
<i>Pseudomys novaehollandiae</i> New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
<i>Prasophyllum correctum</i> Gaping Leek-orchid [64533]	Endangered	Species or species habitat likely to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
<i>Apus pacificus</i> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
<i>Hirundapus caudacutus</i> White-throated Needletail [682]		Species or species habitat known to occur within area
<i>Merops ornatus</i> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<i>Monarcha melanopsis</i> Black-faced Monarch [609]		Species or species habitat likely to occur within area
<i>Myiagra cyanoleuca</i> Satin Flycatcher [612]		Species or species habitat known to occur within area
<i>Rhipidura rufifrons</i> Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
<i>Ardea alba</i> Great Egret, White Egret [59541]		Species or species habitat known to occur within area
<i>Ardea ibis</i> Cattle Egret [59542]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura nudifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Gippsland Lakes Area	VIC	Indicative Place
Lake Guthridge	VIC	Indicative Place
Historic		
Australian Mutual Provident Society Building	VIC	Indicative Place
Bishopscourt	VIC	Indicative Place
Colonial Club Hotel	VIC	Indicative Place
Continuing Education Centre	VIC	Indicative Place
Gables	VIC	Indicative Place
King George V Jubilee Avenue	VIC	Indicative Place
Mechanics Institute Group	VIC	Indicative Place
Sale Cemetery	VIC	Indicative Place
St Annes and Gippsland Grammar School	VIC	Indicative Place
St Marys Cathedral Complex	VIC	Indicative Place
St Patricks College	VIC	Indicative Place
St Pauls Anglican Cathedral	VIC	Indicative Place
Victoria Park	VIC	Indicative Place
Victoria Park Water Towers	VIC	Indicative Place
Cobb and Company Stables	VIC	Registered
Criterion Hotel	VIC	Registered
Fulham Park	VIC	Registered
Grassdale Homestead	VIC	Registered
Kilmany Park	VIC	Registered
Our Lady of Sion Convent	VIC	Registered
Powder Magazine	VIC	Registered
Sale Canal	VIC	Registered
Sale and District Museum	VIC	Registered
Victoria Hall	VIC	Registered

State and Territory Reserves [Resource Information]

Name	State
Herb Guyatt F.R.	VIC
Sale Common N.C.R.	VIC

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
Gippsland RFA	Victoria

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
<i>Acridotheres tristis</i> Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
<i>Alauda arvensis</i> Skylark [656]		Species or species habitat likely to occur within area
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Carduelis carduelis</i> European Goldfinch [403]		Species or species habitat likely to occur within area
<i>Carduelis chloris</i> European Greenfinch [404]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Passer montanus</i> Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
<i>Sturnus vulgaris</i> Common Starling [389]		Species or species habitat likely to occur within area
<i>Turdus merula</i> Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
<i>Turdus philomelos</i> Song Thrush [597]		Species or species habitat likely to occur within area
Mammals		
<i>Bos taurus</i> Domestic Cattle [16]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Capra hircus</i> Goat [2]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Salix spp. except S.babylonica, S.x calodendron & S.x reichardti		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus		
Gorse, Furze [7693]		Species or species habitat likely to occur within area
Nationally Important Wetlands		[Resource Information]
Name		State
Lake Wellington Wetlands		VIC

Coordinates

-38.11587 147.02687

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- [Natural history museums of Australia](#)
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [State Forests of NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- Other groups and individuals

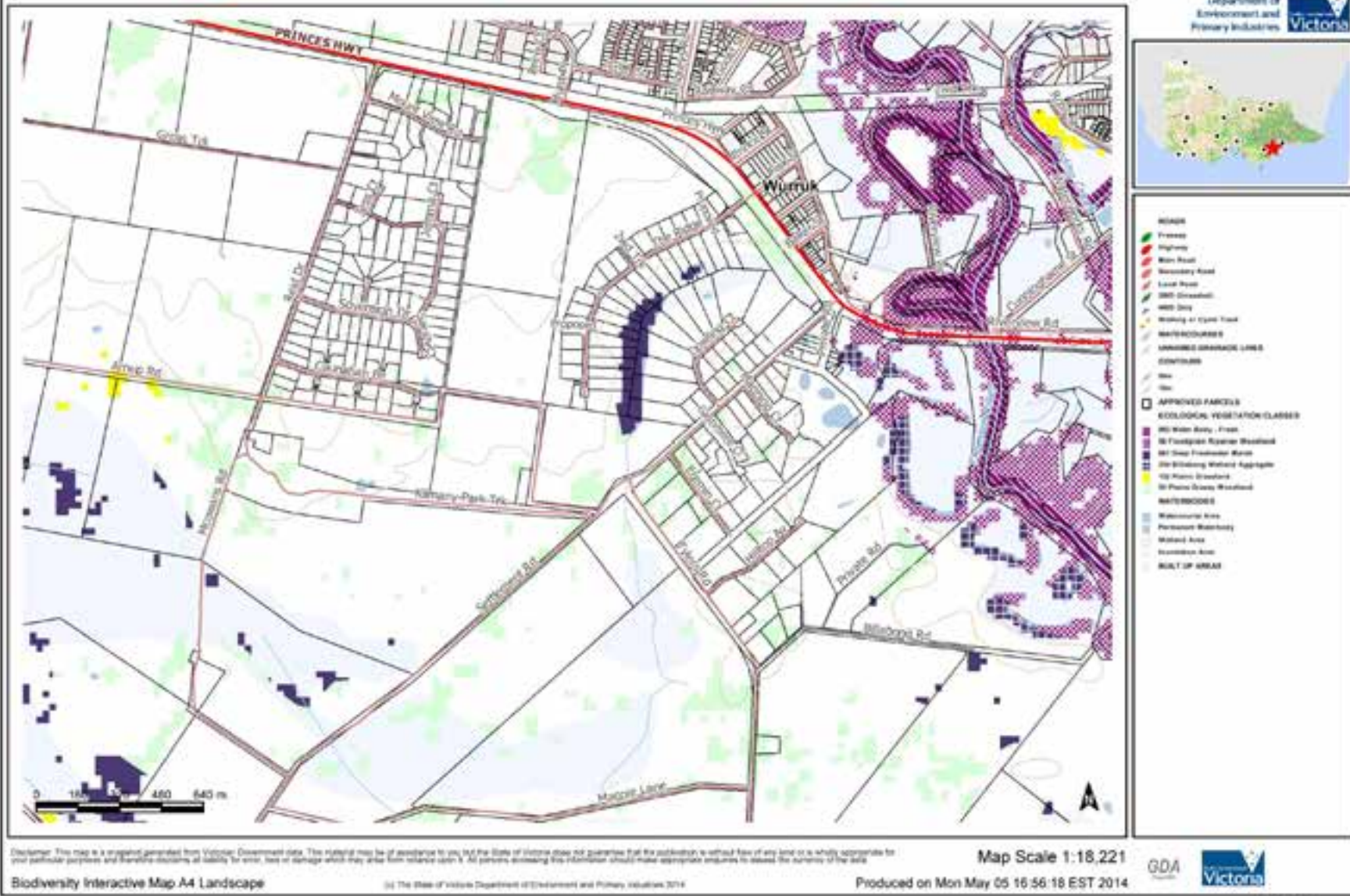
The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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7.2 Appendix 2: DEPI EVC Mapping

Map created Mon May 05 16:56:09 EST 2014



7.3 Appendix 3: Scattered Tree Measurements and Locations

Tree No. refers to Appendix 4. *denotes estimated DBH. GPS location accuracy $\pm 5m$.

Parcel_ID	Tree No	category	dbh_cm	Tree_ret_zone_m	Easting_GDA	Northing_GDA
CA 19 E	14	Scattered tree	122	15	502133	5781269
CA 19 E	15	Scattered tree	98	12	501986	5781182
CA 19 E	16	Scattered tree	93	11	501982	5781144
CA 19 E	17	Scattered tree	129	15	501984	5781094
CA 19 E	18	Scattered tree	90*	11*	501663	5781286
CA 21 E	12	Scattered tree	90*	11*	502652	5781307
CA 21 E	13	Scattered tree	60*	7*	502989	5781203
Lot 1 PS410216	11	Scattered tree	80	10	502547	5781725
Lot 1 PS415183	19	Scattered tree	87	10	501942	5781050
Lot 1 PS415183	20	Scattered tree	25	3	501946	5781054
Lot 1 PS415183	21	Scattered tree	44	5	501952	5781054
Lot 1 PS415183	22	Scattered tree	89	11	501943	5781041
Lot 1 PS415183	23	Scattered tree	60	7	501967	5781055
Lot 1 PS415183	24	Scattered tree	147	18	501752	5781050
Lot 1 PS415183	25	Scattered tree	101	12	501737	5781004
Lot 1 PS415183	26	Scattered tree	158	19	501796	5781004
Lot 1 PS415183	27	Scattered tree	145	17	501830	5781021
Lot 1 PS415183	28	Scattered tree	125	15	501838	5781008
Lot 1 PS415183	29	Scattered tree	130	16	501882	5781013
Lot 1 PS415183	30	Scattered tree	68	8	501874	5780963
Lot 2 PS415183	31	Scattered tree	115	14	502276	5780512
Lot 2 PS415183	31	Scattered tree	125	15	502041	5780467
Lot 2 PS415183	32	Scattered tree	117	14	502220	5780471
Lot 2 PS415183	33	Scattered tree	111	13	502058	5780447
Lot 2 PS415183	35	Scattered tree	101	12	502068	5780647
Lot 2 PS415183	36	Scattered tree	102	12	502056	5780661
Lot 2 PS415183	37	Scattered tree	87	10	502020	5780598
Lot 2 PS415183	38	Scattered tree	94	11	501969	5780493
Lot 2 PS415183	39	Scattered tree	91	11	501920	5780434
Lot 2 PS415183	40	Scattered tree	104	12	501936	5780558
Lot 2 PS415183	41	Scattered tree	95	11	501892	5780641
Lot 2 PS415183	42	Scattered tree	70	8	501863	5780647
Lot 2 PS415183	43	Scattered tree	149	18	501866	5780726
Lot 2 PS415183	44	Scattered tree	129	15	501789	5780707
Lot 6 PS702630	1	Scattered tree	125	15	502711	5782449
Lot 6 PS702630	2	Scattered tree	80	10	502543	5781960
Lot 7 PS702630	n/a	Protected tree	n/a	n/a	502860	5782182
Lot 7 PS702630	n/a	Protected tree	n/a	n/a	502905	5782213
Lot 7 PS702630	3	Scattered tree	109	13	502695	5782269

ETHOS NRM

ENVIRONMENTAL, PLANNING & NATURAL RESOURCE MANAGEMENT CONSULTANTS

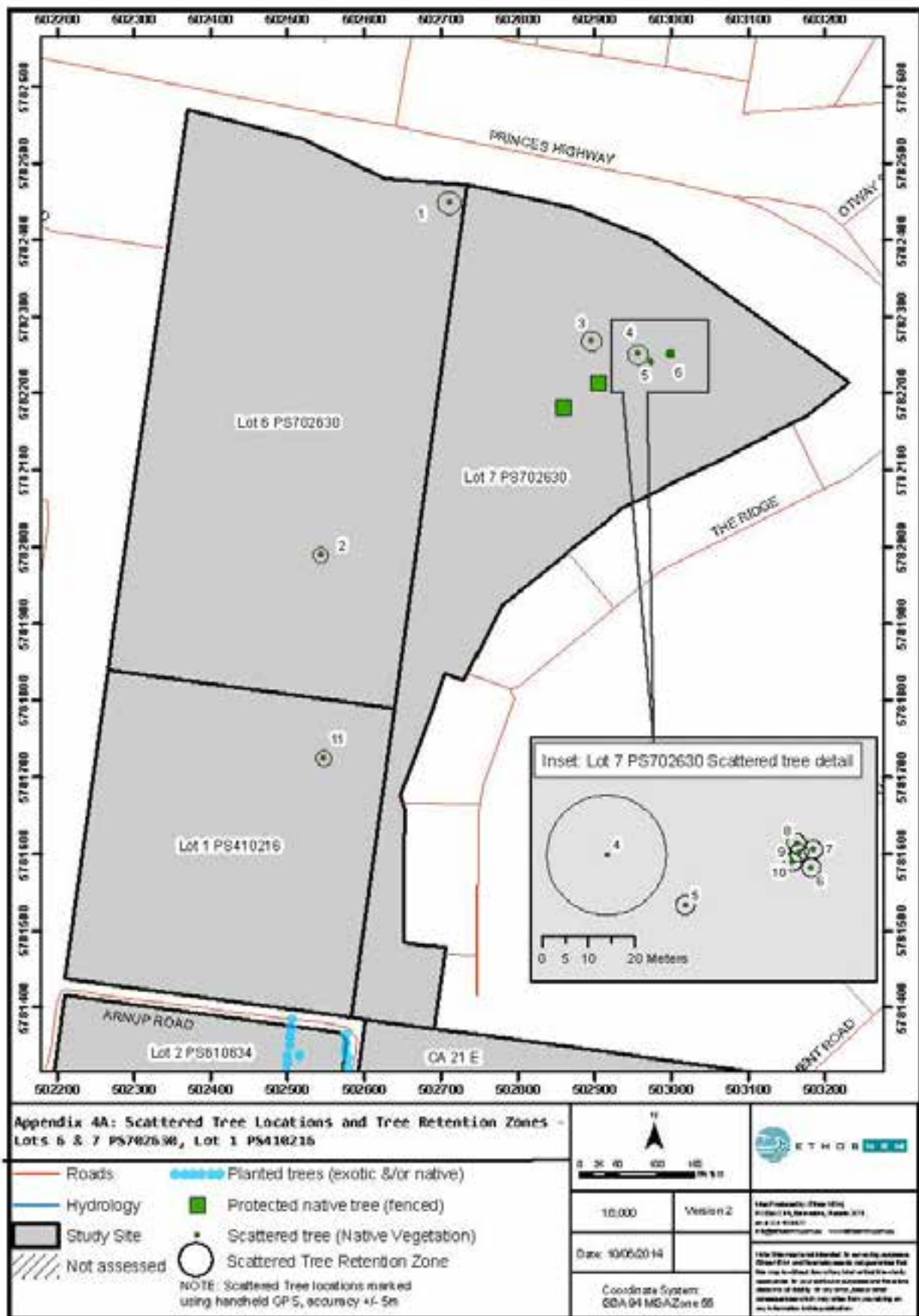
Parcel_ID	Tree No	category	dbh_cm	Tree_ret_zone_m	Easting_GDA	Northing_GDA
Lot 7 PS702630	4	Scattered tree	108	13	502955	5782252
Lot 7 PS702630	5	Scattered tree	19	2	502972	5782241
Lot 7 PS702630	6	Scattered tree	20	2	503000	5782249
Lot 7 PS702630	7	Scattered tree	20	2	503000	5782253
Lot 7 PS702630	8	Scattered tree	20	2	502997	5782254
Lot 7 PS702630	9	Scattered tree	20	2	502997	5782252
Lot 7 PS702630	10	Scattered tree	20	2	502996	5782250

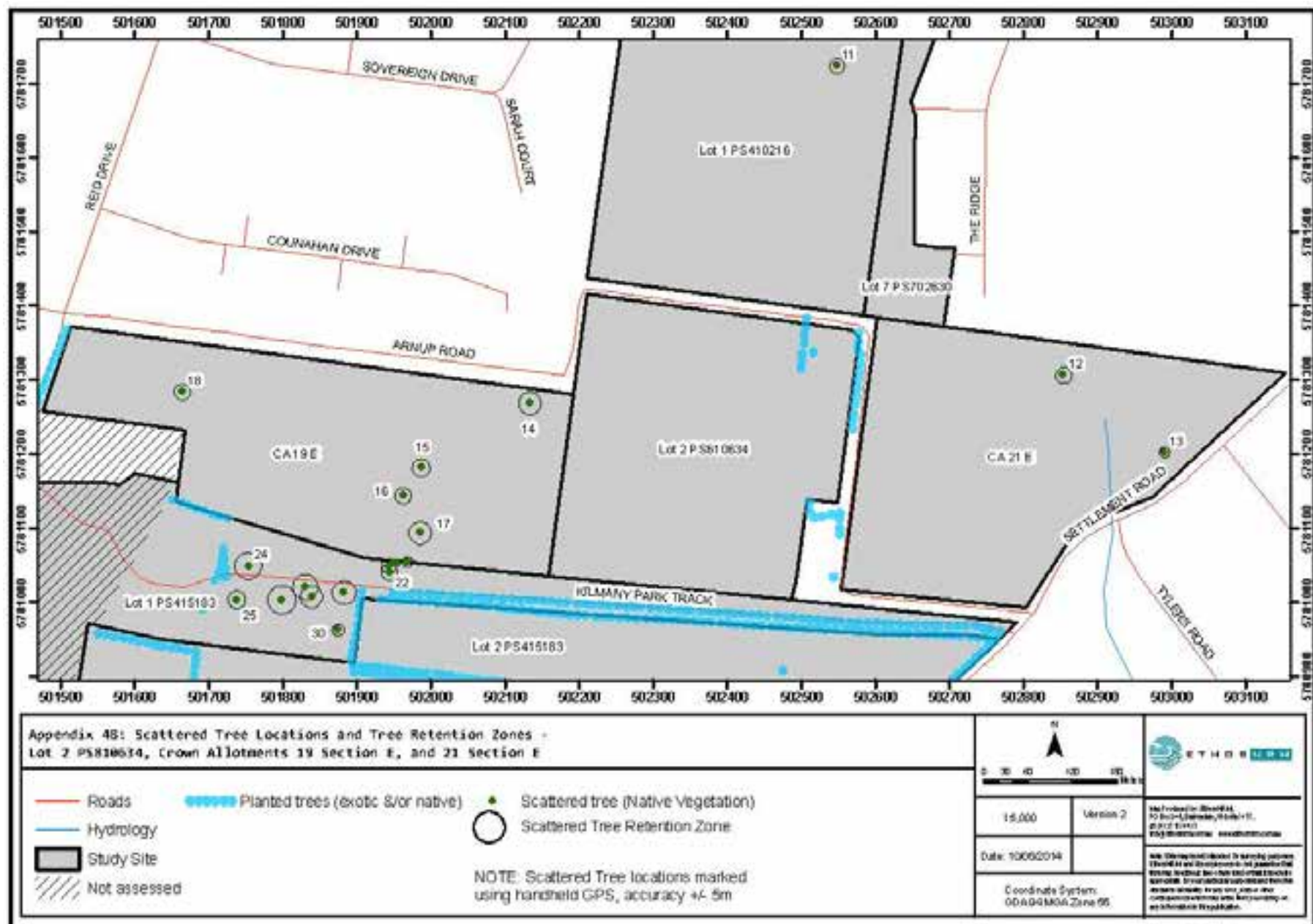
7.4 Appendix 4: Scattered Tree Locations and Tree Retention Zone Maps

4A – Lots 6 & 7 PS702630 and Lot 1 PS410216

4B – Lot 2 PS610634, Crown Allotments 19 Section E and 21 Section E

4C – Lots 1 & 2 PS415183







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geoscience and environmental

Land Capability Assessment, Onsite Wastewater Management Plan and
Concept System Designs for

Proposed Rezoning Settlement Road Wurruk

March 2016

*LCA, Onsite Wastewater Management Plan and Concept System Designs for
Proposed Rezoning Settlement Road Wurruk*

Important Notes:

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Strata Geoscience and Environmental reserves the right to submit this report to the relevant regulatory agencies where it has a responsibility to do so.

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Executive Summary

Strata Geoscience and Environmental Pty Ltd was commissioned to perform a Planning Stage Land Capability Site Reconnaissance and Onsite Wastewater System Concept Designs for a proposed rezoning of land at Settlement Road Wurruk "the site" to a minimum lot size of 4000m².

The investigation involved desktop research, field reconnaissance, geotechnical drilling, permeability testing and soil sampling for laboratory chemical analysis.

The investigation has found that secondary treatment of effluent with onsite disposal are suitable concept designs to support the application.

Suitable systems include:

- Approved commercially available AWTS system with minimum daily flow capacity of 1500L.

OR:

- Min 4000L dual purpose septic tank with outlet filter
- Min 22m² gravity dosed EPA endorsed sand filter (for 5 bed dwelling)
- Min 1000L pump well

Suitable land application area concept designs include:

- Min 420 m² of subsurface irrigation with appropriate buffer zones
- OR
- Min 90 m² trench/bed basal area.
 - Provision for 50% reserve area (must remain free from development)

The investigation has found that the nominated land application area (LAA) derived from the water balance method is large given low permeability subsoils and high rainfall with low evaporation throughout the winter months. However given the minimum lot size of 4000 m² this investigation has concluded that:

- Adequate land area is available for sustainable long term land application of wastewater from residential dwellings, given the proposed rezoning.
- **If the prescriptions of this report are followed the likely human and environmental health risks associated with effluent disposal over the site is low.**

1. Introduction and Background

1.1 Purpose of Report

It is the objective of this report to assess the ability of the land to be used for sustainable on-site domestic wastewater management systems given a proposal for rezoning with minimum 4000m² lot size.

1.2 Background

The proponents, Jelaryl P/L, have engaged Strata Geoscience & Environmental Pty Ltd to conduct a Land Capability Assessment in support of an application to Council.

1.3 Codes, Guidelines and Standards Referenced

The investigation with reference to the following documents:

1. EPA Victoria (2013) Code of Practice for Onsite Wastewater Management
2. Australian Standard AS1547-2012 Onsite Wastewater Management

The investigation also follows the principles outlined in:

1. MAV & DSE 2006 (as amended) Model LCA Report
2. AS1726-1993 Geotechnical Site Investigations.

2. Description of the Proposed Development

Table 1 Site Description	
Site Address	Settlement Road Wurruk
Owner/Developer/Agent	Beveridge Williams
Address	As above
Authorities:	
Council Area	Wellington
Water Supply	Gippsland Water
Sewage	Gippsland Water
CMA	West Gippsland Catchment Management Authority
Zoning	FZ
Overlays	FO, HO, DDO, LSIO, AEO, DPO
Proposed Allotment Size	Min 0.4 Ha approx.
Proposed Domestic Water Supply	Onsite roof water collection
Anticipated Wastewater Load	1080 L/D (See Section 6)
Availability of Sewer	Unsewered and unlikely to be unsewered in mid term

3. Key Property Features

S Nielsen (MEngSc, CPSS-2) undertook a site investigation in March 2016. A range of soil and landscape features were assessed for their potential to impact upon land application area siting and level of wastewater treatment required over the site. Figures 1 & 2 give locality and site plans respectively whilst Table 2 summarises key features as in relation to effluent management over the site.

Figure 1 Locality Plan



Figure 2 Aerial/Development Plan



Table 2 Site Features

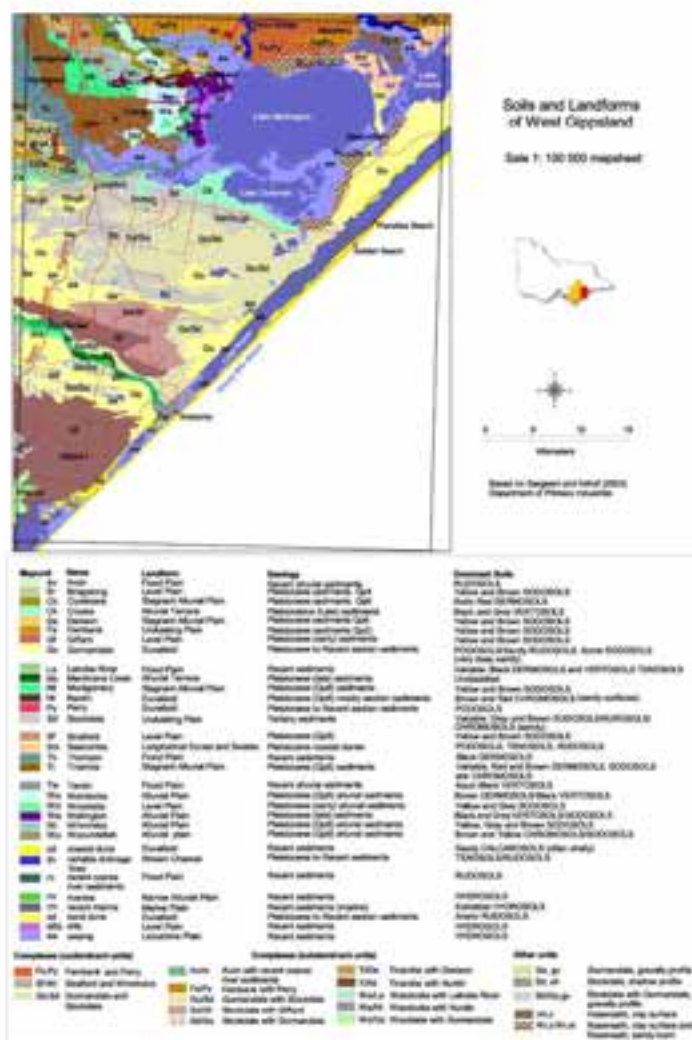
Climate	The nearest weather station with long term data is the Sale Station with a mean annual rainfall of 598.1 mm (BOM 2016) and no evaporation data. Sale Airport has the closest evaporation data. The region has a near Mediterranean climate with maximum temperatures and minimum rainfall in the summer.
Exposure	The site is relatively unshielded with exposure to winds which predominate from the NW/SW directions
Vegetation	Improved Pasture
Landform	Rolling Hills
Slope	Slight to moderate slopes
Fill	No fill evident
Rocks and Rock Outcrops	None evident
Erosion Potential	None observed
Surface Water	Several dams over site. Site not in a water catchment
Flood Potential	<1:100 AEP
Site Drainage and Subsurface Drainage	The site is likely to receive significant run on and shows signs of springs/Dams or other areas of ephemeral subsurface water retention. Given clay subsoils ephemeral perched watertables may exist in some areas of the site.
Stormwater Run-on and Upslope Seepage	Run on from slopes to flatter areas. Drainage likely required
Groundwater	
• <i>Permanent Groundwater Table</i>	Unknown, likely several metres below ground surface contained within fractured rock
• <i>Perched Watertables</i>	Flatter areas likely to suffer from seasonal perched water table given clay subsoils
• <i>Groundwater Quality</i>	Unknown, possible high TSS and saline
Geology and Soils	
• <i>Site Geology</i>	Pleistocene Sediments
• <i>Soil Classification (Isbell)</i>	Yellow, Brown and Grey Sodosols, Brown/Red Chromosols
Recommended Buffer Distances	Given the significant land area, all buffer distances as stipulated in EPA (2013) are achievable.
Available Land Application Area	There is surplus space to land application area requirements (including reserves).

3. Soil Assessment and Constraints

Soils have been assessed for their suitability for onsite wastewater management through both desktop review and intrusive field investigation.

3.1 Published Soil Information

Reconnaissance land system mapping carried out by DEPI (2003) at a scale of 1:100,000, indicates the subject land is underlain by Yellow/Brown Sodosols and/or Brown/Red Chromosols weathering from Pleistocene aged sediments.



3.2 Soil Classification and Physical Properties

Field investigation consisted of drilling 20 soil bores using a Dando Terrier percussion drilling rig driving 50mm soil probes to 1.5m (or refusal on rock) with retrieval of undisturbed soil cores for logging, sampling and testing for pH, EC and Emmerson Aggregate Class using a handheld meter to measure 1:5 soil:water solutions.

Bore logs and soil permeability data/soil dispersion test results (where relevant) are presented in Appendix 2/4.

With reference to the classification system of Isbell (2002) soils are classified as either:

1. Yellow and Brown **Sodosols** - strong textural contrast into structured subsoils with a high exchangeable Sodium complex. Soils had duplex increases in texture with soils depth grading to silty clays/clayey silts to approximately 1500mm bgs. Soils are moderately structured and may show the existence of vertical macropores throughout drier periods, significantly increasing their unsaturated hydraulic conductivities. These soils will show a moderate cation exchange complex for the absorption of nutrients, are non dispersive and a slightly acidic pH trend.

Table 3 Key Soil Characteristics - Sodosols

Soil Depth (m)	1.5m+ (variable)
Depth to Water Table (m)	2.5m+
Coarse Fragments (%)	0-5%
Soil Permeability and Design Loading Rates	Approximately 0.1m/d DIR of 3mm/d suitable

	Topsoils (A1-A3)	Subsoils (B1-B3)
Description	Clayey SAND (SC)	Silty CLAYS (CL/CH)
Soil Category (AS1547-2012)	1	5
DIR (mm/d)/DLR (L/D) (Secondary Effluent)	4.5/30	3/12
Colour	Brown	Yellow
Mottling	Absent	Present
pH (units)	4.5	5.1
EC (microsiemens/cm)	33	68
Emmerson Class (units)	8	5
CEC (meq/100g)	5	20
ESP (%)	1	6
SAR	20	80

2. Red/Brown **Chromosols** – Weaker textural contrast, low- to moderate CEC grading to clayey sands with quartz rock inclusions. These soils will show a low to moderate cation exchange complex for the absorption of nutrients, are non dispersive and a slightly acidic pH trend.

Table 4 Key Soil Characteristics – Chromosols

Soil Depth (m)	1.0m+ (variable- auger refusal in quartz gravels)
Depth to Water Table (m)	2.5m+
Coarse Fragments (%)	25%
Soil Permeability and Design Loading Rates	Approximately 0.75m/d DIR of 3.5mm/d suitable

	Topsoils (A1-A3)	Subsoils (B1-B3)
Description	Clayey SAND (SC)	SANDS (SW/SP)
Soil Category (AS1547-2012)	4	2
DIR (mm/d)/DLR (L/D) (Secondary Effluent)	4.5/30	5/50
Colour	Brown	Red
Mottling	Absent	Absent
pH (units)	4.5	5.1
EC (microsiemens/cm)	49	47
Emmerson Class (units)	8	8
CEC (meq/100g)	0.84	2.5
ESP (%)	1	6
SAR	29	7.5

4. Land Capability Assessment Matrix

Referring to MAV & DSE (2006) and EPA Victoria Publication 746.1 Land Capability Assessment (LCA) for Onsite Domestic Wastewater Management, the following LCA assessment table has been produced for the site:

*LCA, Onsite Wastewater Management Plan and Concept System Designs for
Proposed Rezoning Settlement Road Wurruk*

Table 5: Risk Assessment of Site Characteristics (MAV, DEPI, EPA 2014)

Characteristic	Level of Constraint			Assessed Level of Constraint for Site and Mitigation if required
	Nil or Minor	Moderate	Major	
Aspect (affects solar radiation received)	North / North-East / North-West	East / West / South-East / South-West	South	Moderate
Climate (difference between annual rainfall and pan evaporation)	Excess of evaporation over rainfall in the wettest months	Rainfall approximates to evaporation	Excess of rainfall over evaporation in the wettest months	Moderate
Erosion ¹ (or potential for erosion)	Nil or minor	Moderate	Severe	Moderate
Exposure to sun and wind	Full sun and/or high wind or minimal shading	Dappled light	Limited patches of light and little wind to heavily shaded all day	Minor
Fill ² (imported)	No fill or minimal fill, or fill is good quality topsoil	Moderate coverage and fill is good quality	Extensive poor quality fill and variable quality fill	Minor
Flood frequency (ARI) ³	Less than 1 in 100 years	Between 100 and 20 years	More than 1 in 20 years	Minor – above 1:100
Groundwater bores ⁴	No bores onsite or on neighbouring properties	Setback distance from bore complies with requirements in EPA Code of Practice 891.3 (as amended)	Setback distance from bore does not comply with requirements in EPA Code of Practice 891.3 (as amended)	Minor

*LCA, Onsite Wastewater Management Plan and Concept System Designs for
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Characteristic	Level of Constraint			Assessed Level of Constraint for Site and Mitigation if required
	Nil or Minor	Moderate	Major	
Land area available for LAA	Exceeds LAA and duplicate LAA and buffer distance requirements	Meets LAA and duplicate LAA and buffer distance requirements	Insufficient area for LAA	Minor
Landslip (or landslide potential)	Nil	Minor to moderate	High or Severe	Minor
Rock outcrops (% of surface)	<10%	10-20%	>20%	Minor
Slope Form (affects water shedding ability)	Convex or divergent side-slopes	Straight side-slopes	Concave or convergent side-slopes	Minor
Slope gradient [†] (%)				
(a) for absorption trenches and beds	<6%	6-15%	>15%	Minor
(b) for surface irrigation	<6%	6-10%	>10%	Minor
(c) for subsurface irrigation	<10%	10-30%	>30%	Minor
Soil Drainage [†] (qualitative)	No visible signs or likelihood of dampness, even in wet season	Some signs or likelihood of dampness	Wet soil, moisture-loving plants, standing water in pit; water ponding on surface, soil pit fills	Minor

*LCA, Onsite Wastewater Management Plan and Concept System Designs for
Proposed Rezoning Settlement Road Wurruk*

Characteristic	Level of Constraint					Assessed Level of Constraint for Site and Mitigation if required
	Nil or Minor		Moderate	Major		
Stormwater run-on	Low likelihood of stormwater run-on			High likelihood of inundation by stormwater run-on		Minor
Surface waters - setback distance (m) *	Setback distance complies with requirements in EPA Code of Practice 891.3 (as amended)			Setback distance does not comply with requirements in EPA Code of Practice 891.3 (as amended)		Minor – 30m upslope setback
Vegetation coverage over the site	Plentiful vegetation with healthy growth and good potential for nutrient uptake		Limited variety of vegetation		Sparse vegetation or no vegetation	Moderate
Characteristic	Level of Constraint					Assessed Level of Constraint for Site and Mitigation if required
	Nil or Minor		Moderate	Major		
Soil Drainage * (Field Handbook definitions)	Rapidly drained. Water removed from soil rapidly in relation to supply, excess water flows downward rapidly. No horizon remains wet for more than a few hours after addition	Well drained. Water removed from the soil readily, excess flows downward. Some horizons may remain wet for several days after addition	Moderately well drained. Water removed somewhat slowly in relation to supply, some horizons may remain wet for a week or more after addition	Imperfectly drained. Water removed very slowly in relation to supply, seasonal ponding, all horizons wet for periods of several months, some mottling	Poorly/Very poorly drained. Water remains at or near the surface for most of the year, strong gleying. All horizons wet for several months	Moderate

*LCA, Onsite Wastewater Management Plan and Concept System Designs for
Proposed Rezoning Settlement Road Wurruk*

Table 6: Risk Assessment of Soil Characteristics

Characteristic	Level of Constraint			Assessed Level of Constraint for Site and Mitigation if required
	Nil or Minor	Moderate	Major	
Electrical Conductivity (ECe) (dS/m) as a measure of soil salinity ¹	<0.8	0.8 - 2	>2	Minor
Emerson Aggregate Class (consider in context of sodicity)	4, 5, 6, 8	7	1, 2, 3	Minor
Gleying ² (see Munsell Soil Colour Chart)	Nil	Some evidence of greenish grey / black or bluish grey / black soil colours	Predominant greenish grey / black, bluish grey / black colours	Minor
Mottling (see Munsell Soil Colour Chart)	Very well to well-drained soils generally have uniform brownish or reddish colour	Moderately well to imperfectly drained soils have grey and/or yellow brown mottles and in the mottled areas occur higher in the profile the less well-drained the soil	Poorly drained soils have predominant grey colours with yellow brown or reddish brown mottles located along root channels, large pores and cracks	Minor
pH ³ (favoured range for plants)	5.5 - 8 is the optimum range for a wide range of plants, 4.5 - 5.5 suitable for many acid-loving plants		<4.5, >8	Minor

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Characteristic	Level of Constraint			Assessed Level of Constraint for Site and Mitigation if required
	Nil or Minor	Moderate	Major	
Rock Fragments (size & volume %)	0 – 10%	10 – 20 %	>20%	Moderate
Sodicity ² (ESP %)	<6%	6 – 8%	>8%	Minor
Soil Depth to Rock or other impermeable layer (m) ³	>1.5 m	1.5 – 1 m	<1 m	Moderate
Soil Structure (pedality)	Highly or Moderately structured	Weakly-structured	Structureless, Massive or hardpan	Minor
Soil Texture, ⁴ Indicative Permeability	Cat. 2b, 3a, 3b, 4a	Cat. 4b, 4c, 5a	Cat. 1, 2a, 5b, 5c, 6	Moderate
Watertable Depth (m) below the base of the LAA	>2 m	2 – 1.5 m	<1.5 m	Moderate

Legend:

Nil or Minor: If all constraints are minor, conventional/standard designs are generally satisfactory.

Moderate: For each moderate constraint an appropriate design modification over and above that of a standard design, should be outlined.

Major: Any major constraint might prove an impediment to successful on-site wastewater management, or alternatively will require in-depth investigation and incorporation of sophisticated mitigation measures in the design to permit compliant onsite wastewater management.

4.2 Land Capability Constraints

Qualitative LCA matrix have identified the following site constraints:

- Low permeability soils
- Possible high seasonal water tables and waterlogged soils
- Climate
- Soil Texture
- Potential erosion
- Aspect
- Drainage
- Rock Fragments

Given the above secondary treatment is deemed appropriate for the site.

Please refer to See Section 6 and Appendices for specific system recommendations.

5. Proposed Onsite Wastewater System Concept Designs and Management Plan

5.1 General System Recommendations

Given the results of the LCA, the following recommendations are made for a suitable wastewater treatment system:

- That secondary treatment of effluent with appropriate land application design is suitable given site constraints

Adoption of designs considering these recommendations will limit the public and environmental health risks associated with effluent treatment and disposal over the site and provide for a sustainable long term solution to effluent treatment and land application.

5.2 Onsite Wastewater Flow and Land Application Area Modelling

5.2.1 Flow and Land Application Area Requirement

The modelling below allows for the construction of a wastewater system to service a 5 bedroom equivalent dwelling with provision for future mains water availability and standard water savings fixtures and a design flow allowance under EPAV 2013 of 180 L per person per day. Therefore the calculated effluent flows and required disposal area is as follows:

Wastewater System Modeling	
Proposed Number of Bedrooms	5
Number of Equivalent Persons (EP)	6
Water Source (Tank/Reticulated Mains)	R
Water Saving Fixtures (None/Standard/Full)	S
Total Daily Loading	1080
Soil Category (AS1547-2012)	5
Indicative Permeability (m/d)	1
Design Irrigation Rate/ Design Loading Rate (DIR/DLR)	3.5
Required Effluent Disposal Area (m ²)	309

As a result of these calculations, at least **309 m²** of area is required dispose of these flows on a daily basis via subsurface irrigation

5.2.2 Water Balance and Land Application Area Modelling

Please refer to Appendix 2 for the water balance modelling for each lot based upon VLCAF (2013). The nominated area method is used to calculate the area required to balance all inputs and outputs, without the need for wet weather storage. As a result of these calculations, at least **420 m²** of area is required to achieve zero wet weather storage.

5.2.3 Nutrient Balance and Land Application Area Modelling

Please refer to Appendix 2 for the nutrient balance modelling (Nitrogen and Phosphorus) for each lot based upon VLCAF (2013). The methodology aims to ensure that the LAA is of sufficient size to ensure all nutrients from the applied effluent are assimilated by soils and vegetation. As a result of these calculations, at least **358 m²** of area is required to achieve sustainable assimilation of N and P over the nominated system design life.

**BASED UPON THE ABOVE MODELLING THE MAXIMUM MODELLED
LAA REQUIREMENT IS 420 m² FOR SECONDARY TREATED EFFLUENT
BASED UPON THE WATER BALANCE MODEL.**

5.2.4 Mound/Bed/Trench Area Sizing

Based upon Trench/Bed Area Sizing Spreadsheet (EPA 2013) the modelled loading would require 90 m² of bed/mound basal area based upon loading secondary treated effluent into Category 4 clay loams.

5.2.5 Wastewater BOD

Based upon a loading of 60 g BOD/person/day under EPAV 2013 maximum daily influent BOD would be 360 g BOD/day.

5.2.6 Alternative Loadings and LAA Modelling

Given that the water balance model produces the most conservative LAA, it has been used to calculate the subsurface drip irrigation area for a range of

loadings based upon the "Number of bedrooms plus 1" model at 180L/person/day. Results are detailed in Table 6 below:

Table 6 LAA Requirement for Various Dwelling Sizes		
Number of Bedrooms	Theoretical Loading (L/day)	Required LAA (m ² of irrigation)
3	720	280
4	900	350
5	1080	420
6	1260	490
7	1440	560

5.3 Proposed System Concept Designs

5.3.1 Treatment Systems

Given the above modelling the following treatment system would be appropriate:

- Min DN100 gravity fed sewer pipe
- Approved commercially available AWTS system with minimum daily flow capacity of 1500L.

OR:

- Min 4000L dual purpose septic tank with outlet filter
- Min 22m² gravity dosed EPA endorsed sand filter (for 5 bed dwelling)
- Min 1000L pump well

5.3.2 Land Application Areas

- Min 420 m² of subsurface irrigation with appropriate buffer zones

OR:

- Min 90m² trench/bed basal area.
- Provision for 50% reserve area (must remain free from development)
- Interceptor drainage where necessary

5.3.3 Provision of Adequate Setback Distances and Reserve Area

Given the minimum land application areas modelled above combined with the current development plan, setback distances complying with the minimum requirements of EPA Vic (2013) are achievable (see Figure 2 and Appendix 4). Further more there is adequate room for the modelled reserve requirements as modelled above.

5.4 Monitoring, Operation and Maintenance

It is imperative that regular servicing of the AWTS unit compliant with the prescriptions of the manufacturer and Council permit occur.

To ensure that the treatment system functions adequately and provides effective treatment and disposal of effluent over its design life, asset owners have the following responsibilities:

- Suitably qualified maintenance contractors must be engaged to service the AWTS every three months, as required by Council under the approval to operate.
- Keep as much fat and oil out of the system as possible; and
- Conserve water.

To ensure that the land application area (LAA) functions adequately and provides effective treatment and disposal of effluent over its design life, asset owners have the following responsibilities:

- Irrigation areas should be checked regularly to ensure that effluent is draining freely, including flushing of irrigation lines and cleaning of inline filters
- All vehicles, livestock and large trees should be excluded from around the irrigation area.
- Low sodium/phosphorous based detergents should be used to increase the service life of irrigation area.
- Regularly harvest (mow) vegetation within the LAA and remove this to

maximise uptake of water and nutrients;

- Not to erect any structures over the LAA;
- Ensure that the LAA is kept level by filling any depressions with good quality topsoil (not clay).

Excessive surface dampness, smell or growth of vegetation around the LAA may indicate sub-optimal performance and professional advice should be sought.

5.5 Stormwater Management

Stormwater flows are to be captured and diverted around any land application area. Given the variable slopes of the site combined with low permeability clay soils, interceptor drainage or barrier diversion of stormwater or surface/subsurface water will likely be required on a lot specific basis.

It is further recommended that:

- adequate capture and reticulation of stormwater to approved discharge points is achieved
- rainwater capture be a part of the design of the future dwellings and buildings, with the aim of supplying at least the toilet cisterns and laundry with rainwater, with the excess rainwater from the tanks going to a soak trench(es) appropriately sized via the Australian rainfall and runoff method.
- An integrated communal stormwater management system following water sensitive urban design principals be installed for the entire proposed subdivision.

6. Conclusions and Further Recommendations

In conclusion the following comments and recommendations are made:

- The LCA has found that the site is suitable for secondary effluent disposal.
- The maximum wastewater flow rate (MWWF) modelling shows that the generated flows from the proposed 5 bedroom equivalent dwelling is likely to be no more than 1080 L/day.
- Modelled flows will likely require a land application area comprising:

- Min 420 m² of irrigation derived from the water balance

OR

- Min 90m² trench/bed basal area
 - Provision for min 50% reserve area (must remain free from development)

- It is likely that peak flows associated with the modelled development on each 4000m² lot should be within the buffering capacity of proposed systems both in terms of the system sizing as well as for their acceptance into the disposal area.
- Given the proposed lot size of 0.4 ha adequate setback distances and reserve provisions can be met.
- It is likely that bulk earthworks and drainage installation associated with development proposal will alter conditions of the site and as a result the recommendations of this report **MUST** be reconfirmed after these works have occurred. Stormwater diversion or interceptor drain installation may be appropriate at this time.

- If the prescriptions of this report are followed the likely human and environmental health risks associated with effluent disposal over the site is low.



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7. References

- AS1726-1993- Geotechnical Site Investigations
- AS 1547-2012 Onsite Wastewater Disposal
- Bureau of Meteorology Website- Monthly Climate Statistics
- EPA (2013) Vic Code of Practice for Onsite Wastewater Management
- MAV & DSE 2006 (as amended) Model LCA Report
- VLCAF (2013) Victorian Land Capability Assessment Framework – Calculation of Water and Nutrient Balances
- Isbell (2002) Australian Soil Classification (Revised Edn) CSIRO Publishing

LCA and Onsite Wastewater Management Plan and System Design for
Proposed Subdivision Settlement Road Wurruk

Appendix 1 Water and Nutrient Balance Method Calculations (after
VLCAF 2013)

Irrigation area sizing using Nominated Area Water Balance & Storage Calculations															
Site Address:		Settlement Road Wurruk													
Date:		2008		Assessor:		Noelken									
INPUT DATA															
Design Wastewater Flow:		12	L/s	12	L/s	Based on maximum projected occupancy and defined from Table 10.1 of the EPA Code of Practice (2013)									
Design Irrigation Rate:		200	L/s	200	L/s	Based on soil texture classification and defined from Table 10.1 of the EPA Code of Practice (2013)									
Nominated Land Application Area:		1.0	ha	1.0	ha	Estimates evaporation as a function of crop irrigation, varies with season and crop type									
Crop Factor:		0.5		0.5		Proportion of rainfall that remains on-site and otherwise, allowing for any runoff									
Annual Rainfall Factor:		1.0		1.0		Rain Station and location									
Mean Monthly Rainfall Data:		100	mm	100	mm	Rain Station and location									
Mean Monthly Evaporation Data:		100	mm	100	mm	Rain Station and location									
OUTPUTS															
Design Wastewater Flow:		12	L/s	12	L/s	12	L/s	12	L/s	12	L/s	12	L/s	12	L/s
Design Irrigation Rate:		200	L/s	200	L/s	200	L/s	200	L/s	200	L/s	200	L/s	200	L/s
Nominated Land Application Area:		1.0	ha	1.0	ha	1.0	ha	1.0	ha	1.0	ha	1.0	ha	1.0	ha
Crop Factor:		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Annual Rainfall Factor:		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
Mean Monthly Rainfall Data:		100	mm	100	mm	100	mm	100	mm	100	mm	100	mm	100	mm
Mean Monthly Evaporation Data:		100	mm	100	mm	100	mm	100	mm	100	mm	100	mm	100	mm
STORAGE CALCULATION															
Storage required for given rainfall:		100	mm	100	mm	100	mm	100	mm	100	mm	100	mm	100	mm
Storage required for given evaporation:		100	mm	100	mm	100	mm	100	mm	100	mm	100	mm	100	mm
Storage required for given crop factor:		100	mm	100	mm	100	mm	100	mm	100	mm	100	mm	100	mm
Storage required for given annual rainfall factor:		100	mm	100	mm	100	mm	100	mm	100	mm	100	mm	100	mm
Storage required for given nominated area:		100	mm	100	mm	100	mm	100	mm	100	mm	100	mm	100	mm
LAND AREA REQUIRED FOR ZERO STORAGE															
MINIMUM AREA REQUIRED FOR ZERO STORAGE:															
4000															

Nutrient Balance																																																																																																																													
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*LCA and Onsite Wastewater Management Plan and System Design for
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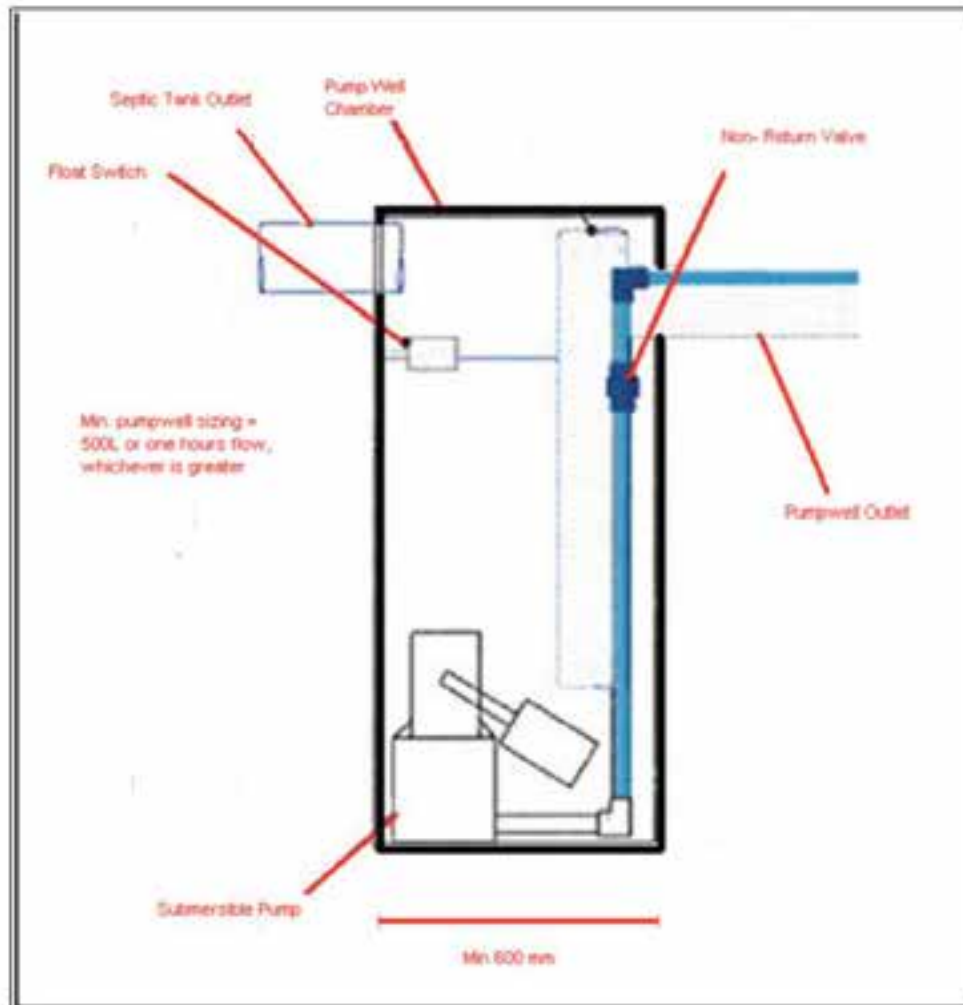
VLCAF Trench & Bed Sizing				
FORMULA FOR TRENCH AND BED SIZING				
$L = QDCR \times W$				
Where:				
L = Trench or bed length	m			Total trench or bed length required
Q = Design Wastewater Flow	L/day			Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2015)
DCR = Design Loading Rate	mm/day			Based on soil texture (impermeability) and derived from Table 5 in the EPA Code of Practice (2015)
W = Trench or bed width	m			As selected by design/installer
INPUT DATA				
Design Wastewater Flow	Q	890	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2015)
Design Loading Rate	DCR	12.0	mm/day	Based on soil texture (impermeability) and derived from Table 5 in the EPA Code of Practice (2015)
Trench (bed) area required	A	74.2	m ²	
Selected trench or bed width	W	2.0	m	As selected by design/installer
OUTPUT				
Required trench or bed length	L	36.9	m	

Appendix 2 Wastewater System Concept Design and Construction Notes

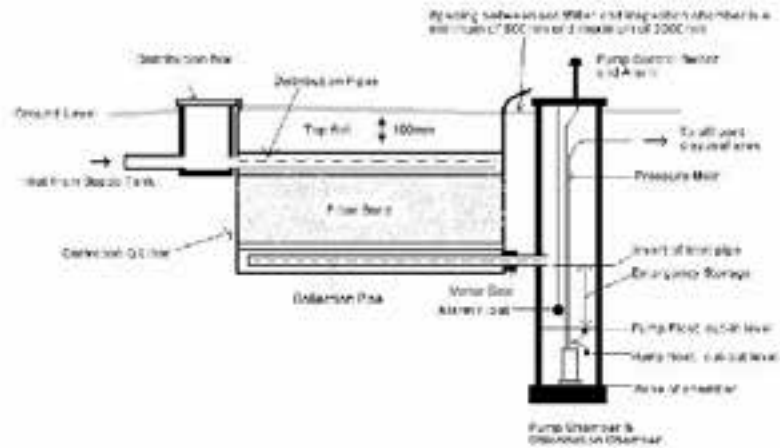
Septic Tank and Pumpwell Installation

1. Septic Tanks should be installed in firm ground and/or on a uniform layer of sand of minimum thickness 100mm.
2. Septic Tanks should be surrounded by sand or compacted soil by watering and tamping to the firmness of the surrounding soil.
3. The influent pipe should be installed with a minimum grade of 1.65% or 1 in 60.
4. It is recommended that septic tanks are installed a minimum of 3 meters from foundations and for systems utilising a pump well, away from bedrooms.
5. The effluent pipe **MUST** have an outlet filter fitted. This **MUST** be cleaned every month.
6. Fiberglass or plastic tanks set in urban or Aboriginal Housing in Remote Area Communities shall be fitted with concrete lids or collars.
7. All vehicles and livestock should be excluded from septic tank areas.
8. The Septic Tank **MUST** be a dual purpose design with a minimum capacity compliant with the stipulations of AS1547-2000 Appendix 4.3 A.
9. An outflow filter and pump well shall be connected to the outflow of the sand filter. The pump well shall:
 - i. Have the minimum emergency storage capacity of 1000L or one days flow, which ever is greater, to provide for situations such as pump or power failure.
 - ii. Contain a pumpset of the submersible type, driven by motors not less than 0.3 Kw, activated by a float switch, with plastic impellers to minimise corrosion problems.
 - iii. Contain a non return valve to be fitted to the discharge pipe.
 - iv. Have a high level alarm light and/or audible device (bell or buzzer) connected to the pumpset and located within the serviced dwelling so that failure of the pumpset is readily observed. All electrical cabling shall be resistant to moisture and gas penetration and control switches shall be installed in accordance with the manufacturer's specifications and to the requirements of the local electricity supply authority.

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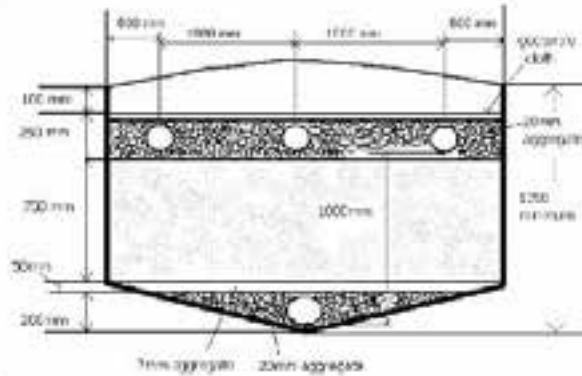
Sand Filter Design and Construction Notes



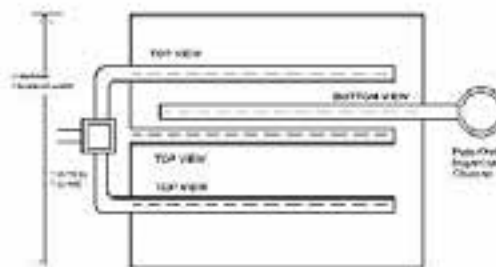
Construction Specifications		Filter Sand Specifications
Liner	Carvacron required if water table is close to surface	Use clean washed sand complying with these requirements. For sand filters loaded at less than 50kg/m ² everyday sand: <ul style="list-style-type: none"> Must contain less than 5% of clay and fine silt by volume Must have an effective size between 0.25 and 0.60mm Must have a uniformity coefficient less than 4
Distribution box	Minimum internal width 250 mm	
Distribution pipes	Sloped 90 mm plastic pipe (Complying with AS 2439)	
Inlet from Septic	100 mm Sewer Grade Plastic Pipe (Complying with AS 1260)	
Collection Pipe	100 mm Sewer Grade Sloped Pipe (Complying with AS 2439)	
Pump chamber	<ul style="list-style-type: none"> Minimum internal diameter 750 mm Base of Chamber 1000 mm below sand filter outlet invert 	
Alarm Float	100 mm above out in	
Pressure Man	Minimum 40 mm diameter	
Alarm	An alarm or light indicating a pump failure must be fitted to the pump well or within the building being serviced by the septic system	

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CROSS SECTION OF SAND FILTER



TOP VIEW OF SAND FILTER



Irrigation Area Concept Designs

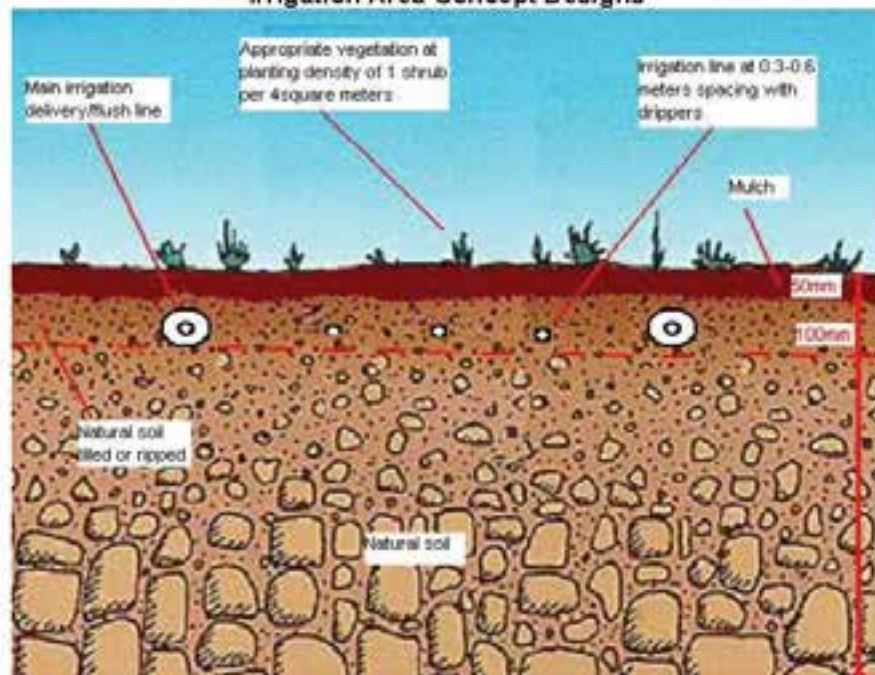


Figure 1 Irrigation cross section showing major delivery/flush lines and irrigation lines.

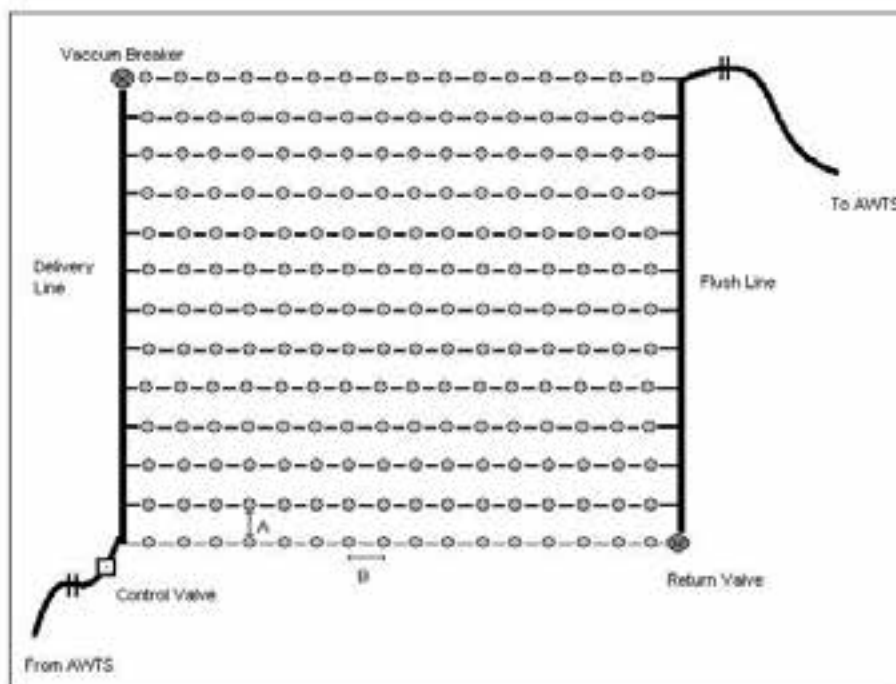


Figure 2 Irrigation Plan View

Land Application Area Design and Construction Notes

1. Delivery/flush line diameter = 25 -30 mm
2. Irrigation line diameter = 12-16mm
3. Irrigation line spacing (A) =300 mm for Sands, Sandy Loams and Loams to 600mm for Clay Loams, Light Clays and Heavy Clays (see the wastewater flow modelling section of this report for soil classification).
4. Dripper/Sprinkler spacing (B) as per manufacturers specifications.
5. A vacuum breaker should be installed at the highest point of the irrigation area (or in the case of multiple irrigation lots at each lot). This breaker should be protected and marked).
6. A flush line should be installed at the lowest point of the irrigation area incorporating a return valve for back flushing of the system back into the treatment chamber.
7. **All lateral lines MUST be installed parallel to the contours of the land. All minimum setbacks MUST be adhered to.**
8. An inline filter must be inserted into the delivery line
9. The first 100mm of the natural soil below the ground surface should be mechanically tilled to aid line installation and soil permeability
10. Gypsum should be incorporated at the rate of 1kg/5m² in dispersive soils.
11. Selected vegetation should be planted at a density of approx. 1 plant per 4m². Recommendation regarding suitable species is made in this report.
12. Irrigation areas greater than 400 m² should be split into 100 m² cells with effluent flows switched between irrigation lots with an automatic valve system.
13. Where practical a 50% reserve area should be identified on the site to allow movement of the irrigation area if required.
14. In areas of moderate to steep slopes (>10%) then upslope cut off drainage should be installed to minimise shallow ground water recharge of the irrigation area from upslope.

Interceptor Ag Drain Design and Construction Notes

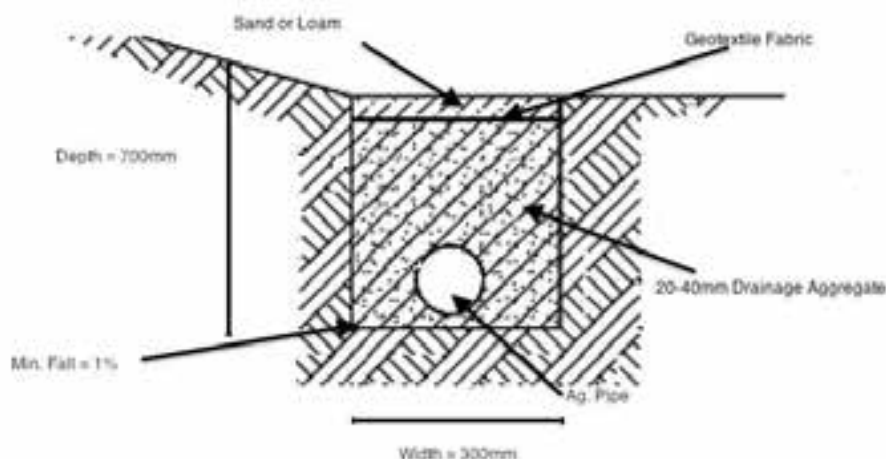


Figure 2 Ag drain cross section showing key dimensions

1. Ag drain should be located upslope of the proposed irrigation area/trenches/beds as shown in site plan.
2. Ag drain should be 300mm wide and 700mm deep. The base of the trench **MUST** be excavated evenly with a minimum fall to the discharge point of 1%. In clay soils smearing of walls and floors of bed **MUST** be avoided. Gypsum **MUST** be applied to base of trench at a rate of 1kg/m^2 .
3. Ag drains are best employed for areas where significant subsurface groundwater recharge is anticipated.
4. Ag drains should be constructed to ensure adequate fall to appropriate stormwater discharge points or other suitable areas provided that any water is not disposed of over site boundaries.


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Appendix 3 Borelogs


strata		Bore Log		BH1				
Client: See Section 1				Coords				
Project: see report				Bearing: Dip:				
Drill Type: HA				R.L. SEE WS				
Drilling Met: Nil				Logged by: SN				
Fluid: Nil				Date:				
Depth (m)	Graphic Log	Material Description	Soil	Rock	Weathering	Fract. Spacing	Sampling and Tests	Test Results and Comments
0		Brown Clayey SAND (SC) loose-MD, NP						
100		Reddish Brown SAND (SW), MD, NP						
150		rock inclusions, Gradual Refusal						
200								
250								
300								
350								
400								
450								
500								
550								
600								
650								
700								
750								
800								
850								
900								
950								
1000								
BORE TERMINATED AT 0.8 m								

 <div> <div>Bore Log</div> <div>BH2</div> </div>										
<div>Client: See Section 1</div> <div>Project: see report</div> <div>Soil Type: HA</div> <div>Drilling Method: NI</div> <div>Fluid: NI</div>		<div>Coords:</div> <div>Bearing: Dip:</div> <div>R.L. SEE WS</div> <div>Logged by: SN</div> <div>Date:</div>								
RL	Depth (mm)	Graphic Log	Material Description	Soil	Rock	Gravel/Clay	Fine	Spacing	Sampling and In Situ Testing	Test Results and Comments
			Brown Clayey SAND (SC) loose-MD, NP							
	100		Reddish Brown SAND (SW), MD, NP rock inclusions, Gravel Refusal							
	1000		tending Clayey SAND(SC)							
	1000									
	2000									
	3000									
	4000									
	5000									
	6000									
	7000									
	8000									
	9000									
	10000									
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	53000									

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 strata <small>geoscience and environmental</small>		Bore Log				BH3						
Client: See Section 1 Project: see report Drill Type: HA Drilling Method: N/A Fluid: N/A						Coords: Bearing: Dip: R.L. 585 WS Logged by: BH Date:						
Depth (mm)	Gravel Log	Material Description	Soil		Rock		Weathering		Fract. Spacing		Sampling and In situ Testing	
			Very Loose	Loose	Medium	Hard	Very Hard	Extremely Hard	Very Soft	Soft	Medium	Hard
0		Brown Clayey SAND (SC) loose-MD, NP										
800		Reddish Brown SAND (SW), MD, NP rock inclusions, Gravel Refusal										
1000												
1500												
2000												
2500												
3000												
3500												
4000												
4500												
5000												
5500												
6000												
6500												
7000												
7500												
8000												
8500												
9000												
9500												
10000												
BORE TERMINATED AT 8.5m												

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 strata <small>geoscience and environmental</small>		Bore Log				BH4										
Client: See Section 1						Coords:										
Project: see report						Bearing: Dip:										
Drill Type: HA						R.L. SET WS										
Drilling Met:						Logged by: BH										
Fluid: Nil						Date:										
Depth (mm)	Geoplot Log	Material Description	Soil		Rock	Weathering	Fract. Spacing	Sampling and In situ Testing								
			Very Loose	Loose	Medium Dense	Dense	Very Dense	Hard	Very Hard	Extremely Hard	Gravelly	Sand	Silt	Clay	Other	Notes
0		Brown Clayey SAND (SC) loose-MD, NP														
800		Reddish Brown SAND (SP), MD, NP rock inclusions,														
1000		Brown CLAY (CL) firm, LP LBU														
1200																
2000																
2500																
3000																
3500																
4000																
4500																
5000																
5500																
6000																
6500																
7000																
7500																
8000																
8500																
9000																
9500																
10000																
			BORE TERMINATED AT 1.5 m													

Bore Log								Shts
Client: See Section 1							Coords	
Project: see report								
Drill Type: RA						Bearing: Dip		
Drilling Met:						R.L. (SE/E W/S)		
Fluid: Nil						Logged by: BN		
						Date:		
Depth (mm)	Graphic Log	Material Description	Soil Very Loose Loose Medium Stiff Hard Very Hard Extremely Hard	Rock Soft Medium Hard Very Hard Extremely Hard	Weathering 	Frac Spacing 	Sampling and Test Results	
0-100	[Brown Clayey SAND (SC) loose-MD, NP]							
100-200	[Reddish Brown SAND (SW), MD, NP]							
200-300	[Yellowish LBU]							
300-400								
400-500								
500-600								
600-700								
700-800								
800-900								
900-1000								
1000-1100								
1100-1200								
1200-1300								
1300-1400								
1400-1500								
1500-1600								
1600-1700								
1700-1800								
1800-1900								
1900-2000								
2000-2100								
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3000-3100								
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5000-5100								
5100-5200								
5200-5300								
5300-5400								
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5500-5600								
5600-5700								
5700-5800								
5800-5900								
5900-6000								
6000-6100								
6100-6200								
6200-6300								
6300-6400								
64								

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 strata <small>geoscience and environmental</small>		Bore Log										BHE	
Client: See Section 1												Coords:	
Project: see report												Bearing: Dip:	
Drill Type: HA												R.L. SET WS	
Drilling Met:												Logged by: BH	
Fluid: Nil												Date:	
Depth (mm)	Graphical Log	Material Description	Soil		Rock		Weathering		Fract. Spacing		Sampling and In-situ Testing		
			Very Loose	Loose	Very Loose	Loose	Very Loose	Loose	Very Loose	Loose	Very Loose	Loose	Very Loose
0		Brown Clayey SAND (SC) loose-MD, NP											
100		Reddish Brown SAND (SW), MD, NP											
200													
300													
400													
500													
600													
700													
800													
900													
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*LCA and Onsite Wastewater Management Plan and System Design for
Proposed Subdivision Settlement Road Wurruk*

Appendix 4 Laboratory Results



Strata Geoscience and Environmental P/L
17 Little Arthur Street
North Hobart
TAS 7000



Certificate of Analysis

NATA Accredited
Accreditation Number 1381
Site Number 1254
Accredited to compliance with ISO/IEC 17025
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian national standards.

Attention: **Sven Nielsen**

Report: **491387-S**
Project name: **SETTLEMENT ROAD WURRUK**
Received Date: **Mar 03, 2016**

Client Sample ID			BH2 (500)	BH4 (500)
Sample Matrix			Soil	Soil
Eurofins mgt Sample No.			M16-Ma02790	M16-Ma02791
Date Sampled			Feb 24, 2016	Feb 24, 2016
Test/Reference	LOR	Unit		
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	49	47
pH (1:5 Aqueous extract)	0.1	pH Units	4.5	5.1
Calcium (exchangeable)*	0.1	mg/100g	0.3	1.9
Magnesium (exchangeable)*	0.1	mg/100g	0.2	0.3
Potassium (exchangeable)*	0.1	mg/100g	0.2	0.1
Sodium (exchangeable)*	0.1	mg/100g	0.2	0.2
% Moisture	1	%	2.0	5.3
Emerson Class Number	1	units	See attached	See attached
Ion Exchange Properties				
Cation Exchange Capacity	0.05	mg/100g	0.84	2.5
Exchangeable Sodium Percentage (ESP)*	0.1	%	29	7.5

Date Reported: Mar 16, 2016

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Report Number: 491387-S

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Sample History

When samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).
If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Conductivity (1:5 aqueous extract at 25°C) - Method: LTM-60-600	Melbourne	Mar 03, 2016	7 Day
Ion Exchange Properties pH (1:5 Aqueous extract) - Method: LTM-G2N-7000 pH in soil by ISE	Melbourne	Mar 07, 2016	
	Melbourne	Mar 03, 2016	7 Day
Calcium (exchangeable)*	Melbourne	Mar 07, 2016	0 Day
Magnesium (exchangeable)*	Melbourne	Mar 07, 2016	0 Day
Potassium (exchangeable)*	Melbourne	Mar 07, 2016	0 Day
Sodium (exchangeable)*	Melbourne	Mar 07, 2016	0 Day
% Moisture - Method: LTM-G2N-7000 Moisture	Melbourne	Mar 03, 2016	14 Day

Date Reported: Mar 16, 2016

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Report Number: 491357-5

*LCA and Onsite Wastewater Management Plan and System Design for
Proposed Subdivision Settlement Road Wurruk*



11/05/2016

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Company Name:	Strata Geoscience and Environmental Pty	Order No:	02186	Received:	May 11, 2016 11:00 AM
Address:	177/180 Arthur Street North Sydney NSW 1585	Request #:	000000	Date:	May 11, 2016
Project Name:	SETTLEMENT ROAD WURRUK	Phone:	02 9250 6000	Project:	11/05/2016
				Contact Name:	Don Walker

Sample / Test / Client Manager / Test Method

Sample Detail		Sample ID	Sample Date	Requesting Party	Matrix	Lab ID										
		001-001	27/04/2016	SEA	WASTEWATER	001-001	1	1	1	1	1	1	1	1	1	1
		001-002	27/04/2016	SEA	WASTEWATER	001-002	1	1	1	1	1	1	1	1	1	1
		001-003	27/04/2016	SEA	WASTEWATER	001-003	1	1	1	1	1	1	1	1	1	1
LABORATORY ANALYSIS & COMMENTS																
Wastewater Laboratory - DATA ONLY 2016 & 2017																
Wastewater Laboratory - DATA ONLY 2017																
Wastewater Laboratory - DATA ONLY 2018																
General Laboratory																

2016 November 14, 2016

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2016 May 11, 2016

LCA and Onsite Wastewater Management Plan and System Design for Proposed Subdivision Settlement Road Wurruk



Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependent. Quoted LORs may be relaxed where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on water are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (200300).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

**NOTE: pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre
µg/L: micrograms per litre	ppm: Parts per million
ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres	

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting
SPRKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on deionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPRKE	Splice recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (Timothy) (mg/L) uses NATA accredited in-house method LTM-G2N-7010
TCLP	Toxicity Characteristic Leaching Procedure
DOC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Permit - QC was performed on samples pertaining to this report
NCP	Non-Client Permit - QC performed on samples not pertaining to this report. QC is representative of the sequence or batch that client samples were analysed within
TBO	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Good RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

- Results <10 times the LOR : No Limit
- Results between 10-50 times the LOR : RPD must be between 0-50%
- Results >50 times the LOR : RPD must be between 0-50%
- Surrogate Recoveries : Recoveries must be between 50-150% - Phenols 20-150%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominal LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Permit and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike & LCS data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C10-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analysis.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Date Reported: Mar 16, 2016

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Report Number: 491357-5

*LCA and Onsite Wastewater Management Plan and System Design for
Proposed Subdivision Settlement Road Wurruk*



Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Conductivity (1:5 aqueous extract at 25°C)			uS/cm	< 10			10	Pass	
Calcium (exchangeable)*			meq/100g	< 0.1			0.1	Pass	
Magnesium (exchangeable)*			meq/100g	< 0.1			0.1	Pass	
Potassium (exchangeable)*			meq/100g	< 0.1			0.1	Pass	
Sodium (exchangeable)*			meq/100g	< 0.1			0.1	Pass	
Method Blank									
Ion Exchange Properties									
Cation Exchange Capacity			meq/100g	< 0.05			0.05	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M16-Ma02637	NCP	%	13	13	3.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C)	M16-Ma02791	CP	uS/cm	47	48	4.0	30%	Pass	
pH (1:5 Aqueous extract)	M16-Ma02791	CP	pH Units	5.1	5.1	pass	30%	Pass	

*LCA and Onsite Wastewater Management Plan and System Design for
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Comments

Emerson Class : analysed by SESL Australia NATA accreditation number 15633, Report Number 38249

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analyte received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subconstructed	Yes

Authorised By

Our Michael	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson

National Operations Manager

Final report. This Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Eurofins mgt and its subsidiaries, employees or agents, do not warrant the accuracy, reliability, or completeness of the information or data provided in this report. It is the user's responsibility to ensure the accuracy, reliability, and completeness of the information and data provided in this report. The user shall be responsible for the use of the information and data provided in this report. The user shall be responsible for the use of the information and data provided in this report. The user shall be responsible for the use of the information and data provided in this report.

Appendix 5 Extract from EPAV 2013

Code of Practice Onsite Wastewater Management

Table 4: Minimum daily wastewater flow rates and organic loading rates ¹⁻¹⁰

Source	Design hydraulic flow rates for all water supplies ^{1-4,9} (L/person.day)	Organic material loading design rates (g BOD/person.day) ⁷
Households with extra wastewater producing facilities ¹	220	60
Households with standard water fixtures	180	60
Households with full water-reduction fixtures ²	150	60
Hotels/hotels/guesthouse		
- per bar attendant	1000	120
- bar meals per diner	10	10
- per resident guest and staff with in-house laundry	150	80
- per resident guest and staff with out-sourced laundry	100	80
Restaurants (per potential diner) ³		
- premises <50 seats	40	50
- premises >50 seats	30	40
- tearooms, cafés per seat	10	10
- conference facilities per seat	25	30
- function centre per seat	30	35
- take-away food shop per customer	10	40
Public areas (with toilet, but no showers and no café) ⁴		
- public toilets	6	3
- theatres, art galleries, museum	3	2
- meeting halls with kitchenette	10	5
Premises with showers and toilets		
- golf clubs, gyms, pools etc. (per person)	90	10
Hospitals - per bed	350	150
Shops/shopping centres		
- per employee	15	10
- public access	5	3
School - child care	20	20
- per day pupil and staff	20	20
- resident staff and boarders	150	80
Factories, offices, day training centres, medical centres	20	15
Camping grounds		
- fully serviced	150	60
- recreation areas with showers and toilets	100	40

1. Based on EPA Code of Practice for Small Wastewater Treatment Plants, Publication 500 (1997).

2. When calculating the flow rate for an existing commercial premise, use this table or metered water usage data from the premise's actual or pro-rata indoor use.

3. WELS-rated water-reduction fixtures and fittings - minimum 4 Stars for dual-flush toilets, shower-flow restrictors, aerator taps, flow/pressure control valves and minimum 3 Stars for all appliances (e.g. water-conserving automatic clothes washing machines).

4. These flow rates take into consideration the likelihood of a reliable water supply being currently provided to a premises or in the future (e.g. from groundwater, surface water or reticulated water supply, or a tankered water supply).

5. Where Council is satisfied a household or premises is unlikely to be provided with a reliable water supply (e.g. a rural farming property where groundwater or surface water is unavailable or used only for stock) the design flow rates for Onsite Roof Water Tank Supply listed in the most current version of AS/NZS 1547 may be used.

6. Extra water producing fixtures include, but are not limited to, spa baths.

7. Based on Crites & Tchobanoglous (1998) and EPA Publication 500 (1997).

8. For premises such as public areas, factories or offices that have showers and toilets, use the flow rates for 'Premises with showers and toilets' in the calculations.

9. Number of seats multiplied by the number of sittings i.e., may include multiple sittings for breakfast, morning and afternoon teas, lunch and/or dinner.

10. The organic loading rate must be considered as well as the hydraulic flow rate when selecting the most suitable treatment system.

Code of Practice Onsite Wastewater Management

Table 5: Setback distances for primary and secondary treatment plants and effluent disposal/irrigation areas ^{1, 2, 4, 10, 11}

Landscape feature or structure	Setback distances (m)		
	Primary treated effluent	Secondary sewage and greywater effluent	Advanced secondary greywater effluent ³
Buildings			
Wastewater field up-slope of building	6	3	3
Wastewater field down-slope of building	3	1.5	1.5
Wastewater up-slope of cutting/escarpment ¹¹	15	15	15
Adjacent landings			
Wastewater field up-slope of adjacent lot	6	3	1
Wastewater field down-slope of adjacent lot	3	1.5	0.5
Supply lines			
Water supply pipe	3	1.5	1.5
Wastewater up-slope of potable supply channel	100	150	150
Wastewater field down-slope of potable supply channel	20	10	10
Gas supply pipe	3	1.5	1.5
In-ground water tank ¹⁰	15	4	3
Stormwater drain	6	3	2
Recreational areas			
Children's grassed playground ¹¹	6	3 ¹¹	2 ¹¹
In-ground swimming pool	6	3 ¹¹	2 ¹¹
Surface waters (up-slope m)			
Dam, lake or reservoir (potable water supply) ^{1, 11}	100	150 ¹	150
Waterways (potable water supply) ^{1, 11}	100	100 ^{4, 11}	50
Waterways, wetlands (continuous or ephemeral, non-potable); estuaries, ocean beach at high-tide mark; dams, lakes or reservoirs (stock and domestic, non-potable) ^{1, 11}	60	30	30
Groundwater limits			
Category 1 and 2a soils	NA ¹	50 ¹	20
Category 2b to 6 soils	20	20	20
Watercourse			
Vertical depth from base of trench to the highest seasonal water table ¹¹	1.5	1.5	1.5
Vertical depth from irrigation pipes to the highest seasonal water table ¹¹	NA	1.5	1.5

- Distances must be measured horizontally from the external wall of the treatment system and the boundary of the disposal/irrigation area, except for the 'watertable' category which is measured vertically through the soil profile. For surface waters, the measuring point shall be from the 'bank-full' level.
- Primary water-based sewerage systems must only be installed in unsewered areas; secondary sewerage systems must only be installed and managed in sewer areas by Water Corporations; secondary greywater systems can be installed in sewer and unsewered areas (see Section 3.12.3).
- Advanced secondary treated greywater of 10/10/10 standard.
- The setback distances are conditional on the following requirements (otherwise the setback distances for primary effluent apply):
 - effluent is secondary treated to 20/30 standard as a minimum
 - effluent is applied to land via pressure-compensating sub-surface irrigation installed along the contour and
 - a maintenance and service contract, with a service technician accredited by the manufacturer, is in place to ensure the system is regularly serviced in accordance with the relevant CA and Council Septic Tank Permit conditions.

LCA and Onsite Wastewater Management Plan and System Design for
Proposed Subdivision Settlement Road Wurruk



Appendix 6 Terms and Conditions

Scope of Work

These Terms and Conditions apply to any services provided to you ("the Client") by Strata Geoscience and Environmental Pty Ltd ("Strata"). By continuing to instruct Strata to act after receiving the Terms and Conditions or by using this report and its findings for design and/or permit application processes and not objecting to any of the Terms and Conditions the Client agrees to be bound by these Terms and Conditions, and any other terms and conditions supplied by Strata from time to time at Strata's sole and absolute discretion. The scope of the services provided to the Client by Strata is limited to the services and specified purpose agreed between Strata and the Client and set out in the correspondence to which this document is enclosed or annexed ("the Services"). Strata does not purport to advise beyond the Services.

Third Parties

The Services are supplied to the Client for the sole benefit of the Client and must not be relied upon by any person or entity other than the Client. Strata is not responsible or liable to any third party. All parties other than the Client are advised to seek their own advice before proceeding with any course of action.

Provision of Information

The Client is responsible for the provision of all legal, survey and other particulars concerning the site on which Strata is providing the Services, including particulars of existing structures and services and features for the site and for adjoining sites and structures. The Client is also responsible for the provision of specialised services not provided by Strata. If Strata obtains these particulars or specialised services on the instruction of the Client, Strata does so as agent of the Client and at the Client's expense. Strata is not obliged to confirm the accuracy and completeness of information supplied by the Client or any third party service provider. The Client is responsible for the accuracy and completeness of all particulars or services provided by the Client or obtained on the Client's behalf. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever suffered by the Client or any other person or entity resulting from the failure of the Client or third party to provide accurate and complete information. In the event additional information becomes available to the Client, the Client must inform Strata in writing of that information as soon as possible. Further advice will be provided at the Client's cost. Any report is prepared on the assumption that the instructions and information supplied to Strata has been provided in good faith and is all of the information relevant to the provision of the Services by Strata. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever if Strata has been supplied with insufficient, incorrect, incomplete, false or misleading information.

Integrity

Any report provided by Strata presents the findings of the site assessment. While all reasonable care is taken when conducting site investigations and reporting to the Client, Strata does not warrant that the information contained in any report is free from errors or omissions. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever resulting from errors in a report. Any report should be read in its entirety, inclusive of any summary and annexures. Strata does not accept any responsibility where part of any report is relied upon without reference to the full report.

Project Specific Criteria

Any report provided by Strata will be prepared on the basis of unique project development plans which apply only to the site that is being investigated. Reports provided by Strata do not apply to any project other than that originally specified by the Client to Strata. The Report must not be used or relied upon if any changes to the project are made. The Client should engage Strata to further advise on the effect of any change to the project. Further advice will be provided at the Client's cost. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever where any change to the project is made without obtaining a further written report from Strata. Changes to the project may include, but are not limited to, changes to the investigated site or neighbouring sites, for instance, variation of the location of proposed building envelope/footprints, changes to building design which may impact upon building settlement or slope stability, or changes to earthworks, including removal (site cutting) or deposition of sediments or rock from the site.

Classification to AS2870-2011

It must be emphasised that the site classification to AS2870-2011 and recommendations referred to in this report are based solely on the observed soil profile at the time of the investigation for this report and account has been taken of Clause 2.1.1 of AS2870 - 2011. Other abnormal moisture conditions as defined in AS2870 - 2011 Clause 1.3.3 (a) (b) (c) and (d) may need to be considered in the design of the structure. Without designing for the possibility of all abnormal moisture conditions as defined in Clause 1.3.3, distresses will occur and may result in non "acceptable probabilities of serviceability and safety of the building during its design life", as defined in AS2870 - 2011, Clause 1.3.1. Furthermore the classification is preliminary in nature and needs verification at the founding surface inspection phase. The classification may be changed at this time based upon the nature of the founding surface over the entire footprint of the project area. Any costs associated with a change in the site classification are to be incurred by the client. Furthermore any costs associated with delayed works associated with a founding surface inspection or a change in classification are to be born by the client. Where founding surface inspections are not commissioned the classifications contained within this report are void.

Subsurface Variations with Time

Any report provided by Strata is based upon subsurface conditions encountered at the time of the investigation. Conditions can and do change significantly and unexpectedly over a short period of time. For example groundwater levels may fluctuate over time, affecting latent soil bearing capacity and ex-situ/fill sediments may be placed/removed from the site. Changes to the subsurface conditions that were encountered at the time of the investigation void all recommendations made by Strata in any report. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever resulting from any change to the subsurface conditions that were encountered at the time of the investigation. In the event of a delay in the commencement of a project or if additional information becomes available to the Client about a change in conditions becomes available to the Client, the Client should engage Strata to make a further investigation to ensure that the conditions initially encountered still exist. Further advice will be provided at the Client's cost. Without limiting the generality of the above statement,

LCA and Onsite Wastewater Management Plan and System Design for Proposed Subdivision Settlement Road Wurruk

Strata does not accept liability where any report is relied upon after three months from the date of the report, (unless otherwise provided in the report or required by the Australian Standard which the report purports to comply with), or the date when the Client becomes aware of any change in condition. Any report should be reviewed regularly to ensure that it continues to be accurate and further advice requested from Strata where applicable.

Interpretation

Site investigation identifies subsurface conditions only at the discrete points of geotechnical drilling, and at the time of drilling. All data received from the geotechnical drilling is interpreted to report to the Client about overall site conditions as well as their anticipated impact upon the specific project. Actual site conditions may vary from those inferred to exist as it is virtually impossible to provide a definitive subsurface profile which accounts for all the possible variability inherent in earth materials. This is particularly pertinent to some weathered sedimentary geologies or colluvial/alluvial clast deposits which may show significant variability in depth to refusal over a development area. Rock incongruities such as joints, dips or faults may also result in subsurface variability. Soil depths and composition can vary due to natural and anthropogenic processes. Variability may lead to differences between the design depth of bored/driven piers compared with the actual depth of individual piers constructed onsite. It may also affect the founding depth of conventional strip, pier and beam or slab footings, which may result in increased costs associated with excavation (particularly of rock) or materials costs of foundations. Founding surface inspections should be commissioned by the Client prior to foundation construction to verify the results of initial site characterisation and failure to ensure this will void the classifications and recommendations contained within this report. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever resulting from any variation from the site conditions inferred to exist.

Strata is not responsible for the interpretation of site data or report findings by other parties, including parties involved in the design and construction process. The Client must seek advice from Strata about the interpretation of the site data or report.

Report Recommendations

Any report recommendations provided by Strata are only preliminary. A report is based upon the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until earthworks and/or foundation construction is almost complete. Where variations in conditions are encountered, Strata should be engaged to provide further advice. Further advice will be provided at the Client's cost. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever if the results of selective point sampling are not indicative of actual conditions throughout an area or if the Client becomes aware of variations in conditions and does not engage Strata for further advice.

Geo-environmental Considerations

Where onsite wastewater site investigation and land application system designs are provided by Strata, reasonable effort will be made to minimise environmental and public health risks associated with the disposal of effluent within site boundaries with respect to relevant Australian guidelines and industry best practice at the time of investigation. Strata is not liable, and accepts no responsibility, for any claim, demand, charge, loss, damage, injury or expense whatsoever resulting from:

- (i) changes to either the project or site conditions that affect the onsite wastewater land application system's ability to safely dispose of modelled wastewater flows; or
- (ii) seepage, pollution or contamination or the cost of removing, nullifying or clearing up seepage, polluting or contaminating substances; or
- (iii) poor system performance where septic tanks have not been de-sludged at maximum intervals of 3 years or A/WT systems have not been serviced in compliance with the manufacturers recommendations; or
- (iv) failure of the client to commission both interim and final inspections by the designer throughout the system construction; or
- (v) the selection of inappropriate plants for irrigation areas; or
- (vi) damage to any infrastructure including but not limited to foundations, walls, driveways and pavements; or
- (vii) land instability, soil erosion or dispersion; or
- (viii) design changes requested by the Permit Authority.

Furthermore Strata does not guarantee septic trench and bed design life beyond 5 years from installation, given the influence various household chemicals have on soil structural decline and premature trench failure in some soil types. Sand filters are not warranted for more than 2 years given the large impact pre-filtration and septic tank loading and de-sludging has on sand filter performance.

Strata does not consider site contamination, unless the Client specifically instructs Strata to consider the site contamination in writing. If a request is made by the Client to consider site contamination, Strata will provide additional terms and conditions that will apply to the engagement.

Copyright and Use of Documents

Copyright in all drawings, reports, specifications, calculations and other documents provided by Strata or its employees in connection with the Services remain vested in Strata. The Client has a licence to use the documents for the purpose of completing the project. However, the Client must not otherwise use the documents, make copies of the documents or amend the documents unless express approval in writing is given in advance by Strata. The Client must not publish or allow to be published, in whole or in part, any document provided by Strata or the name or professional affiliations of Strata, without first obtaining the written consent of Strata as to the form and content in which it is to appear.

If, during the course of providing the Services, Strata develops, discovers or first reduces to practice a concept, product or process which is capable of being patented then such concept, product or process is and remains the property of Strata and:

- (i) the Client must not use, infringe or otherwise appropriate the same other than for the purpose of the project without first obtaining the written consent of Strata; and
- (ii) the Client is entitled to a royalty free licence to use the same during the life of the works comprising the project.

Digital Copies of Report

If any report is provided to the Client in an electronic copy except directly from Strata, the Client should verify the report contents with Strata to ensure they have not been altered or varied from the report provided by Strata.



CMA Application No: WG-F-2014-0420
Date: 18 February 2016

Chris Curnow,
Beveridge Williams and Co Pty Ltd
PO Box 47
Sale, Victoria 3850

curnow@bevwill.com.au

Dear Chris,

Application Number (CMA Ref): WG-F-2014-0420

Property: Street: Various properties in Wurruk, Victoria 3850

Thank you for your enquiry, received at the West Gippsland Catchment Management Authority (the Authority) on 27 January 2016 seeking updated advice for the proposed rezoning and future subdivision of the land.

The 1% Annual Exceedance Probability (AEP³) flood level (commonly known as the 1 in 100 year flood) under current climatic conditions ranges from 3.8 metres AHD⁴ south of Settlement Road to 4.2 metres AHD north of Settlement Road.

The applicable 1% AEP flood level for this development ranges from 3.8 metres AHD to 4.2 metres AHD.

The following advice is based on the final results of the Latrobe River Flood Study 2015, and supersedes the advice previously provided in relation to this matter, dated 9 September 2014.

Please note: This document contains flood level advice only and does not constitute approval or otherwise of any development at this location.

Please refer to the attached explanatory report for further detail.

Should you have any queries, please do not hesitate to contact Penny Phillipson on 1300 094 262. To assist the Authority in handling any enquiries please quote WG-F-2014-0420 in your correspondence with us.

Yours sincerely,

Adam Dunn
Statutory Planning Manager

Cc: Wellington Shire Council

The information contained in this correspondence is subject to the disclaimers and definitions attached.

ABN 88 062 514 481

Correspondence PO Box 1374, Traralgon VIC 3844

Telephone 1300 094 262 | Facsimile (03) 5175 7899 | Email westgipps@wgcma.vic.gov.au | Website www.wgcma.vic.gov.au

Traralgon Office 16 Hotham Street, Traralgon VIC 3844 | Leongatha Office Corner Young & Bair Streets, Leongatha VIC 3953

EXPLANATORY REPORT

Figure 1 – 1% AEP flood extent



Decision Guidelines

The West Gippsland Catchment Management Authority assesses all applications against the following National, State and Local Policies, Guidelines and Practice Notes:

1. 'Technical Flood Risk Management Guideline: Flood Hazard' (Australian Emergency Management Institute, 2014).
2. 'Victoria Flood Management Strategy' (DNRE, 1998).
3. Council Planning Schemes, including the:
 - i. State Planning Policy Framework
 - ii. Local Planning Policy Framework
 - iii. Relevant Zones and Overlays.
4. 'Guidelines for Coastal Catchment Management Authorities: Assessing development in relation to sea level rise' (DSE, 2012).
5. 'Applying for a Planning Permit under the Flood Provisions – A Guide for Councils, Referral Authorities and Applicants' (DTPLI, 2000).
6. 'Flood Guidelines - Guidelines for development in flood prone areas' (West Gippsland Catchment Management Authority, 2013).

1% AEP³ Flood Level Determination

Floods are classified by the frequency at which they are likely to occur. In Victoria, all proposals for development on floodplains are assessed against a flood that, on average, will occur once every 100 years. A flood of this size has a 1% chance of occurring in any given year, and is known as either the 100 year Average Recurrence Interval (ARI⁵) flood or the 1% Annual Exceedance Probability (AEP) flood.