7.0 MATTERS REQUIRING A DETERMINATION OF COUNCIL

7.1 PUBLIC PARTICIPATION

Cr Paxton declared an impartiality interest in the following item as he is a land developer of similar style developments

Mr David Campbell addressed the Committee in relation to the following application that has been put forward for Council consideration as they have a family farm of 15,000ha at Scaddan and Munglinup. He described themselves as farmers and land managers – they develop farms. In the past they have managed significant problems including salt problems, wind eroded areas, non wetting sands, water logging and have planted over 500,000 trees. They also won the Western Australian Tree Farmer of the year in 1999 and described themselves as very pro-active in their approach to land management.

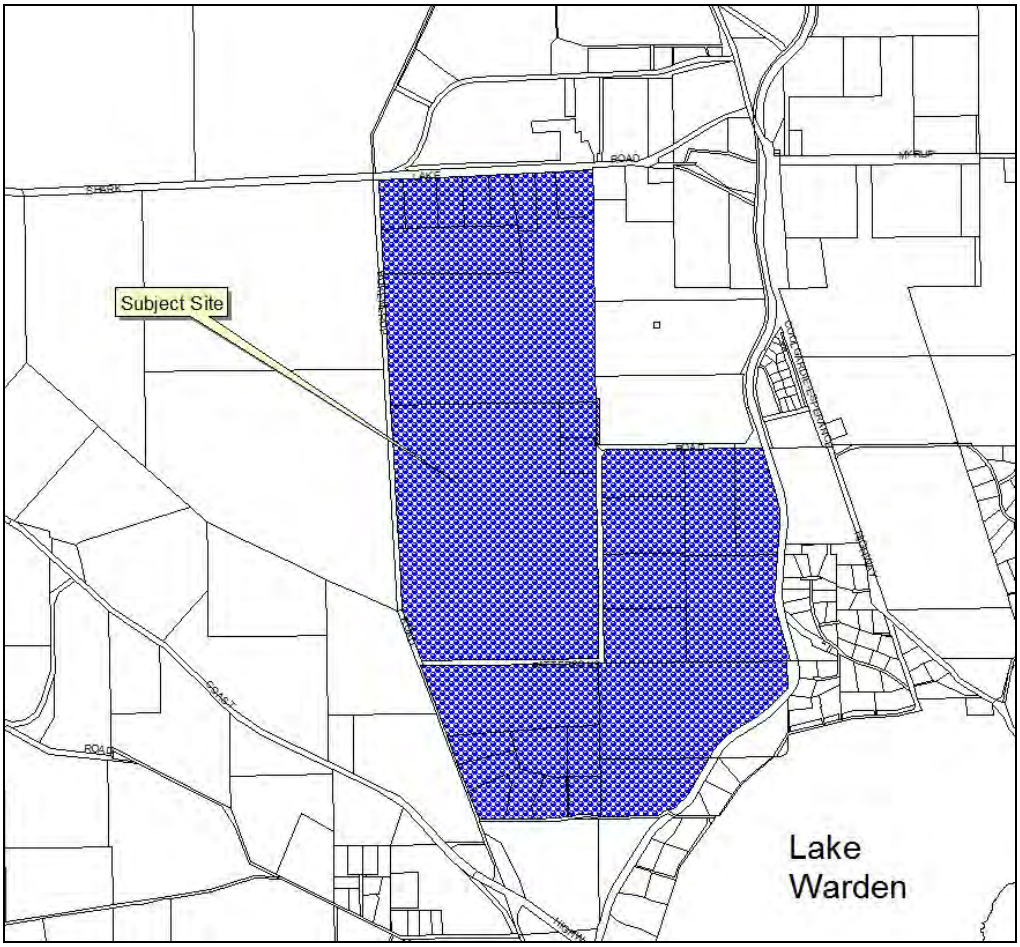
He referred to their ODP for subdividing lot 1492 into smaller lots stating that they agree with the ODP except for the rehab management plan, as they believe that their past experience over 35 years, mixed with the latest technology in soil and nutrient management will give them the ability to make a significant difference.

Mr Campbell then went on to outline the Rehab Management Plan in detail to Committee members. He also submitted a sample of the humified compost for Committee to view. He stated that they are in the process of being licensed with the DEC and the Shire and believes that the product has the ability to do some amazing things to the soil.

7.1.1 PROPOSED OUTLINE DEVELOPMENT PLAN - BUKENERUP RURAL SMALLHOLDINGS PRECINCT NO. 30 AND PROPOSED DETAILED OUTLINE DEVELOPMENT PLAN - LOT 1492 BUKENERUP ROAD, MONJINGUP

Applicant: Karingal Pastoral Co. Superannuation Fund C/- Whelans (WA) Pty Ltd

Location/Address: Bukenerup Rural Smallholdings Precinct No. 30 and Lot 1492 Bukenerup Road, Monjingup



File Ref: ODP/011

Reporting Officer/Position: Annette Harbron - Manager Planning Services

Objective: This report recommends that Council determines that the proposed Outline Development Plan (ODP) for Bukenerup Rural Smallholdings Precinct No. 30 and the proposed Detailed Outline Development Plan (DODP) for Lot 1492 Bukenerup Road, Monjingup are satisfactory to be advertised as per the provisions of Clause 6.13.5 of Local Planning Scheme No. 23 (LPS 23).

Background: Planning Services received a subdivision application referral from the Western Australian Planning Commission (WAPC) for a proposed subdivision of 1 lot into 8 rural smallholding lots (minimum lot size of 8 hectares) and a balance lot of approximately 243 hectares (WAPC Ref: 140533). From discussions Planning Services had with the Department of Planning (DoP) it was evident that the DoP were going to assess the application in accordance with the provisions of Local Planning Scheme No. 23 (LPS 23) as it was a "highly entertained" document rather than the operative Town Planning Scheme No. 22.

Having regard to this advice from the DoP, Planning Services provided a response to the WAPC that the draft Local Planning Strategy referenced that subdivision would not be supported within the relevant Precinct until such time as an ODP for the entire precinct had been prepared, and that to date there had not been an ODP prepared thus it was considered premature to consider the subdivision application until such time as an ODP has been prepared and endorsed by Council and the WAPC.

The applicants were informed of the Shire's response on the proposal and discussions that had occurred with the DoP, and subsequently commenced the process to prepare an ODP and DODP accordingly for consideration by Council and the WAPC.

On 8 December 2009, the WAPC agreed to defer consideration of the subdivision application until 26 February 2010 to provide time for approval of an ODP for the locality. Subsequent deferrals have been issued by the WAPC, with the latest deferral being until 28 February 2011 acknowledging that the applicants were progressing with an ODP for the locality with the Shire of Esperance.

Officer's Comment: The proposed ODP for the Bukenerup Rural Smallholdings Precinct No. 30 and the proposed DODP for Lot 1429 Bukenerup Road, Monjingup were recently lodged with Planning Services for consideration as per Clause 6.13.5 of LPS 23.

Proposed ODP for Bukenerup Rural Smallholdings Precinct No. 30

The main purpose and objective of the proposed ODP for the Bukenerup Rural Smallholdings Precinct No. 30 is to provide a framework for the progressive and planned rural smallholding development of the ODP area consistent with the provisions of the Local Planning Strategy (the Strategy) and LPS 23.

Attached at Attachment A is the proposed ODP. A full copy of the accompanying technical documentation is available for Councillors upon request.

In summary, the principles and components of the proposed ODP are as follows:

- A schematic proposal for rural smallholding development allowing for single dwellings on large lots (minimum lot sizes of 8 hectares), small-scale agricultural pursuits, rural home businesses, cottage industry and tourist related uses;
- The lot yield proposed is subject to detailed subdivision design, environmental and geotechnical investigations;
- The proposed ODP provides the opportunity for the majority of landowners to develop independently as the majority of new subdivision roads are internal to creating new lots, particularly on the larger land parcels of Lot 75 and Lot 1492. With the exception of Lots 1, 381 and 382, all other landowners have the ability to subdivide and develop independently utilising existing road reserves.

The Shire's Development Co-ordination Unit has assessed the proposed ODP and consider that at this stage it is satisfactory to facilitate advertising to occur in accordance with the provisions of Clause 6.13.5 of LPS 23.

Proposed DODP for Lot 1492 Bukenerup Road, Monjingup

Attached at Attachment B is the proposed DODP. A full copy of the accompanying technical documentation is available for Councillors upon request.

In summary, the principles and components of the proposed DODP are as follows:

- 34 x rural smallholding lots with a minimum lot size of 8.0 hectares.
- New internal roads and upgrading of existing roads having regard to the proposed rural smallholding nature of development (i.e. sealed bitumen roads).

- Stormwater management primary objective to minimise the effect to natural waterways and downstream catchments in line with the Shire of Esperance and Australian Rainfall and Runoff Standards.
- Wastewater managed accommodated by on-site effluent disposal units. In areas where there is shallow soil on rocky outcrops, this may require excavation, use of alternative treatment units and 'amended earth' techniques to improve phosphorus retention and nutrient management of on-site effluent disposal.
- Conservation of existing native vegetation re-growth via fencing to prevent disturbance by livestock.
- Remediation of the land affected by intermittent waterlogging – refer comments below in relation to this aspect of the DODP.
- Water supply be via a 120,000 litre rainwater tank, including storage capacity for fire fighting purposes.
- Fire management as per the *Planning for Bush Fire Protection Guidelines Edition 2* (WAPC/FESA, 2010).
- Staging of the subdivision, with the first stage comprising eight (8) lots along Paterson Road with the balance lot to continue to be used for livestock grazing. Future staging would be dependent on market demand.

Specifically in relation to the remediation of the land affected by intermittent water logging, the applicant/landowner's approach differs to the approach that Officer's would prefer. In summary the landowner has proposed that rehabilitation and remediation of the waterlogged areas is best achieved by introducing some clay and compost to restore pasture structure and allow livestock to access such areas given they are an integral part of good land management, the rural landscape and rural lifestyle/amenity. This method of rehabilitation has the support of the Soil Science and Plant Nutrition, University of WA, with whom the landowner has been developing rehabilitation techniques.

The landowner's remediation approach is not supported by Officers primarily because the main form of proposed rehabilitation is the re-establishment of pasture and the eventual reintroduction of livestock. Given the water logging is a direct result of extensive clearing of native vegetation for pasture and livestock, it is highly likely that the readmittance of livestock after re-establishing perennial pastures to these areas will perpetuate the problem and result in the recurrence of water logging issues. This approach does not only impact the landholder but has implications further down the Lake Warden Catchment. As such the following land management outcome is recommended:

- Areas subject to waterlogging must have livestock excluded permanently by fencing;
- Areas subject to waterlogging to be rehabilitated and native vegetation re-established. This is particularly important along drainage lines and should not be an 'option' to landholders but a 'requirement';
- If possible, rehabilitated areas should be covenanted (or protected on title in some other way). This will ensure that the vegetation established to comply with any conditions cannot be cleared in the future.

The applicant has advised that the Officer's preferred remediation approach is not supported by the landowner for the following reasons:

- Fencing areas prone to intermittent waterlogging will restrict access to dams which can be/are used by livestock;
- Fencing areas for rehabilitation can produce on-going management problems (i.e. weeds and fire risk);
- Fencing pastoral areas means the land cannot be used for productive agriculture and/or rural pursuits;

- Pastoral rehabilitation can produce a faster and more permanent result once pasture and soil structure are established; and
- Difficulty for native vegetation to grow in waterlogged areas.

As a result of the two differing opinions on the best remediation approach, Planning Services and the applicant have agreed that at this stage it would be appropriate to advertise the document with both approaches incorporated such that comment from the Department of Environment and Conservation, Department of Water and other agencies accordingly can specifically be sought on this issue. A final decision on the actual remediation approach can then be made when considering the proposed DODP for final approval, rather than making a decision on the remediation approach at this point in time. The DODP documentation has been modified accordingly to include both approaches such that due consideration can be given by the relevant agencies.

The Shire's Development Co-ordination Unit has assessed the proposed DODP and consider that at this stage it is satisfactory to facilitate advertising to occur in accordance with the provisions of Clause 6.13.5 of LPS 23.

Options:

Option 1: Determine that the proposed ODP and proposed DOPD for advertising as submitted are satisfactory to facilitate advertising to occur in accordance with the provisions of LPS 23.

This is the option that is provided for in the Officer's recommendation.

Option 2: Determine that the proposed ODP and proposed DOPD for advertising require modifications be undertaken prior to both documents being satisfactory to facilitate advertising to occur in accordance with the provisions of LPS 23.

Option 3: Determine that the proposed ODP and proposed DOPD are not satisfactory for advertising. If this option is the preferred position of Council, reasons would needs to be provided to the applicant.

Consultation:

External Consultation

In accordance with Clause 6.13.5.5 of LPS 23, the proposed ODP and proposed DODP are required to be advertised for a minimum period of 21 days. For a proposal of this nature the following advertising activities would take place:

- Advertising notices provided to all landowners affected by the proposed ODP and DODP inviting comment;
- Advertising notices provided to nearby landowners inviting comment;
- Referral letters to the relevant government/servicing authorities inviting comment;
- Advertising notices being placed in the Esperance Express inviting comment;
- Proposed ODP & proposed DOPD being available for viewing at the Shire Administration Offices and the Public Library; and
- Proposed ODP & proposed DOPD being available via the Shire of Esperance's website.

Internal Consultation

Development Co-ordination Unit

Strategic Implications: Strategic Action Plan 2007-2027

Sustainable Land Use – Aim for equitable and sustainable development of land in the Shire of Esperance.

Statutory Implications: Local Planning Scheme No. 23

Where an ODP exists, the subdivision and development of land is to generally be in accordance with such ODP.

Policy Implications: Local Planning Strategy

Environmental Considerations: The proposed ODP and proposed DODP have had regard to environmental and sustainability issues.

Asset Management Implications There are no known asset management implications arising from the recommendations of this report.

Financial Implications: There are no known financial implications arising from the recommendations of this report.

Attachment/s: Attachment A: Proposed Outline Development Plan for Bukenerup Rural Smallholdings Precinct No. 30
Attachment B: Proposed Detailed Outline Development Plan for Lot 1492 Bukenerup Road, Monjingup

Officer's /Committee Recommendation:
Moved: Cr Mickel
Seconded: Cr Stewart

AP1010-193

That Council:

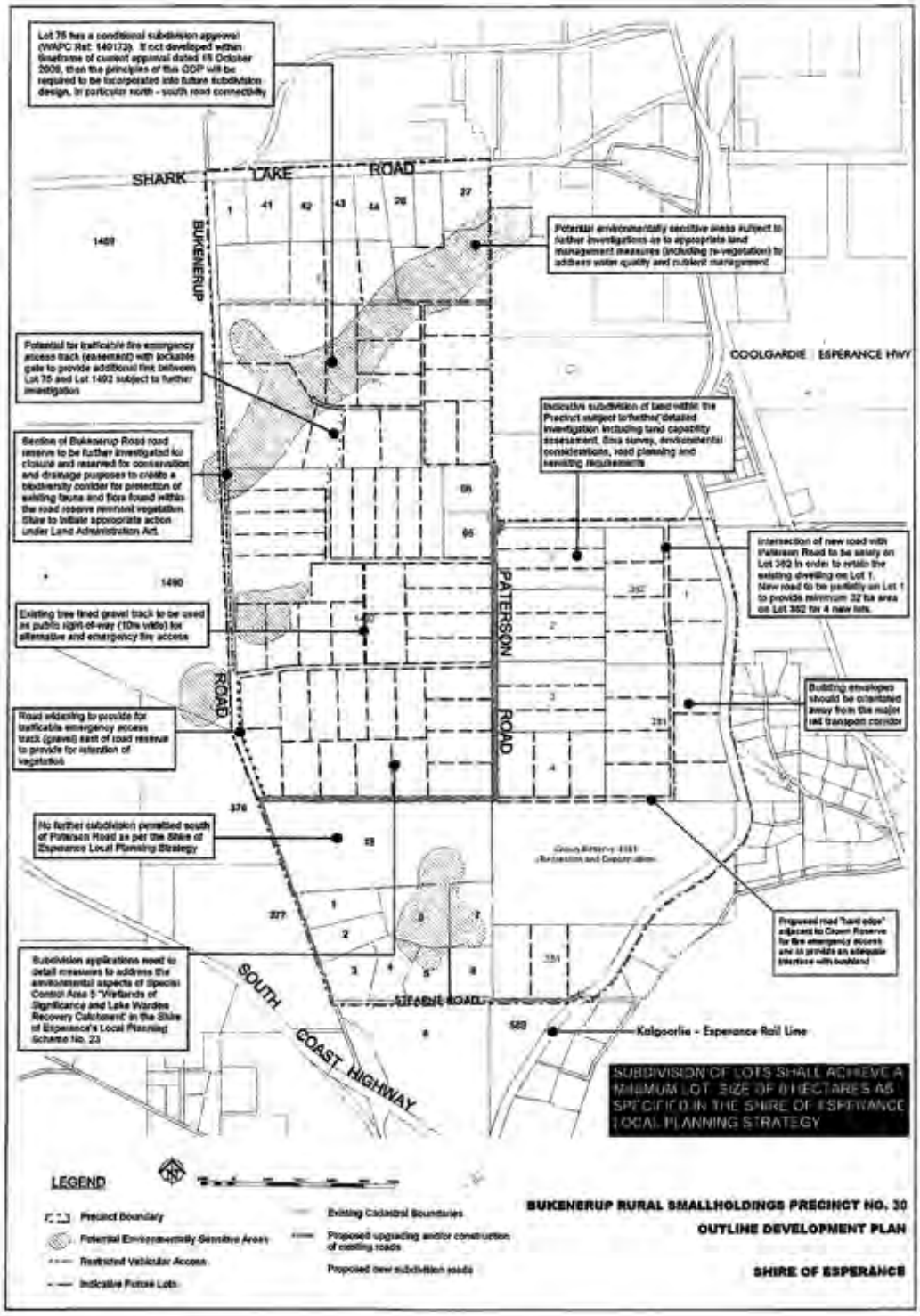
1. **Determines that the proposed Outline Development Plan for Bukenerup Rural Smallholdings Precinct No. 30 is satisfactory to be advertised as per the provisions of Clause 6.13.5 of Local Planning Scheme No. 23; and**
2. **Determine that the proposed Detailed Outline Development Plan for Lot 1492 Bukenerup Road, Monjingup is satisfactory to be advertised as per the provisions of Clause 6.13.5 of Local Planning Scheme No. 23.**

CARRIED
F11 - A0

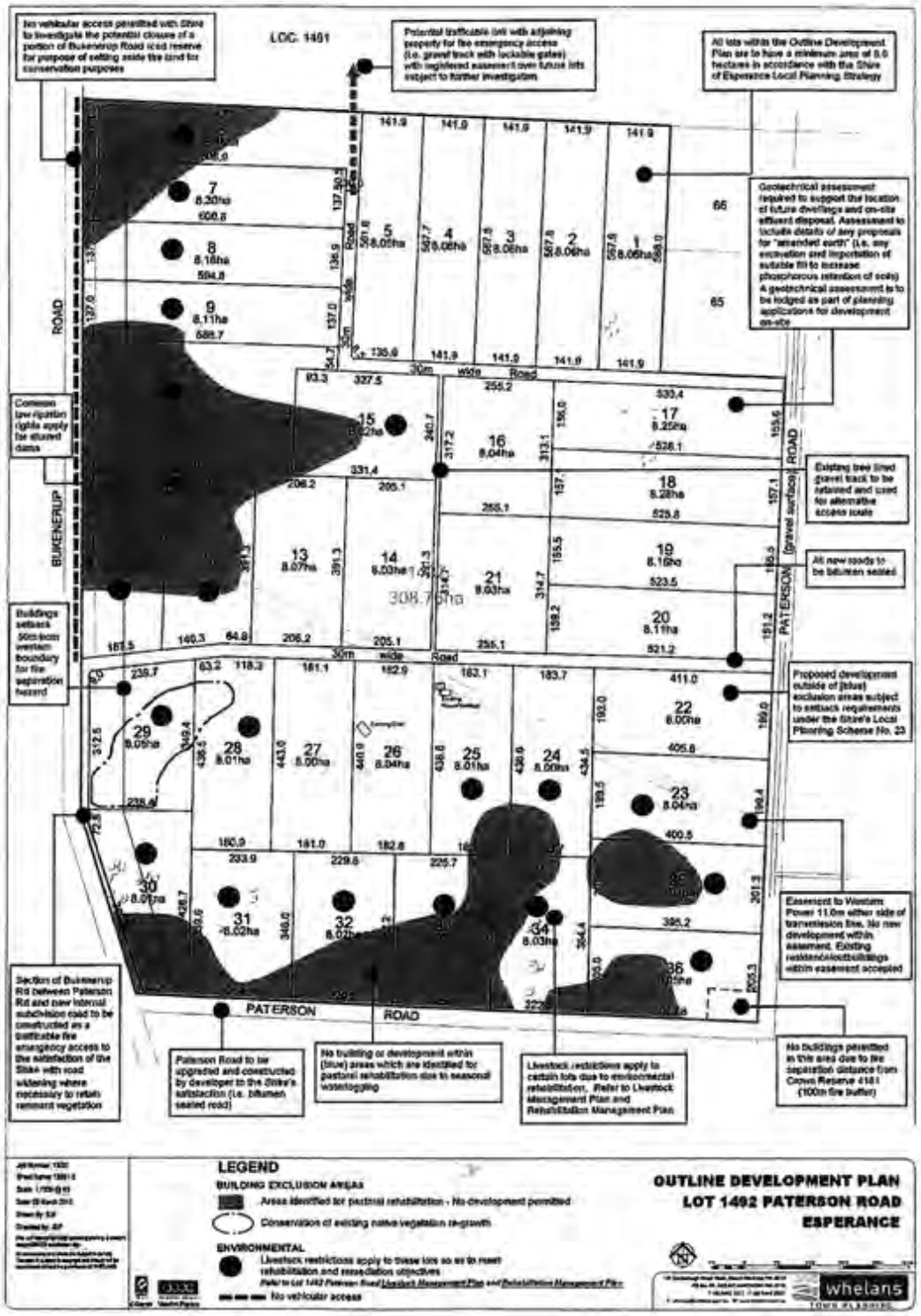
Voting Requirements: Simple Majority.

Council Resolution:

ATTACHMENT A



ATTACHMENT B



BUKENERUP ROAD RURAL SMALLHOLDINGS PRECINCT NO. 30

OUTLINE DEVELOPMENT PLAN

SHIRE OF ESPERANCE

MAY 2010

CONTENTS

1.0 INTRODUCTION

1.1 BACKGROUND

The Bukenerup Small Ruralholdings Precinct No. 30 comprises of small ruralholdings to the north of Lake Warden bounded by Shark Lake Road to the north, Bukenerup Road to the west, Stearne Road to the south and the Kalgoorlie – Esperance Rail line to the east. An endorsed Outline Development Plan for the Precinct is a requirement of the Shire of Esperance Local Planning Strategy and Shire of Esperance Local Planning Scheme No. 23 as a precursor to its subdivision and development for small ruralholdings.

1.2 WHAT IS AN OUTLINE DEVELOPMENT PLAN?

An Outline Development Plan (ODP) is a schematic plan of an area that requires coordinated planning. The ODP shows basic design elements such as the proposed road network, proposed areas for development, areas for conservation and public spaces. It also contains a background report and development expectations. The ODP also sets out general development standards and identifys any issues pertinent to the area that require further consideration prior to subdivision and development.

1.3 PURPOSE OF THE OUTLINE DEVELOPMENT PLAN

The main purpose and objective of the Bukenerup Small Ruralholdings Precinct No. 30 ODP is to provide a framework for the progressive and planned rural smallholding development of the ODP area consistent with the provisions of the Shire of Esperance Local Planning Strategy and Shire of Esperance Local Planning Scheme No. 23.

1.4 OBJECTIVES AND VISION FOR THE ODP AREA

As stated in the Shire of Esperance Local Planning Strategy, the objectives of the Bukenerup Rural Smallholdings Precinct No. 30 is to allow for single dwellings on large lots, small-scale agricultural pursuits, rural home businesses, cottage industry and tourist related uses.

2.0 SUBJECT AREA

2.1 LOCATION AND OWNERSHIP

The Bukenerup Rural Smallholdings Precinct No. 30 is situated approximately 8.5 kilometres north-west of the Esperance town centre. The ODP area comprises of the following land parcels:

- Lot 1, 41 – 44, 27 & 28 Shark Lake Road;
- Lot 63 Bukenerup Road;
- Lot 75 Bukenerup Road;
- Lots 1 – 4, 65 & 66, 1492 & 13 Paterson Road;
- Lot 1, Lot 381& 382 Paterson Road;
- Lots 1 – 3 Bukenerup Road;
- Lots 4 – 8, 351 Stearne Road; and
- Crown Reserve 4181 Paterson Road

The land is in multiple ownership, predominantly private freehold land, however, the multiple fragmented land ownership is not a significant impediment to the planning of the ODP. Most of the landholdings are large lots and can be developed independently, whilst achieving an integrated overall development.

2.2 LAND USE

The land has been predominantly cleared for grazing and is presently used mainly for rural retreats and hobby farms. Crown Reserve 4181 has a Management Order to Shire of Esperance for the purpose of 'Common'. Given the substantial remnant vegetation on the Reserve, it is likely to be retained in its present state for conservation and recreation.

A number of small subdivisions have taken place over the years within the ODP area to create lots for small ruralholdings, particularly along Shark Lake Road and Stearne Road in the north and south-west portions of the Precinct respectively. It should be noted that Lot 75 Shark Lake Road has a conditional subdivision approval (Western Australian Planning Commission subdivision reference 140173).

3.0 OPPORTUNITIES AND CONSTRAINTS

3.1 LANDFORM AND TOPOGRAPHY

The ODP area forms part of the inland Esperance Sandplain. The most significant environmental and landscape features in the area include the ridge on Lot 1492 and ridge and remnant vegetation on Crown Reserve 4181.

The two ridges are of relatively similar heights (74 AHD and 72 AHD), which form the high ground in the ODP area. Both ridges run south-west to north-east and are contained within the southern half of Lot 1492 and through the middle of Crown Reserve 4181. The ridge on Lot 1492 provides opportunities for lots with views.

3.2 HYDROLOGY

Surface water runoff mainly infiltrate the ground, however, excessive runoff drain into property dams and soaks within the ODP area. Natural drainage lines feed into the catchment for permanent surface water outside of the ODP such as Bukenerup Lake to the west and tributaries of Lake Warden to the south. Surface drainage generally follows the local topography. Measures to protect the Lake Warden Catchment Recovery Area will need to be investigated at the detailed subdivision design stage.

Land within the ODP can be susceptible to waterlogging in lower lying areas as a result of past clearing. The degree of flow and quantity of surface water drainage fluctuates seasonally, with inundation and waterlogging of low lying areas occurring in the wetter months of the year. Consideration should be given to drainage and stormwater management as part of any application for subdivision and development. Applications should be accompanied by a Land Capability & Geotechnical Assessment and Stormwater Management Plan.

3.3 VEGETATION

Esperance is part of the South – West Botanical Province and the Esperance Sandplain comprises mainly dense low-lying scrub and thickets of bush and trees. The majority of the ODP area has been cleared and developed for agricultural and rural pursuits, with there being limited remnant vegetation, except for the significant stands of native vegetation on Crown Reserve 4181. The northern portion of the precinct is adjacent to a large vegetated area, which is also Crown reserve land.

There are opportunities at the subdivision stage for landowners to design development and subdivision to retain as much remnant vegetation as

possible, particularly as part of and to encourage good land management. There are also opportunities for additional vegetation planting and rehabilitation of degraded areas (if any as identified by environmental studies) as conditions of development and subdivision. These could include re-vegetation around any surface drainage lines that have been identified as degraded and in need of rehabilitation.

3.4 LAND USE AND SURROUNDING CONTEXT

The ODP area has undergone limited change over the years, with some subdivision of land occurring on the larger properties for rural smallholdings. The Bukenerup Rural Smallholdings Precinct No. 30 adjoins Lake Warden Rural Residential Precinct No. 26 to the south-west. This precinct provides for existing rural retreat development, however, no further subdivision is permitted in this precinct due to the proximity of Lake Warden. Six Mile Hills Precinct No. 35 to the west is largely undeveloped and is an area considered for future long term urban expansion.

To the north, Shark Lake Precinct No. 33 provides for the Shark Lake Industrial Park, which includes light and general industry development. To the east are South Coast Highway/Telegraph Road Precinct No. 31 and Monjingup Precinct No. 49 comprising of larger agricultural lots, which are not proposed for more intensive rural subdivision.

The Shire of Esperance Local Planning Strategy provides for the ODP area to be developed for small ruralholdings with a minimum lot size of 8 hectares. Small Ruralholdings in the ODP area is a land use that is compatible with the surrounding land use context and can be sustainably developed to be consistent with environmental objectives.

3.5 SOILS

The predominant soil type within the area is quartz sand that forms part of the Esperance Coastal Dune Sand Group. This soil type has limited agricultural value due to its low organic and nutrient content. The low agricultural value of the soils is reflected in current land use patterns. The depth of the sand is variable, some of which is prone to waterlogging in lower lying areas where excessive clearing has occurred.

Some underlying rock outcropping and shallow limestone can be found within the ODP area. In general the predominant soil type found in the area is satisfactory to support rural – residential development, however, applications for development and subdivision should be supported by Land Capability Assessment and demonstration of site specific planning.

3.6 CONSERVATION AND HERITAGE VALUE

Conservation Value

Individual Land Capability Assessment is required by the various landowners to determine whether there are any Threatened Ecological Communities. The most significant remnant vegetation in the ODP is currently protected within Crown Reserve 4181, which is reserved under the Shire of Esperance Local Planning Scheme No. 23 for "Parks, Recreation and Conservation - Local".

European Heritage

There are no buildings of heritage or conservation value within the ODP.

Indigenous Heritage

A desktop assessment utilising the website database of the Department of Indigenous Affairs indicates that there is an indigenous site located within the ODP, being Register Site No. W01548. A general description of the site refers to it as being an "old camp" site, approximately 5 kilometres "back from the ring road" with no known hazards. There is no archaeological evidence or information to date to verify the exact location of the "camp" site.

A meeting was held with the Department of Indigenous Affairs to ascertain information about the registered site and implications for the ODP. Site No. W01548 was recorded on 10 February 1999 and has been included on the Department's Interim Register. Information gathered in 1982 – 1986 (mostly anecdotal) indicates that the "camp" site could be somewhere within the general area of the identified Site No. W01548. Its exact location, even to the Department, to date remains unknown.

Site No. W01548 is not considered a priority in relation to the Department's Site Verification Project. At this stage, the site presents no significant constraints to the ODP, however, further advice and investigations may be required by the Department as part of any subdivision/development approval within the ODP.

3.7 ROADS

The Bukenerup Rural Smallholdings Precinct No. 30 is in close proximity to Coolgardie – Esperance Highway to the east and South Coast Highway to the south. The precinct is also bounded by Shark Lake Road to the north. The ODP area therefore enjoys good accessibility to Esperance town centre and to local and regional roads. The existing road reserves within the ODP area can be utilised for subdivision and development of small rural holdlings. Existing roads should be upgraded (bitumen seal for rural residential roads) where necessary as part of subdivision and development. Construction of new roads (within existing road reserves or proposed road reserves) is to be to the satisfaction of the Shire of Esperance.

3.8 SERVICES

The ODP area is currently serviced by power and telecommunications. Reticulated water and sewerage is not available to the precinct and preliminary advice from the Water Corporation indicates that these services are unlikely to be made available to the ODP area in the foreseeable future as it is considered low priority.

Additional telecommunication cabling will need to be provided to service the proposed new lots in the precinct. Proposed lots would be supplied with underground high and low voltage power, including provision of transformers and switchgear relative to each subdivision proposal by various landowners. Servicing requirements for development and subdivision should be investigated by each landowner as part of proposals for subdivision and development.

In general, the ODP area can support rural smallholding development and subdivision without reticulated sewerage and scheme water. Opportunities for on-site wastewater effluent disposal should be investigated by each landowner as part of any proposal for development and subdivision. The Esperance annual rainfall provides sufficient opportunity for rainwater harvesting for domestic water supply. Applications for development should refer to the calculation for minimum roof catchment for rainwater harvesting in the Shire of Esperance Local Planning Scheme No. 23 Clause 5.18 'Potable Water Supply'.

3.9 CLIMATE AND RAINFALL

Esperance has a Mediterranean type climate with cool wet winters. The warm to hot summers are nearly dry except for occasional thunderstorms. Strong winds are a notable feature in Esperance. The town of Esperance receives on average 620mm of rainfall annually over approximately 140 rain days (Bureau of Meteorology). The average annual rainfall in the area creates opportunity for rainwater harvesting as a potential water supply for domestic use.

4.0 PLANNING CONTEXT

4.1 SHIRE OF ESPERANCE LOCAL PLANNING SCHEME NO. 23

The land within the Bukenerup Rural Smallholdings Precinct No. 30 is zoned 'Agriculture – General', 'Rural Smallholdings' and 'Parks, Recreation and Conservation – Local' under the Shire of Esperance Local Planning Scheme No. 23 (LPS 23). Lots 1 – 8 and 13 south of Paterson Road are zoned 'Agriculture – General'.

In general, the objectives of the Rural Smallholdings zone are to:

- provide for large lots primarily for rural development whilst ensuring development does not have a detrimental impact on broad acre agriculture, and environmental values including landscape, vegetation, wetlands and drinking water supply;

- support a range of rural pursuits, which are compatible with land capability and retain the rural character and amenity of the locality;

- encourage the establishment of home businesses, cottage industries and tourist uses while retaining the rural character and amenity of the locality.

The lot sizes in a Rural Smallholding zone is to be determined by the Local Planning Strategy (see below).

Three Special Control Areas affect Precinct No. 30 these being:

- SCA 3B – Shark Lake Industrial Park Special Control Area 3B
- SCA 5 – Wetlands of Significance and Lake Warden Recovery Catchment Special Control Area 5
- SCA 8 – Esperance Airport Special Control Area 8

These Special Control Areas are referenced later in this report.

4.2 SHIRE OF ESPERANCE LOCAL PLANNING STRATEGY

The Bukenerup Rural Smallholdings Precinct No. 30 is identified in the Shire of Esperance Local Planning Strategy (LPS) for rural smallholding lots. The LPS states that the primary use of land in Precinct No. 30 shall be for a single residential dwelling and small scale agricultural uses, such as low key grazing and horticulture, cottage industry and tourist related activities, subject to land capability. Lot sizes for Precinct No. 30 will be a minimum of 8 hectares.

A number of actions are proposed in the LPS for Precinct No. 30, which identify certain environmental and planning issues which require consideration as part of the strategic and statutory planning for the Precinct. These include:

- Encourage the retention of vegetation particularly along drainage lines;

- Manage low key development of the precinct to ensure that land use is compatible with land capability and suitability recognising the considerable environmental constraints;

- Ensure best practice subdivision design that recognises and addresses the environmental constraints and minimises the need for land clearing.

These aspects will be further considered in the report, with specific mention of subdivision and development of Lot 1492 Paterson Road. As a case in point, the following is a brief snapshot of how the above actions apply to the rural residential planning for Lot 1492:

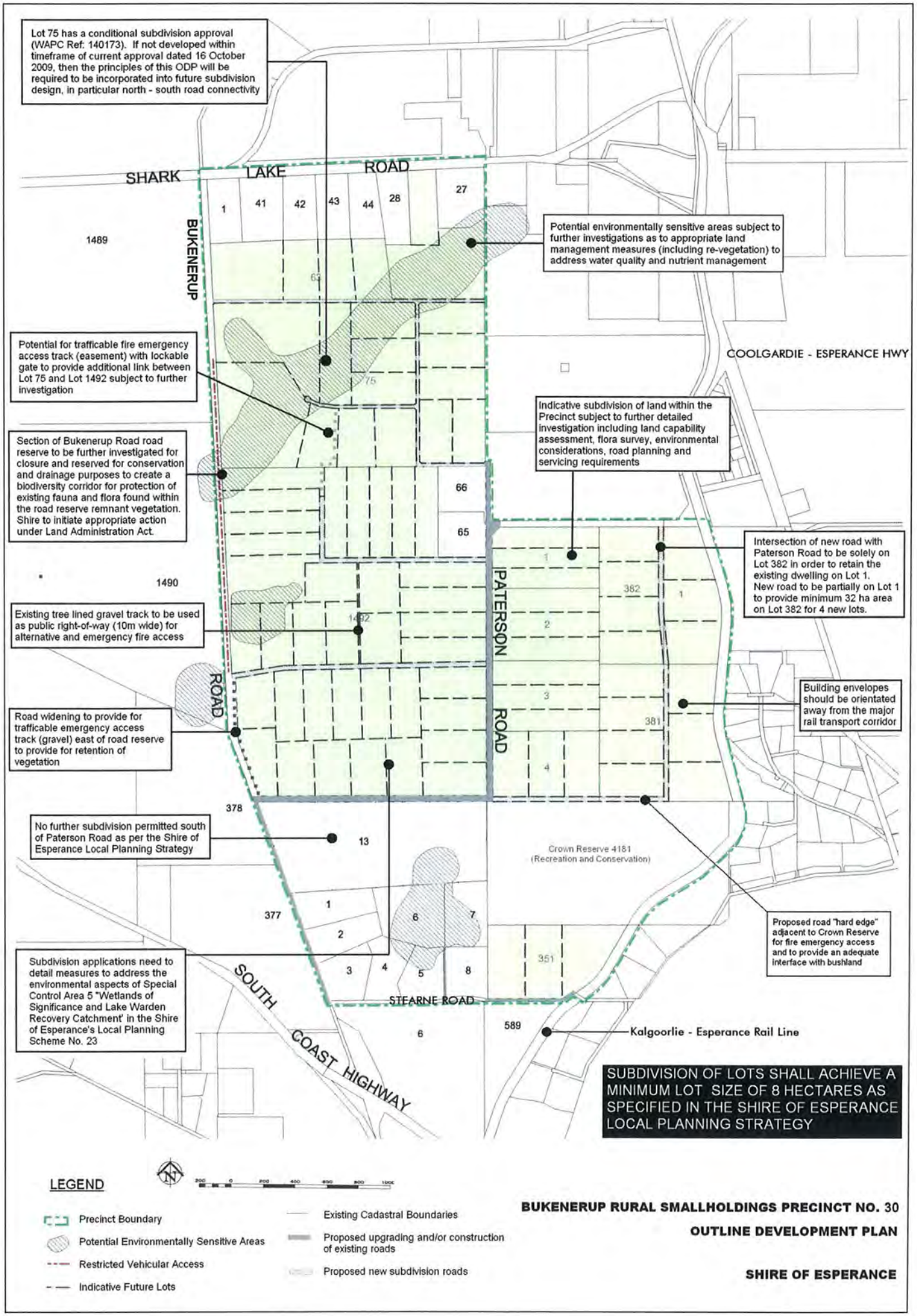
LPS Action	Application at Lot 1492 Paterson Road ODP planning
Encourage the retention of vegetation particularly along drainage lines	Land Capability Assessment for Lot 1492 identifies vegetation to be retained and potential areas for remediation, particularly along eroded drainage lines. Such areas are identified as building exclusion areas with emphasis on conservation and on-going land management. This is further discussed under Clause 6.8 & 6.9.
Manage low key development of the precinct to ensure that land use is compatible with land capability and suitability recognising the considerable environmental constraints	As part of the preparation and approval of an Outline Development Plan, the proponent has prepared a Rehabilitiation and Remediation Management Plan; Livestock Management Plan and Bush Fire Management Plan, to ensure land use compatibility and on-going management of the land
Ensure best practice subdivision design that recognises and addresses the environmental constraints and minimises the need for land clearing	Land Capability Assessment for Lot 1492 identifies opportunities and constraints, which can determine building exclusion areas and areas to be set aside for conservation and land management.

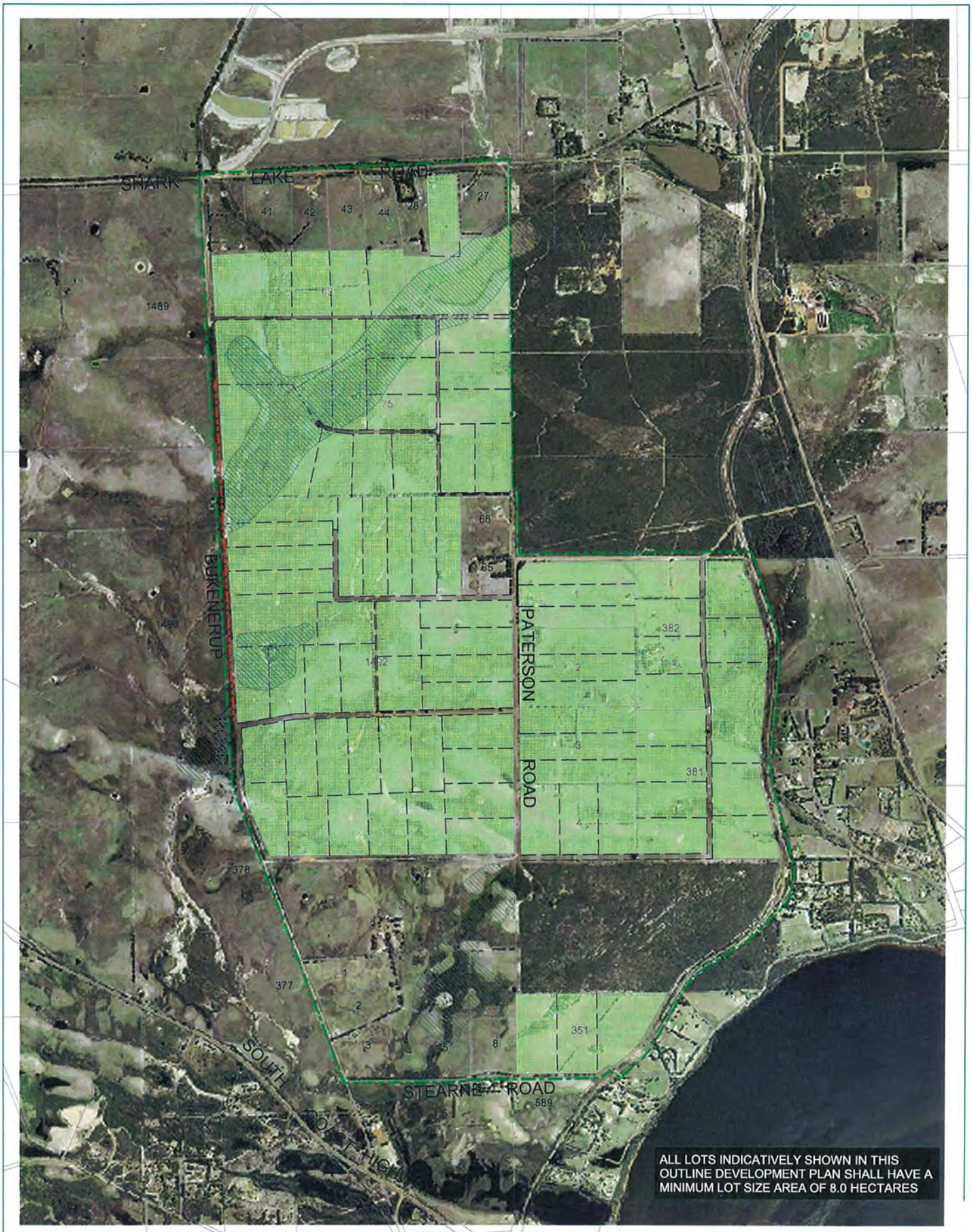
4.3 INTEGRATION OF ODP WITH THE SURROUNDING AREA

The Bukenerup Rural Smallholdings Precinct No. 30 does not require any significant road or infrastructure extensions through neighbouring land. The ODP area can be developed independently from other precincts, subject to upgrading and construction of existing road reserves where necessary.

The ultimate build-out of Precinct No. 30 will provide an attractive rural living community conveniently located in the Esperance hinterlands about 8.5 kilometres (less than 10 minutes drive) from the Esperance town centre.

Consideration of catchment drainage and nutrient management at the Land Capability Assessment stage for each property and at the detailed subdivision design stage is necessary for addressing wider environmental issues, including improving water quality management, as indicated in the Shire of Esperance Local Planning Strategy.


Lot 75 has a conditional subdivision approval (WAPC Ref: 140173). If not developed within timeframe of current approval dated 16 October 2009, then the principles of this ODP will be required to be incorporated into future subdivision design, in particular north - south road connectivity
SHARK LAKE ROAD
BUKENERUP ROAD
Potential environmentally sensitive areas subject to further investigations as to appropriate land management measures (including re-vegetation) to address water quality and nutrient management
COOLGARDIE - ESPERANCE HWY
Potential for trafficable fire emergency access track (easement) with lockable gate to provide additional link between Lot 75 and Lot 1492 subject to further investigation
Indicative subdivision of land within the Precinct subject to further detailed investigation including land capability assessment, flora survey, environmental considerations, road planning and servicing requirements
Section of Bukenerup Road road reserve to be further investigated for closure and reserved for conservation and drainage purposes to create a biodiversity corridor for protection of existing fauna and flora found within the road reserve remnant vegetation. Shire to initiate appropriate action under Land Administration Act.
Intersection of new road with Paterson Road to be solely on Lot 382 in order to retain the existing dwelling on Lot 1. New road to be partially on Lot 1 to provide minimum 32 ha area on Lot 382 for 4 new lots.
PATERSON ROAD
Existing tree lined gravel track to be used as public right-of-way (10m wide) for alternative and emergency fire access
Building envelopes should be orientated away from the major rail transport corridor
Road widening to provide for trafficable emergency access track (gravel) east of road reserve to provide for retention of vegetation
No further subdivision permitted south of Paterson Road as per the Shire of Esperance Local Planning Strategy
Crown Reserve 4181 (Recreation and Conservation)
Proposed road "hard edge" adjacent to Crown Reserve for fire emergency access and to provide an adequate interface with bushland
Subdivision applications need to detail measures to address the environmental aspects of Special Control Area 5 "Wetlands of Significance and Lake Warden Recovery Catchment' in the Shire of Esperance's Local Planning Scheme No. 23
SOUTH COAST HIGHWAY
STEARNE ROAD
Kalgoorlie - Esperance Rail Line
SUBDIVISION OF LOTS SHALL ACHIEVE A MINIMUM LOT SIZE OF 8 HECTARES AS SPECIFIED IN THE SHIRE OF ESPERANCE LOCAL PLANNING STRATEGY
LEGEND
Precinct Boundary
Potential Environmentally Sensitive Areas
Restricted Vehicular Access
Indicative Future Lots
Existing Cadastral Boundaries
Proposed upgrading and/or construction of existing roads
Proposed new subdivision roads
BUKENERUP RURAL SMALLHOLDINGS PRECINCT NO. 30
OUTLINE DEVELOPMENT PLAN
SHIRE OF ESPERANCE



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LEGEND
- Precinct Boundary
- Environmentally Sensitive Areas
- Restricted Vehicular Access
- Indicative Future Lots
- Existing Cadastral Boundaries

BURKENERUP ROAD
RURAL SMALL HOLDINGS PRECINCT
SHIRE OF ESPERANCE

133 Scarborough Beach Road, Mount Hawthorn WA 6016
PO Box 99, MOUNT HAWTHORN WA 6915
T: 08 9443 1511 F: 08 9444 3901
E: whelans@whelans.com.au W: www.whelans.com.au
whelans TOWN PLANNING

5.0 PRINCIPLES OF THE OUTLINE DEVELOPMENT PLAN

5.1 ROAD HIERARCHY

There are no major roads within the Bukenerup Rural Smallholdings Precinct No. 30. No major intersection treatments are necessary. All roads are predominantly local roads, portions of which are to be upgraded/constructed as and when land is subdivided in the ODP. The following is a summary of the major roads and existing/proposed road network in the ODP:

Paterson Road

Paterson Road is the main entry road into the precinct coming off Coolgardie – Esperance Highway. This road is proposed to be retained and upgraded (or constructed where necessary) as part of conditions of subdivision by the relevant landowners. This will most likely occur in stages as and when land is subdivided.

Shark Lake Road

Shark Lake Road provides access to the northern portion of the ODP area. There are no plans to provide another intersecting road with Shark Lake Road to the ODP area and no further upgrading or construction of the road is likely to be necessary.

Bukenerup Road

Currently most of the section of Bukenerup Road along the western boundary of the OPD area is unconstructed. A small section (approximately 800 metres in length) accessing directly from Shark Lake Road has been constructed to a trafficable standard as part of subdivision of land to the north. Similarly the section of Bukenerup Road leading off South Coast Highway to the edge of Lot 13 Paterson Road has been made trafficable for vehicular access.

It is proposed that the southern section of Bukenerup Road from Lot 13 be extended northwards to link with a proposed new east – west internal subdivision road through Lot 1492. A minor road widening and re-alignment of the existing road reserve is proposed within Lot 1492 in order to conserve pockets of remnant vegetation within the Bukenerup Road reserve.

Significant remnant vegetation is present within the balance Bukenerup Road reserve adjacent Lot 1492 and Lot 75. It is considered that this corridor of remnant vegetation in the road reserve be set aside for conservation, as it contributes to the biodiversity in the area. The Shire should investigate the possibility of road closure and setting aside this land for conservation, as opposed to leaving the road reserve as "public street", to reduce potential for clearing and uncontrolled vehicular access.

The section of Bukenerup Road containing remnant vegetation is considered important as it forms an ecological link north-south between Bukenerup Lake and the wetland areas on the adjacent property to the north (currently Lot 75) and the Shark Lake area.

If the road were constructed in this area, it would form a barrier, cutting across natural drainage lines flowing from the north – east in a south-westerly direction towards Bukenerup Lake. This would alter the topography and hydrology in the area. The lower lying area of the road reserve is subjected to inundation and would present challenges to road construction, access to proposed lots and provision of services.

The "no development option" for this section of Bukenerup Road would not have an adverse impact on the proper and orderly planning for the area. An alternative north – south route between Shark Lake Road and South Coast Highway through the ODP precinct can be achieved via the provision of new internal subdivision roads connected to the existing road network.

Stearne Road

Stearne Road is a constructed road and currently provides vehicular access east – west to the southern lots in the ODP area. Some upgrading may be required as a condition of subdivision approval for Lot 351.

Proposed New Subdivision Roads

The new internal subdivision road reserves within the ODP are proposed to be 30 metres in width, which is sufficient to provide road pavement (i.e. bitumen seal) and incorporate drainage. Detailed engineering road design and planning should ensure maximum tree retention wherever possible. All new construction of roads will be subject to the specifications and satisfaction of the Shire of Esperance.

Emergency Fire Access Road (Lot 1492)

The existing internal tree lined gravel access road leading north from the residence on Lot 1492 is proposed to be retained as an alternative emergency escape route (two way laneway 10m wide) as part of the bushfire and emergency planning for the ODP area.

Responsibility for construction/upgrading of ODP roads

In general, all upgrading and construction of existing and new roads shall be the responsibility of landowners who wish to subdivide their respective properties and this will be implemented as a condition of subdivision approval.

It should be noted that the upgrading of rural residential roads will require bitumen seal.

There is no ODP contribution scheme proposed as there are no major road infrastructure works to be co-funded by landowners. A landowner who solely bears upfront the costs to construct a new subdivision road or upgrade an existing road in the ODP as part of subdivision can, under s.159 of the Planning & Development Act 2005, where applicable, recover partial costs from other landowners who later on subdivide land and benefit from the relevant road works.

5.2 BUSHFIRE PLANNING AND FIRE MANAGEMENT

Most of the land with the Bukenerup Rural Smallholdings Precinct No. 30 has been cleared for agricultural and rural activities. The risk of fire for cleared pasture, using the criteria under *Planning for Bush Fire ProtectionGuidelines Ed.2* (WAPC/FESA, 2010), is relatively low due to limited fuel loading. Notwithstanding this, considerations for fire management should be exercised at the subdivision stage, in accordance with the provisions of the Town Planning Scheme and the Shire of Esperance requirement for property firebreaks.

Strategic firebreaks in accordance with Shire requirements should be constructed by the developer as part of subdivision and landowners. In addition, a Bush Fire Management Plan should be prepared by the developer to the satisfaction of the Shire of Esperance and Fire Emergency Services Authority (FESA) as part of the conditions of subdivision approval.

Crown Reserve 4181 has been identified as Bushfire Prone Land under the Shire of Esperance Local Planning Scheme No. 23. As such, building envelopes on proposed lots adjoining the reserve should be located in accordance with the recommendations and provisions of the *Planning for Bush Fire Protection Guidelines*. A water supply for fire fighting equipment should also be considered in the Bushfire Management Plan.

A new subdivision road is proposed along most of the northern boundary of Crown Reserve 4181 to assist in protecting neighbouring properties from potential bushfire and also to provide for better emergency and fire fighting access from Paterson Road.

A new fire emergency access link made trafficable and established by potentially an easement along firebreaks is proposed to link Lot 75 and Lot 1492 as part of subdivision. This would provide additional opportunity for movement and access in this area and would also provide an alternative fire escape route as part of planning for bushfire management. The location of the access link could be investigated further as part of preparation of an Outline Development Plan for Lot 1492 and subdivision conditional approval.

5.3 LOCAL OPEN SPACE

There is no requirement to provide public open space within the Bukenerup Rural Smallholdings Precinct No. 30. Crown Reserve 4181 (zoned for 'Parks, Recreation and Conservation – Local') will provide the local community with accessible public open space. The existing and proposed road network provides opportunity for residents in and outside the ODP area to access the reserve.

5.4 SUBDIVISION OF RURAL LOTS

The minimum lot size within the Bukenerup Rural Smallholdings Precinct No. 30 is 8 hectares. The indicative lots shown on the Precinct ODP reflect the minimum 8 hectare lot size. No battleaxe lots are proposed within the Precinct ODP as the use of battleaxe lots are generally discouraged.

The lot yield proposed on the Precinct ODP is subject to detailed subdivision design and Land Capability Assessment, to substantiate conditions necessary for sustainable rural residential development. Variations to the indicative lot design shown on the Precinct ODP may be permitted subject to justification and satisfaction of the Shire of Esperance. The Precinct ODP should be considered as a working guide only and is subject to further detailed subdivision design, environmental and geotechnical investigations.

5.5 RAILWAY NOISE

The Kalgoorlie – Esperance Rail line runs north – south along the eastern boundary of the Bukenerup Rural Smallholdings Precinct No. 30. Subject to Land Capability Assessment, to minimise the land use conflict between major rail transport use and rural living, building envelopes for proposed lots along the eastern edge of the Precinct should be located as far away from the railway line as possible. Similarly building envelopes for proposed lots on Lot 351 Stearne Road should be located as far to the west as possible away from the railway line. Vegetation planting can also assist in increasing landscape values along the major rail transport corridor.

5.6 BASIC RAW MATERIALS

The Shire of Esperance Local Planning Strategy requires that as part of any Land Capability Assessment, as a prerequisite to subdivision approval, landowners should identify the possible presence of basic raw materials (i.e. sand, clay, gravel, limestone and hard rock) on their respective properties. Should any significant deposits of any basic raw material be found, investigations should be made as to the possibility of extracting the resources, particularly prior to any subdivision and development. If extraction of resources can be achieved in a sustainable manner, this should be done first sequentially, prior to subdivision and development. Rehabilitation and remediation should be considered as part of any sequential rural development.

Developers should be encouraged to use suitable material extracted from the site within roads of the subdivision. A rehabilitation plan is required to be submitted and implemented prior to the final clearance of the subdivision being granted. Small scale extraction operations, associated with the construction of a subdivision, maybe supported where development is staged. Any large scale extraction operations adjacent to staged subdivisions will not be supported, unless it can be demonstrated that suitable buffers can be established.

5.7 STORMWATER DRAINAGE AND NUTRIENT MANAGEMENT

General practice for rural stormwater drainage in sandy soil areas is to use a drainage management system involving vee-drains, culverts, energy dissipaters, open drains and spur drains. Spur drains are usually located on the low side of proposed lots on both sides of the road. Additional spur drains are required in areas of large flow. Energy dissipaters are deployed in the vee-drains situated on both sides of the road reserve throughout subdivision roads.

Subject to calculations determining quantities of stormwater and the possibility of overflows, the detailed stormwater management design can be assessed in consultation with the Shire of Esperance. Drainage easements in favour of the Shire of Esperance may also be necessary over areas of proposed lots required for stormwater management, such as detention basins/swales.

Any use of vee drains, table drains and open channels alongside roads or within lots (directing surface runoff from road pavement and road verges and runoff from lots in excess of lot storage capacities, into detention basins such as sumps or deep swales) should be in accordance with the *Stormwater Management Manual for Western Australia* and *Guidelines and Principles for Water Sensitive Urban Design* to the satisfaction of the Shire of Esperance.

5.8 SPECIAL CONTROL AREA 3B – SHARK LAKE INDUSTRIAL PARK

A portion of SCA 3B affects the northern portion of Precinct No. 30, particularly Lot 75 Shark Lake Road. The purpose of SCA 3B is to provide guidance for land use and development within proximity to the Shark Lake Industrial Park. Clause 6.6 of LPS 23 sets out the planning considerations relevant to any subdivision and development of land affected by SCA 3B.

5.9 SPECIAL CONTROL AREA 5 - LAKE WARDEN RECOVERY CATCHMENT

The Precinct is subject to Clause 6.9 of LPS 23 which sets out "Wetlands of Significance and Lake Warden Recovery Catchment – Special Control Area 5". The purpose of SCA 5 is to provide guidance for land use and development within the catchment of wetlands of significance.

The objectives of SCA 5 are to:

- Ensure that the use and development of affected land is compatible with and does not detrimentally affect the SCA 5 wetlands;
- Encourage retention and planting of native vegetation and properly managed perennial pasture;
- Encourage fencing and rehabilitation of creek lines; and

- Discourage subdivision and intensification of development within Department of Environment and Conservation Priority 1 areas due to the risks posed by the shallow water table, flooding, nutrient pollution, domestic animal impact and risks to public health.

The Precinct is located in the Priority 1 and Priority 2 zones for the Lake Warden Recovery Catchment (RAMSAR listed). Clause 6.9.2(d) discourages subdivision and intensive development within the Priority 1 area due to risks posed by the shallow water table, flooding, nutrient pollution, domestic animal impact and risks to public health.

As part of any application for subdivision or development approval within the Precinct, consideration should be given to protect or re-vegetate the margins of wetlands and natural drainage lines that feed into the tributary creeks outside of the ODP area (i.e. Bukenerup Lake and Lake Warden). The fencing of these areas will be required to restrict access by livestock and maintain minimal disturbance to allow rehabilitation.

Re-vegetation will contribute towards managing soil erosion by water flow, which ultimately has an influence on water quality. Because most of the ODP area has been almost totally cleared, landowners (and landowners of new lots) should be encouraged to re-establish degraded pastoral areas and/or plant native vegetation towards better land management.

Proposals that include the filling, excavation of drainage into or out of a wetland are to be referred to the Department of Environment and Conservation for assessment. Any developments affecting wetlands are to incorporate an assessment of their conservation value (using DEC criteria) and may be required to include a wetland management plan addressing, as appropriate:

- Fertiliser usage;
- Fencing and restriction of stock access;
- Vegetation re-planting and buffer zones/setbacks from effluent disposal systems;
- Groundwater extraction

5.10 SPECIAL CONTROL AREA 8 - ESPERANCE AIRPORT

Precinct No. 30 is situated within Special Control Area 8 as set out under Clause 6.12 of LPS 23. More particularly, the Precinct falls within SCA 8B, which requires that planning approval is required for any proposed development exceeding 15 metres in height. Development with SCA 8 includes planting of trees and shrubs, a flagpole, antenna, aerial, tower, electricity transmission line, satellite dish, chimney, flue, smokestack or other similar structure. Development proposals are required to comply with the Shire of Esperance Local Planning Scheme No. 23 with respect to SCA 8.

5.11 ACID SULPHATE SOILS

Acid Sulphate Soils can occur in waterlogged soils and typically sandy silts and peat soils. However, if development (such as house and road construction) is restricted to outside waterlogged areas (and the soils are not disturbed), then the risk of disturbance to acid sulphate soils is reduced.

5.12 LOCATION OF BUILDING ENVELOPES

There is a requirement for the provision of adequate setbacks from wetlands and watercourses in relation to on-site effluent disposal (i.e. 50m – 100m depending on the type of on-site wastewater treatment system). Building envelopes for dwellings and outbuildings should be located within pockets of better capability land. Where considered appropriate, subdivision applications should include the location of proposed building envelopes and/or specify building exclusion areas where development is discouraged.

5.13 STAGING OF DEVELOPMENT

The Precinct ODP has been prepared to allow the majority of landowners to develop independently. The existing road reserves in the ODP area allow this to happen and most new subdivision roads are internal to creating new lots, particularly on the larger land parcels of Lot 75 and Lot 1492. With the exception of Lots 1, 382 and 381, all other landowners have the ability to subdivide and develop independently utilising existing road reserves.

A new subdivision road is required to provide access to subdivide Lots 1, 381 and 382. In particular, Lot 381 is subject to provision of road access (new subdivision road/s) through other neighbouring lots and the timing of development is therefore predicated upon neighbouring landowners subdividing their lands.

The anticipated timeframe for subdivision and development within the Bukenerup Rural Smallholding Precinct No. 30 will mainly be driven by the initiative of landowners. The *Goldfield – Esperance Country Land Development Program Annual Review 2006* identifies land (particularly Lots 75 & 1492) within the Bukenerup Rural Smallholdings Precinct No. 30 as able to be developed within the next 5 years. Ultimately it is expected that market forces will determine the number of new rural lots to be created.

6.0 LOT 1492 PATERSON ROAD – ODP

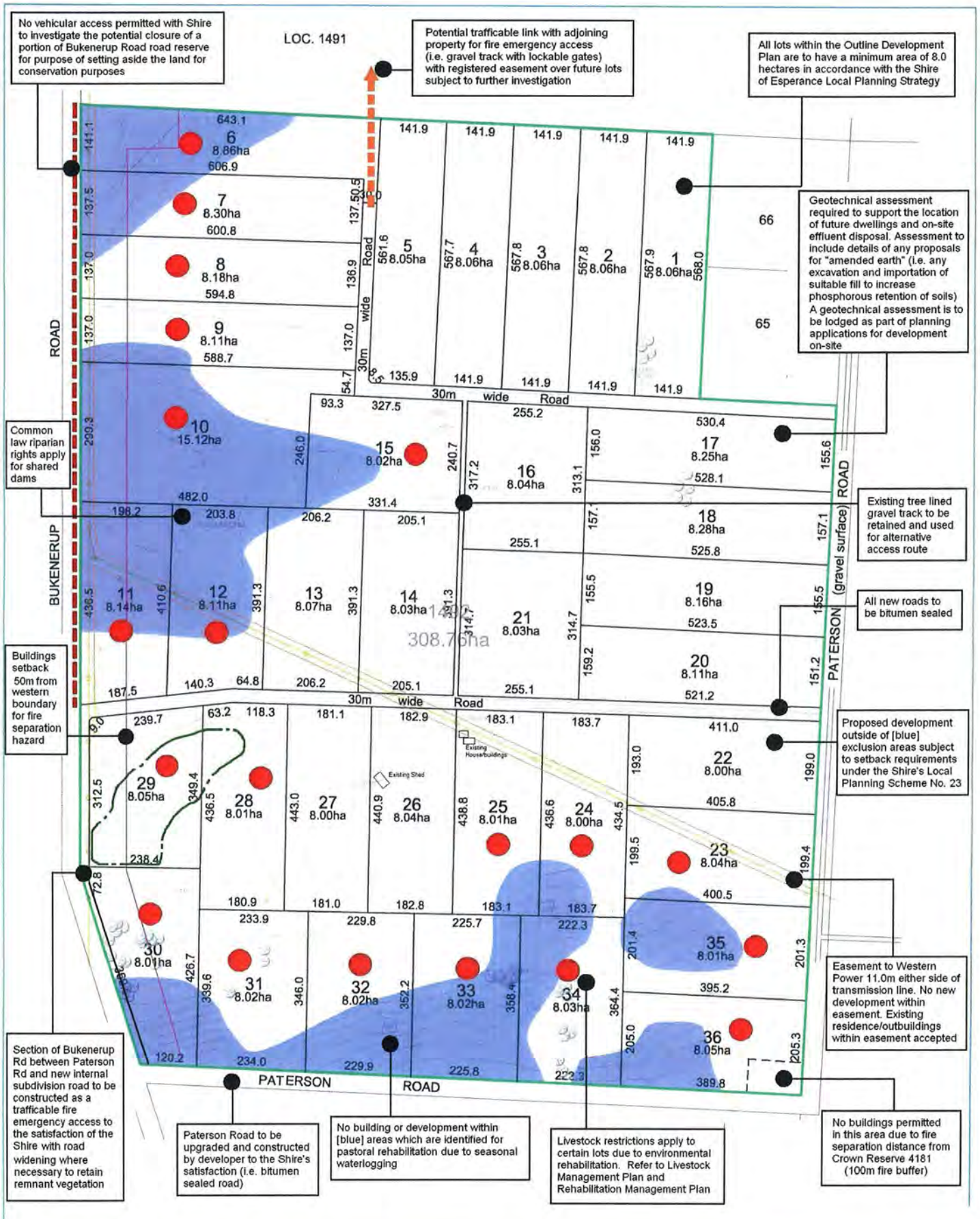
6.1 OPPORTUNITIES FOR RURAL SUBDIVISION

Lot 1492 Paterson Road, Esperance ("subject land") is situated on the western side of the Precinct on the edge of the scarp which forms the boundary between the lowlands of the coastal plain and the higher Esperance sandplain to the north. The estate is held in fee simple comprising an area of 308.8686 hectares. There are no legal encumbrances or restrictions constraining subdivision of the property for rural residential lots.

While containing principally the land forms of the sandplain, some of the elements of the northern margins of the coastal plain are found in the southern part of the subject land. The land is almost completely cleared for agricultural purposes and is divided into seven paddocks which are provided with water reticulated through polypipe and from a number of small dams and soaks. There is a substantial hardi-plank residence perched on top of the ridge with panoramic views of the surrounding lakes and countryside and glimpses of the harbour. Other existing structures on the property include a large machinery shed near the existing dwelling.

Based on the findings of a Land Capability Assessment (Appendix 1), the property is suited for Rural Smallholding subdivision. It is marginal for broad acre farming because of its size and topographical limitations in the southern portion. An attribute of the property is its elevated position in the landscape with views over the countryside and surrounding lakes. It is accessible by Paterson Road (constructed gravel road) and serviced with overhead power, which runs parallel to Bukenerup Road and traverses across the property and telecommunications. There are adequate supplies of quality underground water for farming. Domestic water supply predominantly is provided by rainwater harvesting.

The property has been used as a farm in the past for growing cereal crops and raising sheep. Not all of the land is tillable since granitic – gneissic ridges traverse the property from the south west to the north east, severely limiting the depth of soil and capability for sowing crops. The position of the ridges can be distinguished by the contours on the **Opportunities and Constraints Plan.** Lower lying areas within the farm boundary are subject to seasonal and temporary water logging and these also are not cultivated.



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LEGEND

BUILDING EXCLUSION AREAS

- Areas identified for pastoral rehabilitation - No development permitted
- Conservation of existing native vegetation re-growth

ENVIRONMENTAL

- Livestock restrictions apply to these lots so as to meet rehabilitation and remediation objectives
  Refer to Lot 1492 Paterson Road Livestock Management Plan and Rehabilitation Management Plan
- No vehicular access

OUTLINE DEVELOPMENT PLAN
LOT 1492 PATERSON ROAD
ESPERANCE

133 Scarborough Beach Road, Mount Hawthorn WA 6016
PO Box 99, MOUNT HAWTHORN WA 6915
T: 08 9443 1511 F: 08 9444 3901
E: whelans@whelans.com.au W: www.whelans.com.au
whelans TOWN PLANNING

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PROPOSED SUBDIVISION
LOT 1492 PATERSON ROAD
ESPERANCE

75 0 75 150 225 300 375

133 Scarborough Beach Road, Mount Hawthorn WA 6016
PO Box 99, MOUNT HAWTHORN WA 6915
T: 08 9443 1511 F: 08 9444 2901
E: whelans@whelans.com.au W: www.whelans.com.au
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Plate 1. Spectacular views from the upper ridge of the property overlooking the surrounding lakes and countryside to the south with harbour in the distance

6.2 LOCAL PLANNING STRATEGY CONSIDERATIONS

The Shire of Esperance Local Planning Strategy identifies various issues that need to be addressed for subdivision/development for land in Precinct 30 – Bukenerup (which replaces Precinct No. 3 under Esperance Limited Rural Strategy). These are contained in the Shire of Esperance Local Planning Strategy and include the following:

Precinct 30 - Actions	Comments in relation to Lot 1492 Paterson Road - ODP
(i) Measures to protect Lake Warden Catchment Recovery Area	Opportunities for improved water quality through rehabilitation and well designed stormwater management
(ii) Protection of water quality and other environmental values of relevant portions of Bukenerup and Melijinup Creek catchments, which drain into Lake Warden	Measures taken to improve drainage lines through opportunities for re-vegetation and lot orientation to avoid building envelopes within catchment area. Livestock restrictions apply to rehabilitation areas.. Design seeks to retain the remnant vegetation within the Bukenerup Road reserve, some of which is riparian vegetation for a tributary creek draining into Bukenerup Lake

(iii) Predominantly "High" or "Fair" capability land for rural residential development	Land Capability Assessment confirms subject land contains High – Fair land capability for rural residential living and identifies building exclusion areas
(iv) Similar capability for agricultural land use activities	Subject land contains High – Fair land capability for limited (small scale) agricultural activities
(v) Predominantly elevated terrain with only minor wetland areas	Not applicable. Subject land contains no wetlands
(vi) Opportunities to address catchment management issues and increase landscape values through subdivision conditions	Rehabilitation of pastoral (waterlogged) areas and vegetation planting. These can be further investigated as part of the subdivision approvals process as to whether a fenced native re-vegetation conservation area would be more appropriate
(vii) Opportunities to address wind erosion/land degradation	Stocking rates approved by Shire. Some remedial work can be investigated in north-west corner of property associated with drainage lines within Bukenerup Road reserve and Lot 75. Consideration given to pastoral rehabilitation for waterlogged pastures
(viii) East-west road reserve between Bukenerup and Patterson Road is unmade and should be constructed	Portions of Bukenerup Road and Paterson Road to be upgraded and/or constructed by landowner as shown on indicative ODP. Remnant vegetation in Bukenerup Road along most of western boundary of subject land should be conserved as an *ecological link* and for biodiversity
(ix) Large vegetated area (Reserve 4181) and ecological links	Not applicable. Subject land has no ecological links with Reserve 4181 or other large tracts of remnant vegetation
(x) Proximity to major transport corridor	Not applicable. Subject land generally not impacted by noise generated by road or rail transport
(xi) Presence of basic raw materials and sustainable use of those resources	Not applicable. Subject land contains no known significant deposits of basic raw materials
(xii) DEC assessment for earthworks impacting on existing wetlands	Not applicable. Subdivision works (roads) will have limited impact on existing neighbouring wetlands
(xiii) Re-vegetation of watercourses	Not applicable. Subject land has no permanent surface watercourses.
(xiv) Developments affecting wetland to provide full environmental assessment report	Not applicable. Subject land has no wetlands or will not have a direct impact on wetlands.
(xv) Provision of adequate setbacks from wetlands and watercourses	Not applicable. Subject land has no surface watercourses or wetlands

(xvi) Provision of buffer areas for major transport corridor	Not applicable. Subject land not adjacent to any major road or rail transport corridor
(xvii) Any development must be serviced by Council approved on-site effluent disposal	Conventional septics can be used as all lots are not within close proximity to watercourses or wetlands . Design of septic systems to be to the satisfaction of the Shire and Department of Health.
(xviii) Prospective purchasers must be aware of groundwater abstraction limitations (i.e. 1200m^3 per annum)	Prospective purchasers can be informed by the developer as part of Offer and Acceptance, or if required by Council, through placement of a memorial on titles
(xix) Provision of building envelopes over land with best land capability rating	Building exclusion areas shown on Outline Development Plan. Prospective landowners to locate future dwellings/development in accordance with LPS 23 setback requirements and detailed geotechnical assessment confirming suitability of dwelling site and location for on-site effluent disposal
(xx) Roads to be upgraded and constructed to Council specifications	Roads to be upgraded and constructed as shown on indicative Outline Development Plan and Subdivision Guide Plan

6.3 ROADS

Upgrading/construction of existing roads adjacent to the property is proposed as part of the overall development plan for the property. The upgrading and construction of roads is shown on the Subdivision Guide Plan and summarised as follows:

- Section of Bukenerup Road reserve between new internal subdivision road and Paterson Road along proposed Lots 29 & 30 to be constructed as a fire emergency access (road widening up to 20 metres subject to further investigation) to conserve remnant vegetation as suggested in the Land Capability Assessment report.

- New internal east-west link road to connect Bukenerup Road with Paterson Road.

- Upgrading of Paterson Road along eastern property boundary as part of subdivision of proposed Lot 36.

- Construction of Paterson Road along south boundary to provide access to proposed Lots 30 – 34 as shown on the Subdivision Guide Plan. Some fill and earthworks cut/fill would be required to provide servicing and driveway access to the proposed lots above seasonally waterlogged areas along southern boundary.

- The portion of Bukenerup Road along western boundary north of the proposed internal subdivision road is not required to be constructed as proposed access to lots is via a new internal road. Furthermore, lot access from this section of Bukenerup Road is limited by seasonal waterlogging and access/lot orientation would be superior from the internal road. This section of Bukenerup Road should be set aside for conservation as suggested in the Land Capability Assessment report.

- A new road is proposed along the southern boundary of Lot 65 Paterson Raod. This road provides optimal design to create a row of lots along the northern boundary (Lots 1 – 5).

- Section of Bukenerup Road between Paterson Road and Stearne Road to be constructed (i.e. bitumen seal) to the satisfaction of Shire of Esperance.

The new internal subdivision road reserves are 30 metres in width, which is sufficient to provide for road pavement and drainage. The new east –west roads linking Paterson Road and Bukenerup Road will follow the existing driveway to the house. The driveway is lined with trees and should provide an attractive vista. Detailed engineering road design and planning will ensure maximum tree retention.

All new roads and upgrading will be subject to the specifications and satisfaction of the Shire of Esperance. Construction specification standards (i.e. sealed bitumen) are to be in accordance with *Institute of Public Works Engineering Australia (WA Division Inc) Subdivisional Guidelines Edition No. 2 – 2009*.

It is proposed that the internal alternative emergency fire access laneway (10m wide), which will utilise the existing internal tree lined gravel road leading north from the residence, will remain as a gravel access road.

Plate 2. Paterson Road to be upgraded

Plate. 3 View looking south down tree lined access track towards existing residence which will be utilised as an alternative fire emergency access laneway

6.4 LOT LAYOUT

Proposed lots are a minimum of 8 hectares in size, which conforms to the requirements under the Shire of Esperance Local Planning Strategy. Due to seasonal water logging and dense native vegetation, access to lots and provision of servicing along most of Bukenerup Road is not desirable. This is shown on the Outline Development Plan. For many of the proposed lots, access and servicing will be via new internal roads. To maximise views, lots are proposed on top of ridges or on the slope of the ridges.

6.5 EARTHWORKS

Earthworks would be required for provision of services, driveways and road works. Aside from these, the landowner also intends to improve the storage capacity of the existing soaks and dams on the property for water supply and aesthetical purposes. This may require a separate development approval from the Shire depending on the nature of the works. There may also be a requirement for excavation within the building envelope areas for the construction of dwellings and on-site effluent disposal as determined by full geotechnical investigations.

6.6 URBAN STORMWATER/DRAINAGE MANAGEMENT

A Stormwater Management Plan has been prepared for the Outline Development Plan (refer to Appendix 3). The primary objective of the plan is to minimise the effect to natural waterways and downstream catchments inline with the Shire of Esperance and Australian Rainfall and Runoff Standards. This will be achieved through the use of runoff drains adjacent to

the road formation to infiltrate water at source where possible and move water to existing overland flow paths where necessary.

Open drains will be rock armoured around culverts and planted in areas designated for inundation. This will aid erosion protection and promote water quality. As detailed in the Stormwater Management Plan, consideration will need to be given to construction within waterlogged areas, to ensure separation from the ground water level and varying soil conditions. This strategy will reduce the risk of flooding to developments and disturbance of possible acid sulphate soils. Further geotechnical investigations would follow as part of detailed engineering design.

Any use of vee drains, table drains and open channels alongside roads or within lots, directing surface runoff from road pavement and road verges and runoff from lots in excess of lot storage capacities, into detention basins such as sumps or deep swales shall be in accordance with the *Stormwater Management Manual for Western Australia* and *Guidelines and Principles for Water Sensitive Urban Design* to the satisfaction of the Shire of Esperance. Overall, the Stormwater Management Plan confirms and demonstrates that the proposed drainage system for the subdivision can accommodate a storm event of a 1 in 10 year ARI and has sufficient storage capacity to contain the additional runoff generated by development.

6.7 WASTEWATER MANAGEMENT - ON-SITE EFFLUENT DISPOSAL

There is no reticulated sewerage in this area and it is proposed that wastewater management be accommodated by on-site effluent disposal units. In some areas where there is shallow soil on the rocky outcrops, this may require excavation, use of Alternative Treatment Units (ATUs) and "amended earth" techniques to improve phosphorous retention and nutrient management of on-site effluent disposal. This is discussed in more detail under Land Capability Assessment (refer to Appendix 1).

6.8 REMNANT VEGETATION AND FLORA

Pasture and sedges is the predominant vegetation communities on the property. Some re-growth of native species (mainly *Xanthorrehea platyphylla* and *Isopogon longifolius*) has occurred in isolated pockets, particularly on the northern slope of the central ridge. This area has been fenced to prevent disturbance by livestock.

None of the existing vegetation has any ecological significance and the likelihood of there being any Threatened Ecological Communities is remote. Notwithstanding, as a condition of subdivision approval, a formal spring Flora Survey could be conducted to ascertain and confirm the preliminary findings.

New landowners could be encouraged to plant trees and vegetation as part of development approval. This would contribute to the rural landscape and promote habitat for local fauna.

6.9 REHABILITATION AND REMEDIATION

As identified in the Land Capability Assessment, there are areas of the property that are prone to water logging. This is primarily due to overclearing and the natural sheet drainage that occurs on the property after heavy rainfall.

Strategies for Land Remediation

The landowner and the Shire differ on what is the best approach that should be taken in terms of remediation of the land affected by intermittent waterlogging. Both the approach proposed by the landowner and the approach proposed by the Shire are justifiable, however, each leads to an end outcome which differ significantly. The landowner believes that the pastoral land affected by waterlogging can be restored to quality pasture and potentially used for rural pursuits, such as carefully managed livestock grazing. Council has a different approach and considers that the waterlogged areas should be fenced, rehabilitated with native vegetation and set aside for conservation purposes. The two differing strategies for land remediation are discussed in more detail below, with finalisation of the preferred land remediation subject to further investigation and consultation with relevant agencies.

Landowner's Approach – Pastoral restoration with livestock management

The landowner is an experienced farmer operating a large farm in Scaddan and has an excellent knowledge on rehabilitation of rural land, particularly degraded pasture that is waterlogged. For the subject land, the landowner proposes that rehabilitation and remediation of the water logged areas is best achieved by introducing some clay and compost to restore pasture structure.

The rehabilitation technique of fencing off a degraded area of pasture, planting trees and seeding with native vegetation has its limitations, particularly as:

- native vegetation does not particularly grow well in waterlogged areas; considerable expense is required for native re-vegetation;
- most of the on-site dams (rural pursuits water supply) will be within fenced areas with restricted access;
- the outcomes can only be seen in the long-term; and
- the land (agriculturally productive - grazing) can no longer be used for rural pursuits.

The landowner believes that for the subject site characteristics and for future rural use, good rehabilitation will involve restoring the soil quality, structure and re-establishing the pastoral grasses. The landowner also recognises that livestock are an integral part of good land management, the rural landscape and rural lifestyle/amenity. Therefore livestock should not be strictly prohibited (except in conservation areas as identified in the ODP) as livestock are important as part of the rural lifestyle can assist with fire management and weed management.

To re-establish the pasture, the landowner proposes to introduce clay and compost to replenish the soil profile and nutrients to support good pastoral growth. This method of rehabilitation [frequently used by the landowner] has the support of the Soil Science and Plant Nutrition, University of WA, with whom the landowner has been developing rehabilitation techniques.

The application of compost and pastoral rehabilitation on Lot 1492 would be a model demonstrating the effectiveness of composting. A Rehabilitation Management Plan (refer to Appendix 5) has been prepared to outline the rehabilitation strategy for the subject land.

Shire's Approach – Native re-vegetation fenced conservation area

Council considers that livestock restrictions should be permanent in areas affected by waterlogging as running stock will destroy vegetation and result in further waterlogging/destabilisation and land degradation. Waterlogged areas should be permanently revegetated and fenced to protect vegetation (i.e. covenant on title restricting clearing of vegetation).

Concern is raised with regards to the landowner's approach (above) in that the main form of proposed rehabilitation is the re-establishment of pasture and introduction of livestock. Given the waterlogging is a direct result of extensive clearing of native vegetation for pasture and livestock, it is highly likely that livestock grazing, after re-establishing perennial pastures to these areas, will perpetuate the problem and result in the reoccurrence of waterlogging issues. This does not only impact on the landholder, but has implications further down the Lake Warden Catchment. The proposed subdivision provides Council with an opportunity to achieve best practice land management outcomes for these areas. As such:

- Areas subject to waterlogging must have livestock excluded permanently by fencing;

- Areas subject to waterlogging to be rehabilitated and native vegetation re-established. This is particularly important along drainage lines and should not be an option but a requirement; and

- If possible, rehabilitated areas should be covenanted (or protected on title in some other way). This will ensure that the vegetation established to comply with any subdivision/development conditions cannot be cleared in the future.

Integrated Approach

Alternative to adopting either one (in its entirety) of the above options, there may be some scope to review the rehabilitation/remediation management strategy and integrate aspects from each of the landowner and Council approaches. For instance, some waterlogged areas may be rehabilitated using a combination of pastures and native vegetation, with smaller areas

being set aside for conservation. For instance, smaller pockets of native re-growth could be fenced and set aside, particularly in the corners of lots, with the balance pastoral area being used in a careful manner for livestock grazing. The areas selected to be fenced and set aside for native re-growth and conservation could be those areas identified that are lower and more susceptible to waterlogging and for greater periods of time.

6.10 LIVESTOCK MANAGEMENT

The keeping of livestock within the development shall primarily be controlled by the Shire of Esperance Local Planning Scheme No. 23 and the Shire Local Laws. The subject land is within Wetlands of Significance and Lake Warden Recovery Catchment – Special Control Area 5 (SCA 5). SCA 5 generally restricts the stocking rate of livestock on lots less than 4 hectares. Stocking rates for the subject land should generally be in accordance with the Department of Agriculture recommended guidelines for Rural Small Holdings.

Livestock are proposed to be excluded from any areas which are identified for retention of native vegetation or re-growth native vegetation areas. In addition, livestock should not be kept within pastoral areas that have been identified for rehabilitation and remediation until the pastures have been re-established and integration of livestock can be sustainably managed. A Livestock Management Plan is provided in Appendix 2. A more detailed Livestock Management Plan can be prepared for distribution to prospective purchasers as part of detailed subdivision planning and approval.

6.11 WATER SUPPLY

There is no reticulated water supply in the nearby area and there are no plans to provide reticulated water to this area. In accordance with Clause 5.18 of LPS 23, it is proposed that development on each proposed lot incorporate provision of a 120,000 litre rainwater tank, including storage capacity for fire fighting. Rainwater harvesting would most likely come from the dwelling roof catchment (and nearby outbuildings). For any new development, a minimum roof catchment area for domestic rainwater harvesting in accordance with Clause 5.18 would be required at the development approval stage, to provide a potable water supply.

6.12 TELSTRA & POWER SUPPLY

There is existing telecommunication infrastructure available in Paterson Road. Additional cabling will need to be provided to service the proposed lots. There is also existing power supply infrastructure in the vicinity of the proposed development and the subdivision would be supplied with underground high and low voltage power, including provision of transformers and switchgear around the development site. An easement would be required as part of subdivision over the transmission line through the site.

Plate 4. Bushfire Hazard risk for the property is low due to limited fuel loading.

6.13 BUSHFIRE PLANNING AND FIRE MANAGEMENT

Most of the property has been cleared for grazing. In terms of fire risk, an assessment was made using the criteria under *Planning for Bush Fire Protection Guidelines Edition* 2 (WAPC/FESA, 2010). The risk of significant bush fire occurring on the land is low due to limited fuel loading. Notwithstanding this, considerations for fire management shall be exercised in accordance with the provisions of the Town Planning Scheme. A Bush Fire Management Plan is provided in Appendix 4.

6.14 STAGING OF DEVELOPMENT

The landowner does not wish to subdivide the whole property at once, rather stage subdivision to create lots over time. The first stage will occur along the eastern side fronting Paterson Road (Lots 17 – 20 and 22, 23, 35 & 36). The balance lot will continue to be used for livestock grazing. Further subdivision may occur in future and at this stage there is no indication as to the timing of when this will occur. The Outline Development Plan is an indication as to how the balance land of the property following the first stage (Paterson Road east lots) could be developed at some later point in the future.

7.0 CONCLUSIONS

Following advertising of the Bukenerup Small Ruralholdings Precinct No. 30 Outline Development Plan, submissions on the ODP will be considered and final adoption by the Shire of Esperance and WA Planning Commission (WAPC) will be necessary. This would then provide the strategic planning framework for the consideration by the WAPC of applications for subdivision. Any subdivision and development of the land would also be subject to the provisions of the Shire's LPS 23.

The Bukenerup Small Ruralholdings Precinct No. 30 Outline Development Plan is not a statutory instrument and serves only as a working guide to inform potential subdivision and development within the ODP area. Pursuant to Clause 6.13.3.2 of LPS 23, subdivision and development within the ODP should be generally in accordance with the approved ODP.

Once finalised, the need for review of the Bukenerup Small Ruralholdings Precinct No. 30 Outline Development Plan may be reflected by a number of decisions, which are made that may be contrary to the direction for development set out in the ODP. These might arise from the next review process of the Shire of Esperance Local Planning Strategy and Local Planning Scheme No. 23.

Further investigations by landowners as part of subdividing and developing the ODP land may lead to the need to vary the ODP, to provide for a more optimal outcome. These can be considered on their individual merit subject to detailed investigations and justification.

APPENDIX

APPENDIX 1

LAND CAPABILITY ASSESSMENT
Lot 1492 Paterson Road, Esperance

LAND CAPABILITY ASSESSMENT

LOT 1492 PATERSON ROAD, ESPERANCE

Prepared on Behalf of

KARINGAL PASTORAL COMPANY

By

MAY 2009

S/Projects/13/13281/Planning/Land Capability Assessment

LAND CAPABILITY ASSESSMENT
CONTENTS

1.0 INTRODUCTION

1.1 BACKGROUND

Whelans was commissioned on behalf of the landowner to undertake a Land Capability Assessment a site approximately 308 hectares located at Lot 1492 Paterson Road, Esperance (Figure 1 – Locality Plan). A 9 lot rural residential subdivision is proposed for the site initially (Stage 1), with an ultimate Subdivision Guide Plan being prepared for the property.

This Land Capability Assessment has been prepared to assess the land capability of the site and the suitability of the proposed rural residential development. The site was formally used for the purposes of light sheep and cattle grazing, with the landowner intending to continue limited grazing use.

1.2 OBJECTIVES

The objective of the Land Capability Assessment is to provide an understanding of the environmental opportunities and constraints associated with the 308 hectare site in the context of the proposed rural residential development.

1.3 SCOPE OF WORK

The scope of work to be undertaken for this investigation was generally in accordance with the landowner's brief and included the following:

- A desktop review of available site information to provide details of the development area, including geology, surface hydrology and groundwater.
- An assessment of constraints and opportunities associated with the site. Specific considerations included assessment of remnant vegetation and vegetation complexes present (if any), capability to support the rural residential development and issues of drainage.
- Field and site inspection and formulation of a Land Capability Assessment (this report) detailing the outcomes of the investigation described.

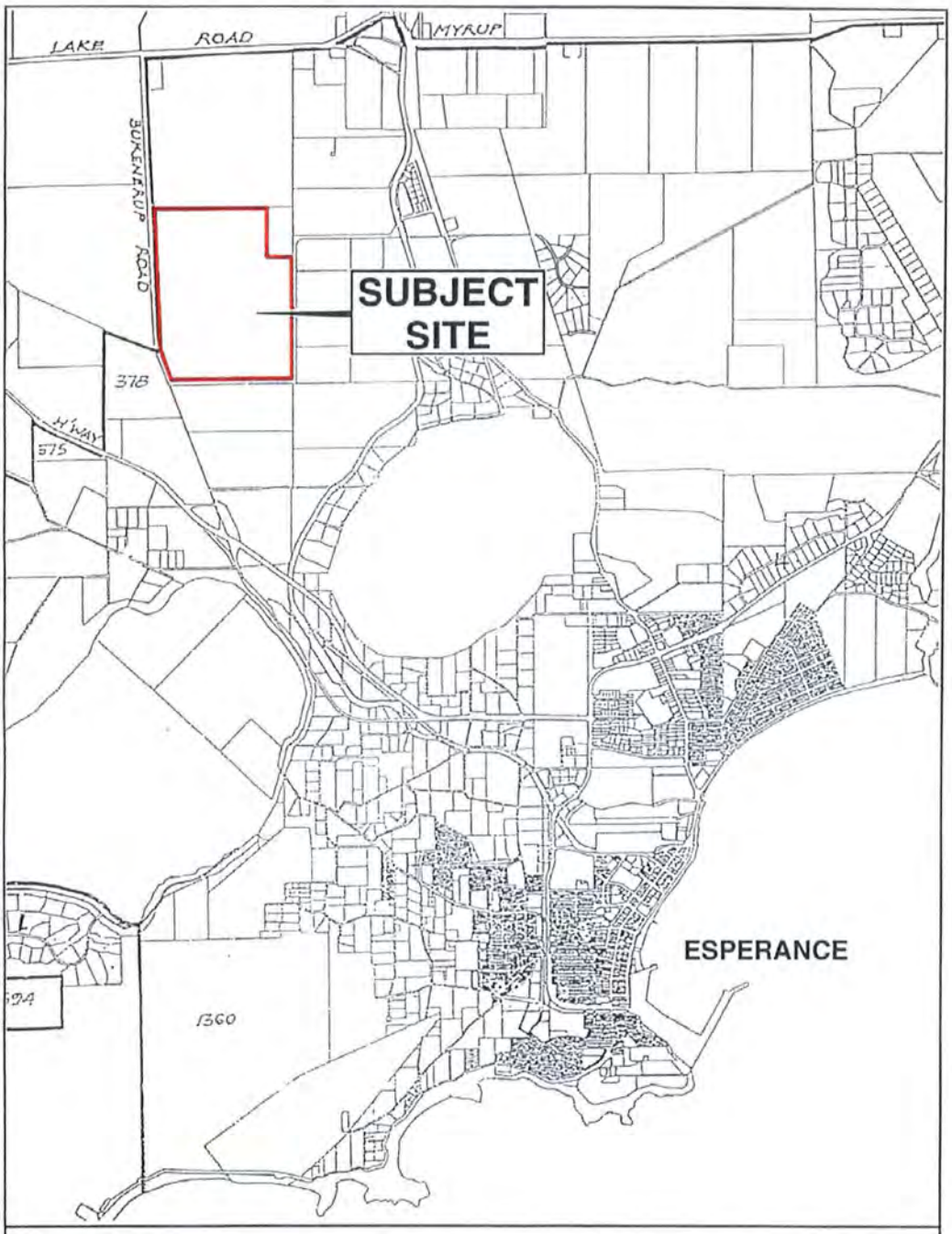


Figure 1
LOCALITY PLAN

2.0 LAND CHARACTERISTICS

2.1 LANDFORM

The property farm is situated on the southern boundary of the level or gently undulating Esperance plain where it joins with the poorly drained coastal plain with its network of swamps and lakes. The northern half which at its highest point is 52m above the low point on the southern boundary consists of undulating plains with slopes of three to five percent.

The high points are characterised by areas of outcropping granite and gneiss, the lows on the west are sedge covered drainages containing flattened zones which feed into tributary drainages and isolated salt lakes above and some 3 kilometres north of Lake Warden and Pink Lake.

The southern half is dominated by a high ridge situated about 700 metres north of the southern boundary. The drainage from the ridge feeds both north and south over slopes, variously from five to ten percent to low-lying ground. Minor areas of outcrop are found within the low-lying ground of the south. There is no incised drainage, but the lower parts of the drainage on the farm contain soaks and poorly drained areas where the water table is shallower.

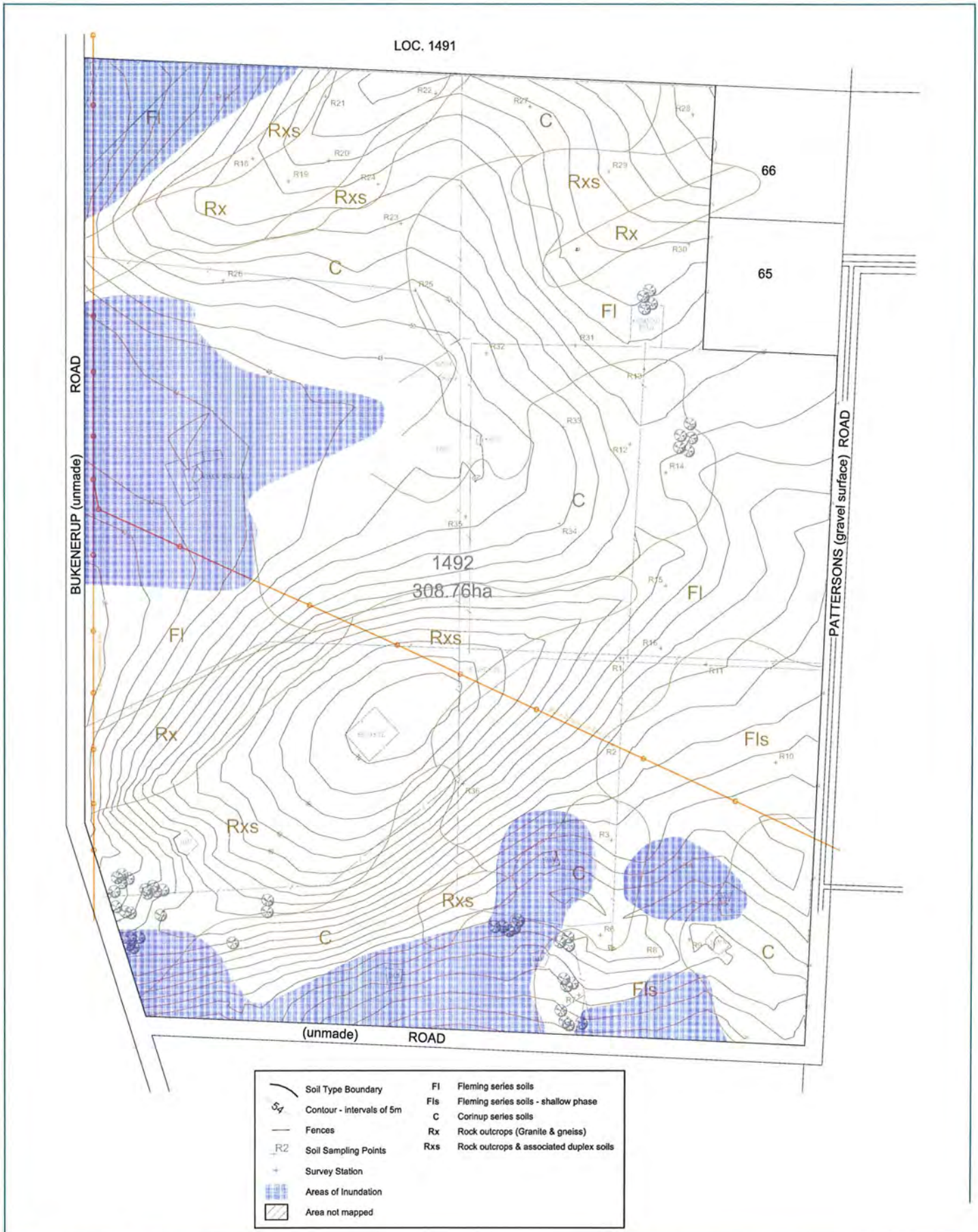
2.2 HYDROLOGY

The land lacks incised drainage though adjoining land on the west and north-west moves in to a defined drainage which leads to the south-west. The lower parts of the land are subject to waterlogging. These areas are prone to waterlogging in the winter months and can be distinguished in the field by the sedge communities and by pronounced mottling and coloured streaking in the B horizons of the soil. The areas susceptible to waterlogging are shown on the **Opportunities and Constraints Plan**.

Although there is no objective evidence, it would appear that the areas of waterlogging on the property, particularly along the southern boundary, are the product of land clearing since settlement in the 1950s and 1960s. Waterlogging should not extend beyond its present limits on a permanent basis though it may spread seasonally following heavier than normal rainfall.

Because of the slope characteristics it is unlikely that the area of current waterlogging will extend significantly, even given the influence of above rainfall conditions. Some of the Fleming series shallow phase soils will be subject to seasonal waterlogging at a depth of about 50 – 60 cms. Consideration will be given to this characteristic when land capability for the subdivision is assessed in more detail.

Natural drainage from the soaks in the north west and western portion of the property runs south west towards Bukenerup Lake on the western neighbouring property. The degree of



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OPPORTUNITIES AND CONSTRAINTS PLAN
LOT 1492 PATERSONS ROAD
ESPERANCE

Member Practice

133 Scarborough Beach Road, Mount Hawthorn WA 6016
PO Box 99, MOUNT HAWTHORN WA 6915
T: 08 9443 1511 F: 08 9444 3901
E: whelans@whelans.com.au W: www.whelans.com.au
whelans
TOWN PLANNING

flow and quantity of surface water from these soaks fluctuates seasonally, with waterlogging occurring in the wetter months of the year.

2.3 SOILS

Aerial photographic interpretation and field survey techniques were used to map the soils of the farm into five mapping units. The distribution of the soils is shown on the Opportunities and Constraints Plan. The location of the sample auger holes is also shown on the Opportunities and Constraints Plan. The soils fall into these classes:

Corinup Series – C –

Well drained, deep, sandy soils with clearly defined podzolic characteristics. They occur on the flanks of the ridges and in the higher valleys. They are slightly acidic to neutral in reaction.

Fleming Series – F1 and F1s

These soils occur in two phases. There is a normal or deep phase and a shallow phase typically with dense rock fragments or partly weathered rock at 60cm plus or minus. They are duplex soils with a fine sandy A horizon, overlying the ironstone gravel layer. The A horizon consists of grayish sand which is acidic in reaction. The B horizon may be sandy clay loam or a light clay, golden yellow in colour, pH 7.5.

Rocky Terrain Rx and Rxs

These soils are found associated with the underlying bedrock of granites and gneiss which occur as three prominent ridges which trend in a south-west to north-east direction. The rocky terrain has free rock at the surface or else has shallow, sandy surfaced soils overlying orange-yellow, sandy clay loams at 10 – 15 cm. The rocky terrain without outcrop (Rxs) has grey, sandy surfaced soils up to 40 cm deep over sandy clay loams containing rock fragments.

2.3.1 Detailed Description of Soils

Corinup Series – C –

Depth (cm)	Horizon	Description
0 – 12	A1	Dark grey, fine sand, single grain; pH 6.0
12 – 65	A2	Pale brown or light grey fine sand; pH 6.5
65 – 120	B1	Brownish yellow fine sand; pH 7.0
120 +	B2	Yellow fine sand; pH 7.5

Fleming Series – F1 and F1s

Depth (cm)	Horizon	Description
0 – 10	A1	Very dark, greyish brown, fine sand; pH 6.5
10 – 40	A2 or 3	Brown, light grey fine sand; ferruginous segregations; pH 7.0
40 – 60	B1	Light yellowish brown, very pale brown fine sand with ferruginous segregations; pH 7.0
60 - 120	B2	Yellowish brown, fine sandy clay, distinct, grey mottles with segregations; pH 7.5

F1s – Fleming Series Shallow

Depth (cm)	Horizon	Description
0 – 10	A1	Very dark greyish brown fine sand; pH 6.5
10 – 50	A1 – 2	Lightish brownish grey, or pale grey, fine sand; pH 7.0
50 – 60	A2 – 3	Light yellowish brown, or pale grey fine sand with ferruginous segregations; pH 7.5
60 - 100	B1	Yellowish brown, fine sandy clay, prominent grey mottles with ferruginous segregations; pH 7.5

Rocky Terrain (Granite) Rx and Rxs

Depth (cm)	Horizon	Description
0 – 10	NA	Dark grey sand; pH 6.0
10 – 20	NA	Pale brown sand; pH 6.5
20 – 30	NA	Brownish yellow clayey sand, distinct grey/orange mottles; pH 7.0
30 +	NA	Yellowish brown clayey loam, distinct mottles; pH 7.0, fresh rock

Rxs Soils

Depth (cm)	Horizon	Description
0 – 10	NA	Dark grey; pH 6.0
10 – 30	NA	Pale brown sand; pH 6.5
30 – 60	NA	Brownish yellowish clayey sand, distinct grey/orange mottles; pH 7.0
60 +	NA	Yellowish brown clayey loam, distinct mottles; pH 7.0

2.4 VEGETATION

There are no significant stands of remnant vegetation on the property, with the property having been predominantly cleared in the past. Pasture and to a degree sedges is the predominant vegetation communities on the property. Some re-growth of native species has occurred in isolated pockets, particularly on the northern slope of the central ridge where there are numerous grass trees. This area has been fenced to prevent disturbance by livestock.

None of the existing vegetation has any ecological significance and the likelihood of there being any *Threatened Ecological Communities* is negligible. Notwithstanding, as a condition of subdivision approval, a formal flora survey could be conducted to ascertain and confirm the preliminary findings, there being no flora or vegetation of significance.

Prospective landowners of proposed lots should be encouraged to plant trees and vegetation as part of development approval. If carried out on a large enough scale, such plantings could reduce waterlogging downslope in certain affected areas.

Plate 1. Subject land has been predominantly cleared for agricultural pursuits

2.5 FAUNA

A complete fauna survey of the area was not completed for the purposes of this assessment. Known species in the area include western grey kangaroo, southern brown bandicoot, bush rat, honey possum, tiger snake, dugite, whistling kite, nankeen kestrel western, kookaburra, rosella, new holland honey eater and grey fantail.

Given the lack of remanent vegetation cover on the property and shelter at ground level, there is a strong likelihood that there would be a minimal representation from amphibians, reptiles, birds and mammals.

2.6 ACID SULPHATE SOILS

This investigation did not include Acid Sulphate Soil Testing. Acid Sulphate Soils occur in waterlogged soils and typically sandy silts and peat soils. There is a possibility that Acid Sulphate Soils could occur in waterlogged portions of the property. However, if development (such as house and road construction) is restricted to outside these waterlogged areas (and the soils are not disturbed), then there should be no issues with regard to the proposed development.

3.0 LAND CAPABILITY ASSESSMENT

3.1 LAND CAPABILITY UNITS

Land capability of the five units was assessed using the method devised by Wells & King[1]. This method breaks the land into five classes called land capability classes which indicate the degree of severity of physical limitations to a particular land use.

The management inputs required to relieve the potential for land degradation caused by a use is also specified. The classes are shown in Table 1. Class I is that land which has a very high capability for the intended use, there being few limitations to the use. Class V land has a very poor capability for the intended use, the costs and conditions necessary to make the use sustainable being prohibitive. Additional subscripts are applied to the classifications II – IV in order to indicate the quality or qualities which restrict the use. Land qualities include such matters as soil absorption ability, ease of excavation, slope instability, water and wind erosion hazard and microbial purification ability among others.

Table 1. Land Capability Classes

Capability Class	General Description
I	Very high capability for the proposed use or activity. Very few physical limitations present which are easily overcome. Risk of land degradation is negligible.
II	High capability. Some physical limitations affecting either productive land use or risk of land degradation. Limitations overcome by careful planning.
III	Fair capability. Moderate physical limitations significantly affecting productive land use or risk of land degradation. Careful planning and conservation measures required.
IV	Low capability. High degree of physical limitations not easily overcome by standard development techniques and/or resulting in a high risk of land degradation. Extensive conservation requirements.
V	Very low capability. Severity of physical limitations is such that its use is usually prohibitive in terms of either development costs or the associated risk of land degradation.

[1] *Land Capability Assessment Methodology for Rural – Residential Development and Associated Agricultural Uses;* MR Wells & PD King, 1989; WA Dept. of Agriculture

3.2 TYPES OF LAND USE PROPOSED

Three types of land use are considered in respect of the subdivisions which are proposed for the subject land. These are:

- House and road construction;
- On-site effluent disposal; and
- Small scale agricultural activities.

It is not proposed to include horticultural activities here since it is considered highly unlikely that horticulture in the sense of truck crops or market gardening will be practiced. Neither is land capability for hobby farm water supply included since there is insufficient information on ground water supplied. Most of the Fleming series should be suitable for dam construction, but the depth of suitable soils is not known. Local evidence suggests that small dams could be constructed and easily managed.

Land capability rating tables for the three land uses are shown in Tables 2 – 4. They are drawn from Dye et al[2]. The capability class in each table is determined by the most limiting land quality.

Table 2. Land Capability rating for housing and road construction

This land use refers to the construction of residential dwellings of one and two storeys and construction of roads with sealed surfaces for light vehicles. The capability assessment applies to house construction using either raft or strip foundations.

Land Quality	Capability Class				
	I	II	III	IV	V
Wind Erosion Hazard	Very low, low	Moderate, high	-	-	Very high
Water Erosion Hazard	Very low, low	Moderate	High	Very high	-
Ease of Excavation	High	Moderate	Low	Very low	-
Foundation Soundness	Good	Fair	Poor	Very poor	-
Slope Instability Risk	Nil	Very low	Low	Moderate	High
Flood Hazard	Nil	-	Low	Moderate	High
Waterlogging Hazard	Rapidly, well and moderately well drained	Imperfectly drained	Poorly drained	Very poorly drained	-

[2] *Rural Residential Land Capability Study*. RA Dye, AME Van Vreeswyk & GA Moore, 1990. MWA Dept. of Agriculture Land Resource Series No. 4

Table 3. Land Capability Rating Table for On-Site Effluent Disposal

This land use refers to the use of an area of land, one hectare or larger, for the on-site absorption of septic tank effluent from a single family dwelling. The assessment assumes that the most common system for on-site disposal will be used (not Alternative Treatment Units or ATUs). This involves use of one or more septic tank units followed by a subsurface soil absorption system. The soil absorption system may consist of one or more leach drains or, in deep sandy soil, two soak wells.

Land Quality	Capability Class				
	I	II	III	IV	V
Ease of Excavation	High	Moderate	Low	Very low	-
Microbial Purification Ability	High	Moderate	Low	Very low	-
Soil Absorption	High	Moderate	Low	Very low	-
Flood Hazard	-	-	Low	Very low	High

Table 4. Land Capability rating for Small Scale Agricultural Activities

This land use covers a diversity of small-scale agricultural activities which may be undertaken within a rural-residential situation.

Land Quality	Capability Class				
	I	II	III	IV	V
Wind Erosion Hazard	Very low, low	Moderate	-	High	Very high
Water Erosion Hazard	Very low, low	Moderate	-	High	Very high
Flood Hazard	Nil, low	Moderate	High	-	-
Waterlogging Hazard	Rapidly, well and moderately well drained	Imperfectly drained	Poorly drained	Very poorly drained	-
Water-holding Capacity	High, moderately	Moderately low, low	Very low	-	-
Salinity Hazard	Nil – low, moderate	High	-	Presently saline	Presently saline
Rooting Conditions	Very good	Good	Moderate	-	Poor
Trafficability	Very high, high	Moderate	Low	Nil	-

The land use requirements, for example, for land to be placed in Class II for on-site effluent disposal are moderately capability for excavation, microbial purification and soil absorption ability.

Table 5 (see Appendix 1) shows the land quality values for each of the five mapped units. In undertaking this examination of the land it was decided to exclude areas shown to be subject to seasonal waterlogging from any consideration of capability. The subdivision proposed takes the distribution of this type of land into account.

Phosphorous retention indices were determined for a range of samples taken from the Corinup and Fleming series of soils. The data are shown in Table 6.

Table 6. Phosphorous Retention Indices (PRI) for soils shown.

Soil Type	Horizon	PRI	Quality
Corinup	A surface	1.5	Very weakly absorbing
Corinup	B pale, yellow sand	4.3	Weakly absorbing
Corinup	A light brown sand	6.0	Moderately absorbing
Corinup	B yellow sand	9.5	Moderately absorbing
Fleming	A pale, yellow sand	26.0	Strongly absorbing
	B sandy, clay loam	233.0	Very strongly absorbing
	B sand, clay loam	478.0	Very strongly absorbing
Fleming Shallow	A clayey sand	29.0	Strongly absorbing
Fleming Shallow	B sandy, clay loam	129.0	Very strongly absorbing
Fleming Shallow	B sandy clay	965.0	Very strongly absorbing

4.0 DISCUSSION

4.1 Land Capability

The capabilities or classifications of the mapped units are shown in Table 7 with the appropriate subscripts which denote the land quality (or condition) which limits the ability of the land to support the designated use.

Table 7. Capability classifications of the mapping units shown

Mapping Unit	Housing and Road Construction	On-Site Effluent Disposal	Small Scale Agriculture
Corinup	II w	II p	III I – IV wm
Fleming	II w	I	II m – IV w
Fleming Shallow	II w	II i	II I – IV w
Rock Outcrops	IV xb	III a – IV xp	V r
Rocky Soils	III xb	III xpa	III r

The subclass subscripts indicating precautions to be noted are as follows:

a – soil absorption ability
b – foundation soundness
i – waterlogging risk
m – moisture availability
p – microbial purification ability
r – rooting conditions
w – wind erosion
x – ease of excavation

The classification suggests that the Corinup and Fleming units (and Rocky areas to a degree) can support housing and road construction and for on-site effluent disposal provided that attention is paid to the precautions noted.

The principal concerns for these soils for small scale agriculture is wind erosion, though moisture availability could be an issue in the Corinup sands. Waterlogging is also an issue in the lower reaches of the Corinup, particularly along the southern boundary (along Paterson Road) of the subject land.

The rock outcrops (Rx) have a low capability in general for the three uses, though pockets could have a fair capability for house construction and effluent disposal, subject to detailed geotechnical investigation to find a suitable site. An alternative could be *amended earth* approach, which is a more costly form of development to overcome constraints. The rocky soils (Rxs) have a fair capability for most uses, but it is necessary to observe a number of precautions.

4.2 On-Site Effluent Disposal

The *Draft Country Sewerage Policy* (Amendment 2003) states the following requirements for on-site wastewater disposal:

- Irrespective of the type of on-site wastewater disposal system proposed, there should be at least 0.5m separation distance between the natural ground surface and the highest known groundwater level;
- The site is required to have soil characteristics capable of receiving all wastewater likely to be generated on the site without risk to public health or the environment; and
- The natural land slope on which wastewater disposal is to occur shall not exceed a one in five gradient.

Wastewater System Installation Requirements:

- The wastewater disposal site should not be subject to inundation or flooding at a probability greater than once in 10 years;
- No wastewater system shall be constructed so that effluent or liquid waste will be discharged into the ground at a distance less than 30 metres from any well, stream or private supplies intended for consumption by humans;
- The depth to the highest groundwater level from the underside of a septic tank effluent drainage receptacle shall be a minimum 1.2m; and
- Setbacks, groundwater clearance and installation requirements of systems other than conventional septic tank systems shall comply with any particular treatment relevant to the particular system.

Overall the subject site has soils which are conducive to on-site effluent disposal. The elevated areas along the ridgeline rocky outcrops may require some excavation and *amended earth* due to the rock and shallow soils present. Subject to geotechnical assessment, phosphate removing ATUs may be preferred over traditional septics in areas where phosphorous retention ability in soils is low. A list of recommended ATU's is supplied in the Appendix and this would be subject to detailed investigation at the development approval stage. The waterlogged areas where ground and water table separation is less than 500mm are not suitable for development.

4.3 Areas subject to waterlogging

Areas were identified as having seasonal waterlogging, recognisable by the sedge communities. Development should be excluded from these waterlogged areas. Waterlogged areas are not suitable for residential use. Grazing should not be encouraged in these areas until pastoral rehabilitation is completed, due to the potential for erosion from animals in those areas where soil structure is poor. Subject to satisfactory pastoral rehabilitation, livestock may be reintroduced into these areas. Building envelopes on proposed lots should be located so as to avoid areas prone to seasonal waterlogging.

4.4 Bukenerup Road Reserve

Currently the section of Bukenerup Road along the western boundary of the property is unconstructed. Significant remnant vegetation is present within the road reserve. The predominant vegetation type found within the road reserve includes stands of *Acacia* and *Epacridaceae* shrub and to a lesser extent *Banksia* and *Xanthorhoea preissici*.

It is recommended that consideration be given to retaining the remnant vegetation in the road reserve. The remnant vegetation should be conserved, as it contributes to biodiversity in the area, which has mostly been cleared for agricultural activities.

The section of Bukenerup Road containing remnant vegetation is considered important as it forms an ecological link north-south within the Bukenerup Lake catchment and also links the wet areas on the adjacent properties to the north (currently Lot 75) and subject land to the west. In this instance, should the Shire wish to construct Bukenerup Road as a link between Paterson Road and Shark Lake Road, it is recommended that either (i) Bukenerup Road be widened so as to preserve the remnant vegetation, or (ii) the Shire reconsider the need to provide such a link, given that a road would cut across natural drainage lines flowing south-west towards Bukenerup Lake and alter the topography and hydrology in the area.

The proposed subdivision does not require the construction of Bukenerup Road along the full length of the property boundary to provide access to lots. The waterlogging hazard along the western boundary would limit access to proposed lots and road construction in general.

It is recommended that proposed lots take access from an alternative new internal road to avoid this waterlogging hazard and interfering with the current natural drainage. It is also recommended that to retain the ecological link provided by the remmant vegetation within Bukenerup Road road reserve, the section of Bukenerup Road to the south be re-aligned as shown on the **Figure 2. Bukenerup Road Ecological Link Concept**.

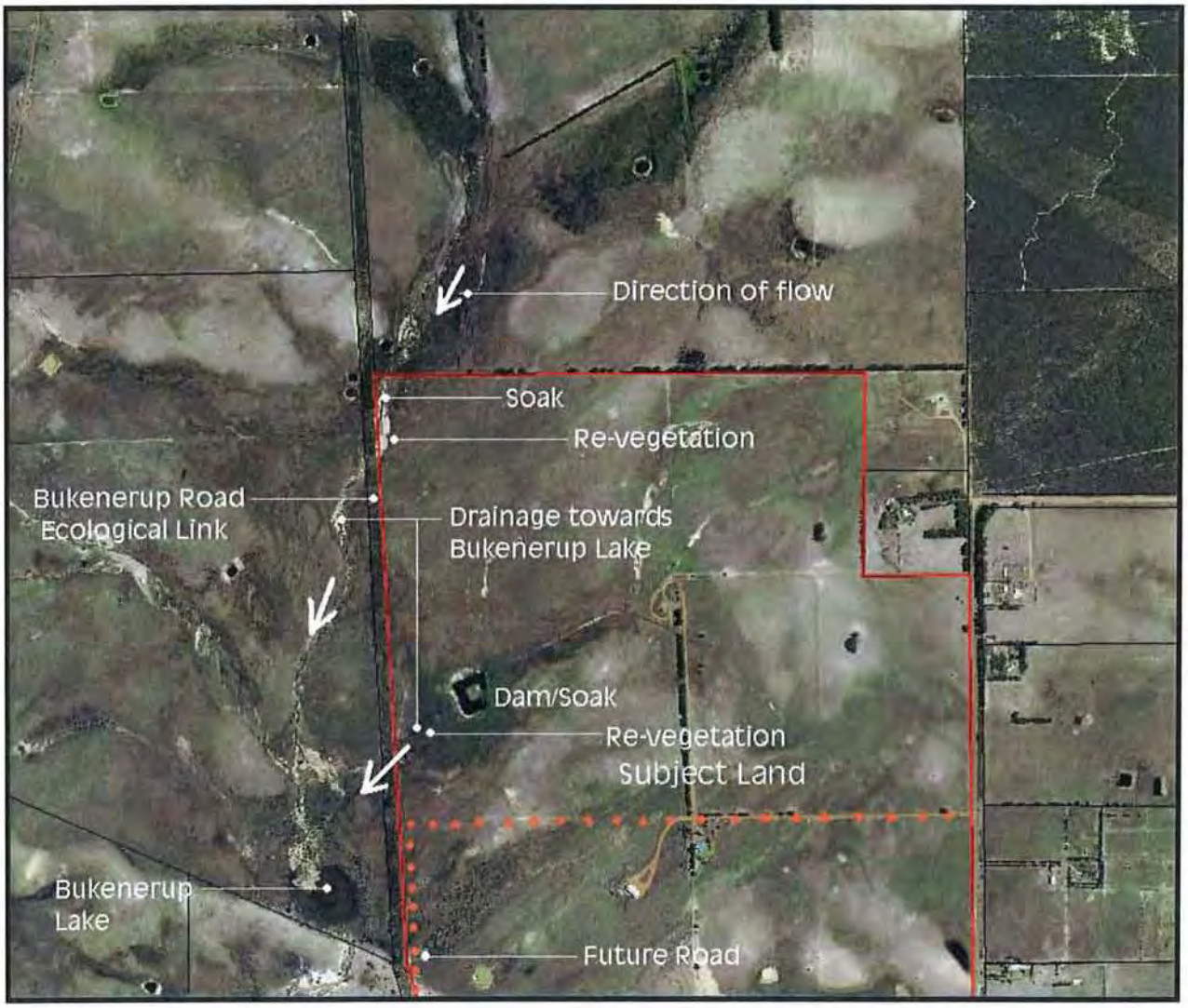


Figure 2. Bukenerup Road Ecological Link Concept

Plate 2. Existing vegetation in Bukenerup Road which is worth retaining in proximity of the proposed road widening along western boundary

Plate 3 View looking north along Bukenerup Road road reserve from approximately where the new subdivision road intersection with Bukenerup Road will be located

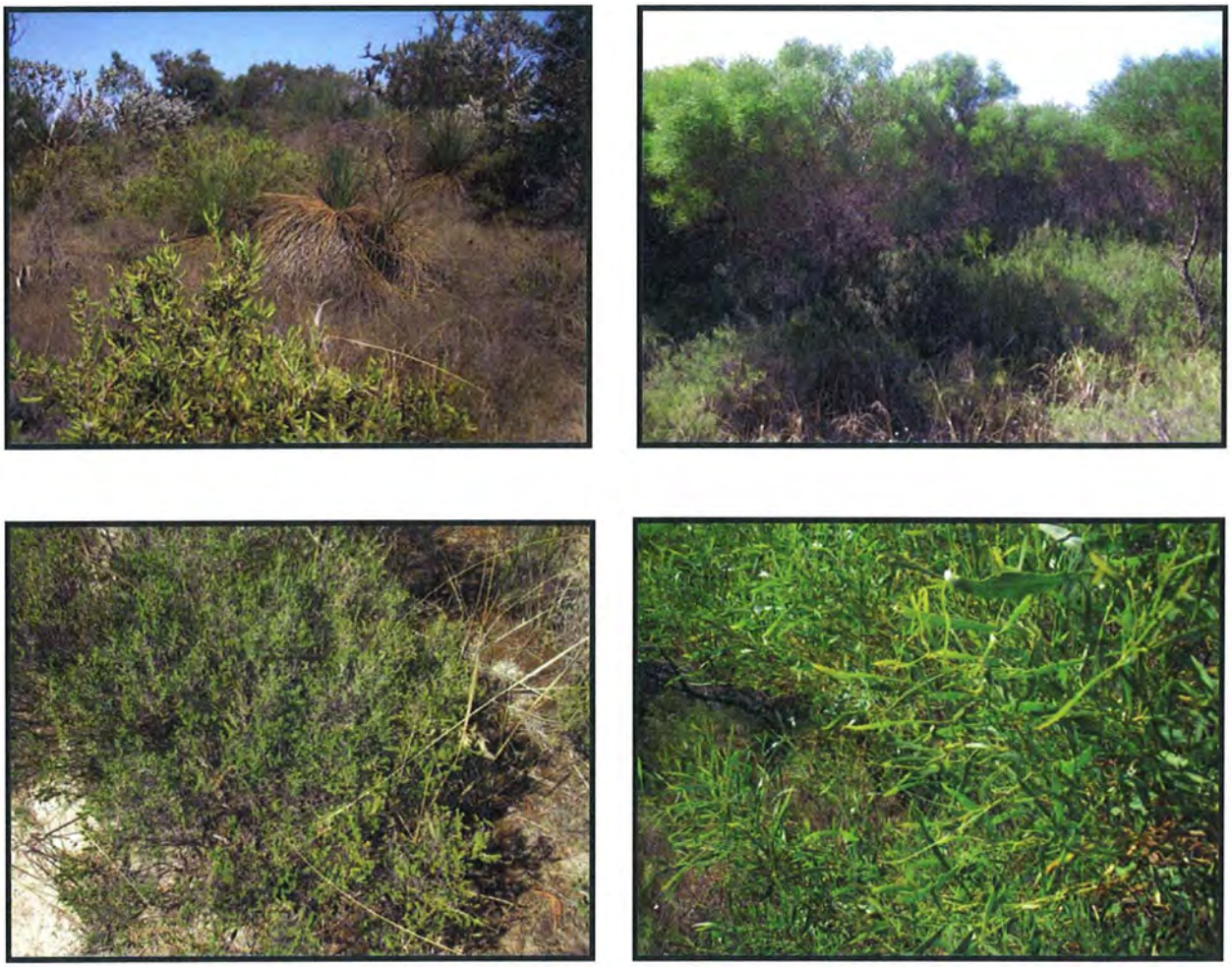


Plate 4 Typical vegetation found in the Bukenerup Road reserve proposed for retention as an ecological corridor (i.e. *Acacia, Xanthorrhoea, Epacridaceae, Hakea* and *Banksia*)

4.5 Opportunities for re-vegetation around drainage lines

It is recommended that consideration be given to re-vegetate around natural drainage lines in the north-west and western portions of the property, that feed into the tributary creek on the western neighbouring property ultimately flowing into Bukenerup Lake (Figure 2). This is particularly recommended in the north-west corner of the property, where some scouring (soil erosion) of the land around drainage lines has taken place over time. Re-vegetation will contribute towards managing soil erosion by water flow, which ultimately has an influence on water quality. Because the property has been almost totally cleared, prospective purchasers should be encouraged to plant trees to assist in land management.

4.6 Proposed Subdivision Guide Plan

The Subdivision Guide Plan is shown in Figure 3. Comments on each of the lots are detailed below. The overall design is a result of the bringing together of land capability, aspect and existing infrastructure. The design ideally represents a staged process based on market demand and sequential development. Some of the lots are more constrained than others, particularly by potential seasonal waterlogging, restricting access and sites for buildings.

Lots 1 – 5

Corinup series soils are present in each with rocky ridges as well. The Fleming series soils are well suited to house and road construction and on-site effluent disposal. The views across the countryside from the ridge are excellent. There are no terrain constraints.

Lots 6 – 9

A rocky major ridge traverses north east to south west and the area in the north west is fenced off and prone to waterlogging. The Corinup series can provide suitable house sites. Some excavation work is likely for construction of house sites on the ridge and this would be subject to detailed geotechnical report and building design. The western boundary of the lot contains a power transmission line. The large area prone to waterlogging in the north west corner of Lots 6 – 8 is not suitable for house and road construction. Bukenerup Road is currenly not constructed and access should be limited from Bukenerup Road to conserve remnant vegetation and avoid waterlogged areas.

Lots 10 – 15

A large waterlogged area dominates much of Lots 10, 11 & 12. The Fleming series soils are conducive to rural residential development. There are good views for Lots 11 – 14 overlooking the countryside to the north for a house site on the slopes. Lot 15 contains the existing Yards Shed and Bore. The large dam and soak area is shared between Lots 10, 11

& 12, which would provide good rural character and amenity. Livestock should be restricted in areas prone to waterlogging to prevent potential for soil erosion. The livestock restriction should apply until soils and pasture are stabalised through rehabilitative measures. A combination of pastoral rehabilitation and re-vegetation plantings is recommended within the waterlogged area to manage waterlogging and aim to lower the water table and stabilise soils.

Lots 16 – 21

The Corinup and Fleming series on these lots is no barrier to rural residential development for house and road construction nor to on-site effluent disposal. There are no terrain constraints. Lots 16 – 18 have excellent views overlooking the countryside.

Lots 22 & 23

There are no constraints to the use of rural residential development. It is noted that a transmission power line traverses Lot 23. It is recognised that Western Power might require an easement over the high voltage transmission line which traverses the property.

Lots 24 - 28

These lots are orientated north-south on the ridge, primarily to maximise the spectacular views to the south overlooking the lakes and countryside. The highest point on the ridge is approximately 70 AHD where the existing shed site is located, compared with the lowest point approximately 25 AHD along the southern boundary at Paterson Road. From here, there are panoramic views in every direction.

Some excavation of the rocky ground may be required for the housing sites for each lot. It is noted that the existing house is situated on this rocky ridge on proposed Lot 25. Vehicular access to these lots would be via a proposed subdivision road linking Paterson Road and Bukenerup Road.

Lots 29 & 30

Placement of housing sites should be located outside of the existing fenced re-growth area. The southern half of Lot 30 is subject to waterlogging and access to the lot preferably should occur from the west via Bukenerup Road (to be constructed), however access to Lot 29 could be taken from the new subdivision road. There should be revegetation considerations (particularly for Lot 30 around waterlogged areas) and restrictions on livestocking within waterlogged areas until the land is stabalised.

Lots 31 – 34

These southern lots are subject to seasonal waterlogging, however, there are high ground areas on these lots up on the slope that can accommodate building envelopes for new dwellings.

The watertable along the southern boundary has almost certainly risen substantially on the south due to the clearing of the land. These soils are waterlogged and have poor water holding capacity. Pastoral rehabilitation and/or plantings on a suitable scale can assist in reducing waterlogging. Restrictions on livestocking due to waterlogging and management of soil erosion on the sloping terrain is necessary.

Construction of Paterson Road would be required to provide vehicular access to these lots. In addition, the landowner proposes to undertake some re-contouring and cut to fill work on the land to improve the soil water absorption and reduce the water logging in the southern portion of the property.

Lots 35 & 36

Areas of these lots is subject to seasonal waterlogging. Housing sites should preferably be located on Corinup series, with residences located away from waterlogged areas. The waterlogging is likely to be the result of natural surface drainage flowing south-east off the ridge slope and also due to the almost total clearing of the land. The existing dams on the lots could be upgraded to accommodate and manage surface water drainage flowing down from the ridge.

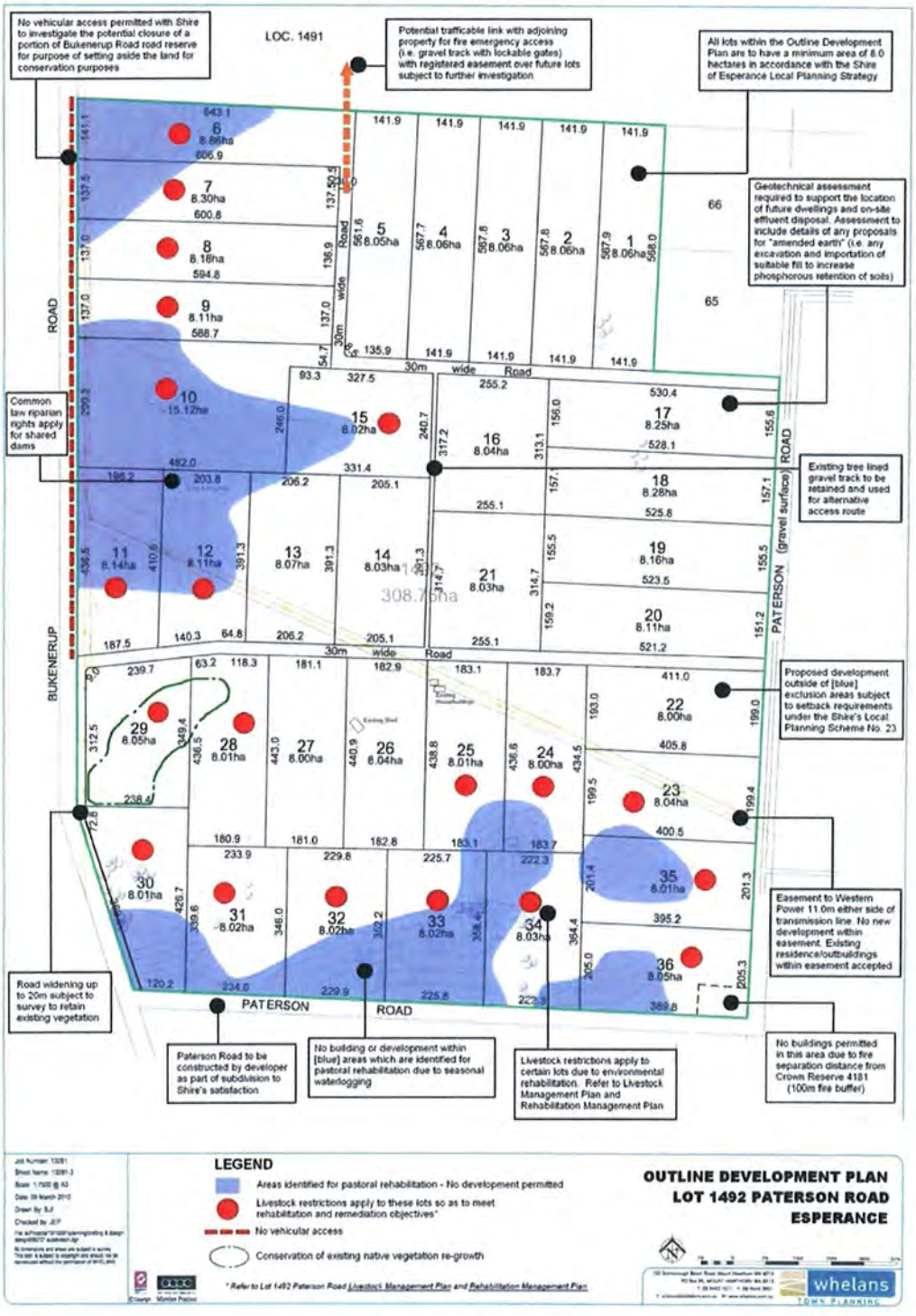


Figure 3. Subdivision Guide Plan for Lot 1492 Paterson Road, Esperance

5.0 CONCLUSIONS

Overall the subject site has the capability for rural residential development over most of the property, excluding waterlogged areas. Consideration to planning the lot layout and road alignments in view of the findings of the Land Capability Assessment would assist in overcoming any limitations. This has been achieved in the proposed Subdivision Guide Plan.

The waterlogged areas on the subject site [in its current state] are unsuitable for development and rural pursuits. Rehabilitation should be encouraged for these seasonally waterlogged areas. This can be undertaken by plantings and pastoral rehabilitation. Grazing within waterlogged areas or on the ridge slopes is not recommended, due to the potential for soil erosion.

It is recommended that the remnant vegetation in Bukenerup Road be conserved as it forms an ecological north-south link that contributes to biodiversity within the Bukenerup Lake catchment area. The road reserve should either be re-aligned by widening. A better outcome would be to not construct Bukenerup Road at all, as it would have an impact on the natural hydrology within Bukenerup Lake catchment and it is questionable as to whether this road should be constructed as a necessity in the context of the local road network.

The costs to construct a road along this section of Bukenerup Road and the associated costs to put in place environmental management practices would most likely outweigh the benefits of having a road in this location.

The proposed Subdivision Guide Plan demonstrates that this section of Bukenerup Road is not required to be constructed. Efforts to re-vegetate around natural drainage soaks on the property, that feed into the creek system on the adjoining western property, should be encouraged. This could be made a condition of subdivision and/or development approval.

The proposed subdivision, as indicated in the Subdivision Guide Plan, takes into account landforms, land capability and existing infrastructure. The findings of the land capability study are such that there are no significant environmental or land use limitations to the proposed subdivision, provided that planning observe precautions discussed in this report, particularly in areas affected by seasonal waterlogging.

whelans

APPENDIX

Government of Western Australia : Department of Health
Approved Alternative Efffluent Disposal Systems

Nutrient (Phosphate) Removing Effluent Disposal Systems

ECOMAX

Ecomax Waste Management Systems Pty Ltd
Unit 2/13 Emplacement Crescent
HAMILTON HILL
Ph: (08) 9335 1600
Fax: (08) 9335 1606
Website: http://www.ecomax.com.au
E-Mail: ecomax@bigpond.com.au

FILTREX WASTEWATER IRRIGATION SYSTEM

Filtrex Innovative Wastewater Solutions
PO Box 5122
BUNBURY WA 6231
Ph: (08) 9726 0118
Fax: (08) 9726 0117
Website: http://www.filtrex.com.au
E-Mail: info@filtrex.com.au

BIOLOGICAL FILTER SYSTEMS

Biolytix Filter (BF-6 Aerated) : Biolytix Technologies

PO Box 591
MALENY QLD 4552
Ph: (07) 54352700
Fax: (07) 5435 2701
Website: http://www.biolytix.com
E-Mail: info@biolytix.com

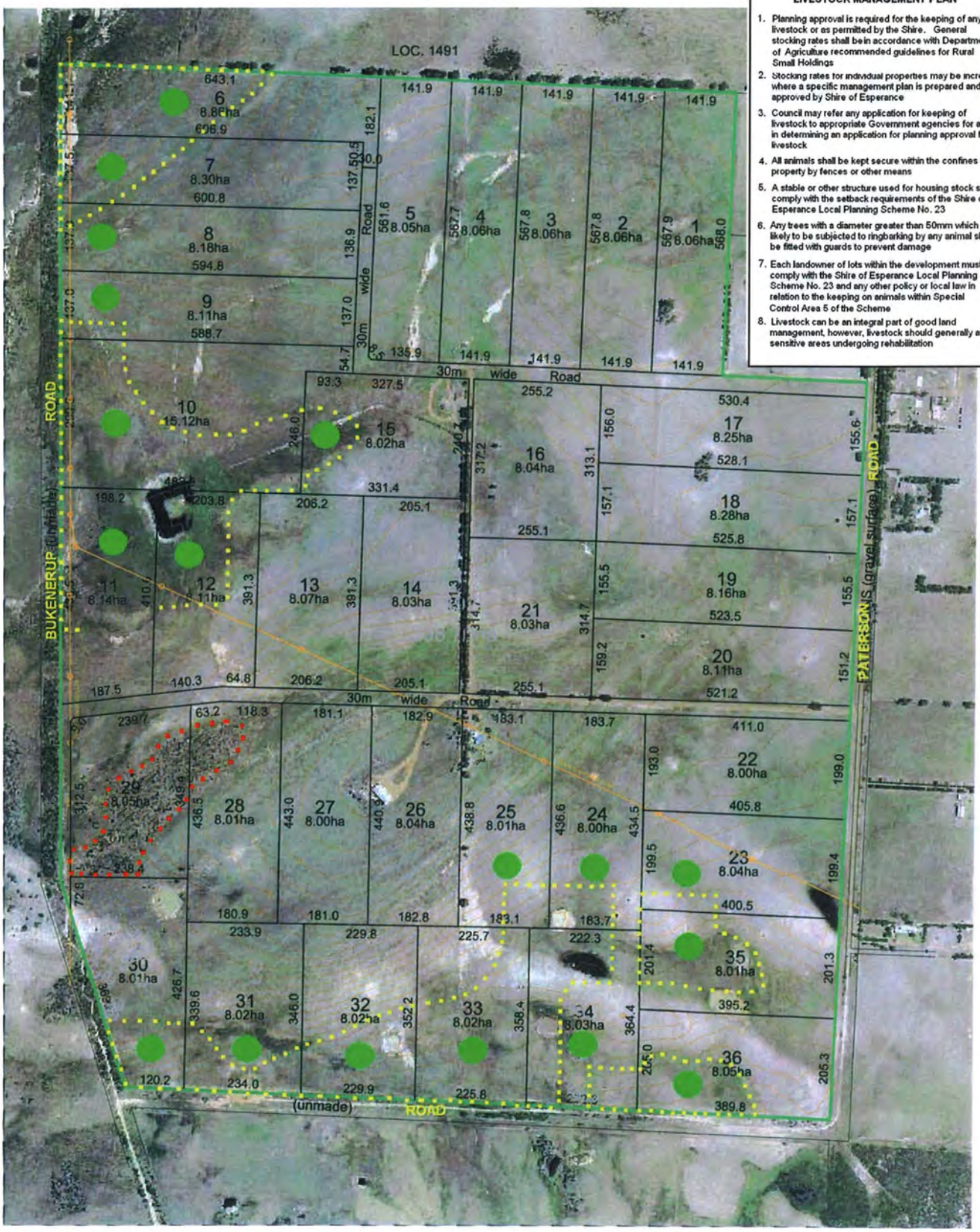
Table 5. Land Quality Values for the Mapped Units shown on the Subject Land

Mapping Unit	Soil Absorption Ability	Foundation Surfaces	Slope Instability	Wind Erosion Hazard	Water Erosion Hazard	Flood Hazard	Ease of Excavation	Water-logging Hazard	Microbial purification ability	Water Pollution Risk	Water Holding Capacity	Salinity Hazard	Rooting Conditions	Trafficability
Corinup	High	Good	Nil	Low	High	Low	High	Rapidly drained	Moderate	Very Low	Low	* Nil	Very good	High
Fleming	High	Good	Nil	Low	High	Low	High	Rapidly drained	High	Low	Low-moderate	Nil	Very good	High
Fleming Shallow	High	Good	Nil	Low	High	Low	High	Imperfectly drained	High	Low	Moderate	Nil	Good	High
Rock Outcrops	Low	Fair	Nil	Low	Low	Low	Very Low	Moderately well drained	Very Low	Low	Very Low	Nil	Poor	High
Rocky Soils	Low	Fair	Nil	Low	Low	Low	Low	Moderately well drained	Moderate	Low	Moderate	Nil	Moderate	High

* Water table rise in the lowest parts may increase salinity locally

APPENDIX 2

LIVESTOCK MANAGEMENT PLAN
Lot 1492 Paterson Road, Esperance



LIVESTOCK MANAGEMENT PLAN

1. Planning approval is required for the keeping of any livestock or as permitted by the Shire. General stocking rates shall be in accordance with Department of Agriculture recommended guidelines for Rural Small Holdings
2. Stocking rates for individual properties may be increased where a specific management plan is prepared and approved by Shire of Esperance
3. Council may refer any application for keeping of livestock to appropriate Government agencies for advice in determining an application for planning approval for livestock
4. All animals shall be kept secure within the confines of the property by fences or other means
5. A stable or other structure used for housing stock shall comply with the setback requirements of the Shire of Esperance Local Planning Scheme No. 23
6. Any trees with a diameter greater than 50mm which are likely to be subjected to ringbarking by any animal shall be fitted with guards to prevent damage
7. Each landowner of lots within the development must comply with the Shire of Esperance Local Planning Scheme No. 23 and any other policy or local law in relation to the keeping on animals within Special Control Area 5 of the Scheme
8. Livestock can be an integral part of good land management, however, livestock should generally avoid sensitive areas undergoing rehabilitation

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Sheet Name:	
Scale	1:7500 @ A3
Date:	16 March 2010
Drawn By:	JP

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LEGEND

- Livestock prohibited within area fenced for conservation of native vegetation re-growth
- Areas to be rehabilitated with clay and humified compost and perennial grasses/pastures
- Livestock restricted within rehabilitation areas until rehabilitation of pastures can sustainably support livestock to the satisfaction of the Shire of Esperance

LIVESTOCK MANAGEMENT PLAN
LOT 1492 PATERSON ROAD
ESPERANCE

133 Scarborough Beach Road, Mount Hawthorn WA 6016
PO Box 99, MOUNT HAWTHORN WA 6915
T: 08 9443 1511 F: 08 9444 3901
E: whelans@whelans.com.au W: www.whelans.com.au
whelans TOWN PLANNING

APPENDIX 3

STORMWATER AND DRAINAGE MANAGEMENT PLAN
Lot 1492 Paterson Road, Esperance

Job No: 10-054

Whelans

Stormwater Management Plan

For

Proposed Subdivision of Lot 1492 Paterson Road, Esperance

April 2010

PRITCHARD FRANCIS PTY LTD
Civil and Structural Engineering Consultants

234 Railway Parade
WEST LEEDERVILLE WA 6901
Telephone: 9382 5111 Fax: 9388 1769

CONTENTS

1 INTRODUCTION

1.1 Background

At the request of Mr Justin Page of Whelans, Pritchard Francis Pty Ltd has prepared this report to assist the planning of stormwater infrastructure services required for the subdivision of Lot 1492 Paterson Road, Esperance.

Lot 1492 is located approximately 12 kilometres northwest of Esperance, and is bounded by Paterson Road to the East and South, and Bukenerup Road to the West.

It is proposed to divide the existing lot into 36 semi-rural lots of minimum size 8 Ha.

A plan of the proposed development as prepared by Whelans dated 27 July 2009 is attached in Appendix A.

Figure 1: Lot 1492 Paterson Road, Esperance

1.2 Objectives

This report will detail the stormwater management strategy for the semi-rural subdivision, in line with the best practice approach prescribed by the Department of Water and the Shire of Esperance.

1.3 References

This report has been compiled based on the following terms of reference:

- Australian Rainfall and Runoff
- Australian Runoff Quality 2006 – A Guide to Water Sensitive Urban Design.
- Consultation with the Shire of Esperance.
- Department of Agriculture and Food Resource Management Technical Report 347: Esperance Area Acid Sulfate Soil Hazard Mapping dated August 2009.
- Department of Environment and Conservation.
- Department of Water Better Urban Water Management October 2008
- Department of Water Stormwater Management Manual for WA.
- Dial Before You Dig data.
- Institute of Public Works Engineering Australia Local Government Guidelines for Subdivisional Development, Edition 2, 2009.
- Proposed subdivision layout and land use mapping provided by Whelans dated 27 July 2009.
- Shire of Esperance Subdivisional Development Guidelines.
- Whelans Land Capability Assessment dated May 2009.

2 SITE EVALUATION

2.1 Site Topographical Evaluation

The proposed development site is situated to the west of Paterson Road, and has a gross area of approximately 308 ha. The northeast part of the site lies at approximately 60m AHD and slopes toward the northwest corner of the site at 44m AHD.

There is an existing house located centrally on the site with an elevation of 70m AHD. This is a high point on the site that slopes down to both the north and south from this elevated area. There are several topographical low points to the west at 44m AHD, and south at 25m AHD, resulting in areas of seasonal inundation.

The property residence has access from Paterson Road. The property is bounded by cleared rural land, with national parks to the northeast and southeast, and a lake system to the southwest and southeast.

The majority of the site has been previously cleared for agricultural purposes. There is a small amount of native vegetation located on the north side of the house site that lines an existing access road.

2.2 Site Geology and Geotechnical Investigation

A formal geotechnical investigation has not been undertaken as yet, however various field investigations in the area provide information about the site geology.

Sample auger holes completed as part of the field survey for the Land Capability Assessment prepared by Whelans in May 2009 indicate that portions of the site consist of fine non-cohesive sands varying between 0.3 to 0.6m deep, overlaying sandy clays to approximately 1m deep. In other parts, the site consists of grey/brown sand to a depth of approximately 0.2m, overlying clayey sand varying between 0.3 and 0.6m deep and clayey loams beneath this sand. There are also areas of rocky terrain, consisting of free rock overlying clayey loams in the southern portion of the site.

Boreholes from investigation completed for the Resource Management Technical Report 347: Esperance Area Acid Sulfate Soil Hazard Mapping indicated the soil near the southern boundary consists of dark yellow clay from a depth of 2-5m, subject to severe and prolonged water logging, and pale blue grey clay from 5-6m. This area was classified as having a low Acid Sulfate Soil (ASS) risk, as 'the wetlands, swamps and drainage lines of this system are limited in extent, formed from much older sediments that are likely to have already been oxidised during past geomorphological environments, and are remote from areas where significant development activities are likely to occur'.

Although the area has been classified as having a low acid sulphate soil risk, it is recommended to use non-intrusive construction techniques to minimise the risk of disturbing potential acid sulphate soils. Roads and crossovers within waterlogged areas should be constructed over the natural ground to minimise earthworks, and building construction should only be permitted outside waterlogged regions, as indicated in Appendix A. If due consideration is given to careful construction practice to ensure minimal soil disturbance, acid sulphate soils should not become an issue for this development.

2.3 Ground Water Level

The Department of Water Geocentric Datum Australia 1994 indicates that the groundwater depth in the region is approximately 1-3m below the natural surface level, and is subject to seasonal variation.

There are several areas to the west and south of the property that are subject to waterlogging at a depth of 50 to 60cm during the winter and periods of high rainfall. These are shown in Appendix A. It is noted in Esperance Lakes Nature Reserve Management Plan 1999-2009 that increasing salinity has become a problem in these low-lying areas.

2.4 Existing Service Infrastructure

Dial Before You Dig data indicates that there is Telstra infrastructure located within the east side of the lot, and a 160mm high pressure gas line located along the east and south boundaries of the site.
There are also overhead power lines along the west boundary and across the site running east to west.

2.5 Existing Drainage

From consultation with the Shire of Esperance, there is minimal drainage infrastructure in the area. Currently Paterson Road is a crowned gravel road that drains to open drains. These drains are covered in natural grasses and ground cover and infiltrate runoff at source.

Stormwater runoff on site moves overland to weakly formed channels in the topography. The northern half of the site predominantly leads towards a dam on the western side of the property and then further to this, flows overland to Bukenerup Lake adjacent to the site.

This is similar in the southern half of the site with water moving overland from the crest in the site towards Bukenerup Lake in the southwest and rural land and national parks to the south of the site.

As reported by Whelans in their Land Capability Assessment, stormwater runoff to the south does reach a portion of the site prone to waterlogging in the winter months at depths of about 50 to 60cm.

3 STORMWATER DRAINAGE

3.1 Objectives

The stormwater drainage design philosophy for this development will be in accordance with:

- The Water Sensitive Urban Design (WSUD) guidelines.
- Urban Water Management guidelines.
- The Shire of Esperance Subdivision Development Guidelines.
- Australian Rainfall and Runoff 2001 and best management practice.

The primary objectives of stormwater management in this case are to:

- Ensure pre-development conditions, with respect to surface and groundwater quality, are maintained or improved, and the total water balance is maintained.
- Retain natural waterways and wetlands, and ensure that existing flow patterns, within and downstream of the site, are not disrupted by the development.
- Drainage system to attenuate runoff from the proposed development for a 1 in 10 year storm event.
- Minimise additional runoff from the proposed development for a 1 in 100 year storm event.
- Protect the proposed housing development from flooding and water damage.

3.2 Drainage Strategy

The proposed road reserves intersect natural overland flow paths across the development. In line with the stormwater management objective point 2, runoff will be collected in open drains adjacent to the road formation and directed towards culverts positioned to facilitate the movement of stormwater in its existing flow pattern. The overland flow paths are indicatively shown in Appendix B.

As per the Shire of Esperance and Local Government Guidelines for Subdivisional Development, the runoff drains will be sized to accommodate flow for a storm event of 1 in 10 year average recurrence interval (ARI). Appendix C gives runoff coefficients and stormwater quantities using the rational method formula, where flow rate is:

$Q = CIA$
Where,

Q = Flow rate in L/s,
C = Runoff coefficient,
I = Rainfall intensity in mm/hr,
A = Catchment area in Ha,
t_c = Time of concentration

A typical road cross section is shown in Appendix D. In line with the Shire of Esperance standards, this will allow for a minimum of 150mm separation between the road base and the top of the water level for a 1 in 10 year event.

The creation of road reserves and development sites (nominated as 60 x 30 m in Appendix A) on each property will marginally increase runoff from the site.

Total Area = 308 Ha
Proposed Road Reserve= 20 Ha
Proposed Development Site = 6.5 Ha

Change in Runoff Coefficient = 0.32
Volume Increase for a 1 in 100 year Event = 3440 m^3
Length of runoff drain to accommodate extra volume = 1376 m

As per the Shire of Esperance guidelines, runoff drains will be designed to attenuate this amount of additional water in large events so as not to increase runoff to downstream catchments. Four areas have been nominated in Appendix B as areas that will feed downstream catchments. These parts of the runoff drains will be further protected with additional rock armour around culverts and leaky rock walls to attenuate flow downstream. A typical leaky rock wall can be seen in Appendix E. Further to this, as recommended by the Shire of Esperance, these areas could be planted with native flora to help prevent erosion of sandy soils and aid filtration of runoff and infiltration of stormwater.

As noted, the site has an undulating topography. In parts where road reserves have been allocated, the site grades between 3-5%. These grades will facilitate the water velocity at the recommended maximum rate of 1m/s. It is intended to use leaky rock walls or typical drop structures as shown in Appendix F should velocities exceed this maximum rate. In line with the objectives of Water Sensitive Urban Design, drains will be cut at minimum grades to promote infiltration at source. The existing Paterson Road uses this philosophy with large flat runoff drains.

The overland flow paths for the development are in line with the existing overland flow paths for the rural pasture. For analysis purposes, the site has been split into 12 catchments as shown in Appendix B. Catchment calculations for each area are shown in Appendix C.

Runoff from Area 1 shall be directed toward Paterson Road, where it will move under the road via a culvert and continue toward the south of the property.

Runoff from Areas 2 and 3 shall be directed along the road reserve to a culvert, where it shall pass under the road and collect in an open drain. In the event of a large storm, this drain shall overflow and water will move overland via natural flow paths into the dam on lot 10.

Runoff from Areas 4, 5 and 6 shall follow existing overland flow paths toward Bukenerup Road and continue toward Bukenerup Creek. This section of Bukenerup road will not be sealed as part of the subdivisional development, as remnant vegetation within the road reserve has been identified to be conserved.

Runoff from Area 8 shall be directed to a sedge-lined drain near the southwest corner of the property. The sedges will aid infiltration and pollutant removal. In the event of a large storm, this drain shall overflow and runoff will naturally flow into the Bukenerup Road reserve towards Bukenerup Lake.

Runoff from Areas 7, 11 and 12 shall be directed toward Paterson Road where it shall move via drains and culverts toward the topographical low points at the south of the property. Runoff from Areas 9 and 10 shall also be directed toward this low point. In the event of a 1:100 year storm, it is proposed that the water shall flow through culverts under the road at the south of the property. Overflow will be directed through leaky rock walls and into the natural overland flow paths, one towards the dam on the adjacent property closest to the boundary and also towards the lake system to the south east of the site.

Residential Development

It is recommended that roof runoff be collected and stored in rainwater tanks on site. This will reduce the runoff from the development and help maintain the site water balance.

In line with the Shire of Esperance Subdivisional Development guidelines, it is recommended that development levels are 1.2m above the AAMGL. Considering the nominated water table, it is recommended there is a minimum of 300mm separation between natural ground and finished floor levels.

It is also recommended that development take place outside of nominated inundation areas. The embankment for access roads in these areas will need to be raised from natural ground level and lined with shallow sub-soil drains. Further geotechnical investigation will help optimise the proposed position for housing development.

It will be necessary to construct culverts under property crossovers. A typical pipe culvert is shown in Appendix F.

CONCLUSION

This report outlines the stormwater management strategy for the proposed development of Lot 1492 Paterson Road into 36 semi-rural lots. The primary objective of the plan is to minimise the effect to natural waterways and downstream catchments inline with the Shire of Esperance and Australian Rainfall and Runoff Standards. This will be achieved through the use of runoff drains adjacent to the road formation to infiltrate water at source where possible and move water to existing overland flow paths where necessary. Open drains will be rock armoured around culverts and planted in areas designed for inundation. This will aid erosion protection and promote water quality.

As detailed in the report, consideration will need to be given to construction within waterlogged areas subject to seasonal inundation, to ensure separation from the ground water level and varying soil conditions. This strategy will reduce the risk of flooding to developments and disturbance of possible acid sulphate soils. It is recommended further geotechnical testing confirm site conditions in this regard.

It is noted that a high pressure gas main is in the vicinity of the site. Confirmation of position via survey should take place before detailed design.

Overall the stormwater management plan confirms that the proposed drainage system for the subdivision can accommodate a storm event of a 1 in 10 year ARI, and has sufficient storage capacity to contain the additional runoff generated by development.

Appendix A: Subdivision Guide Plan prepared by Whelans on the 27 July 2009

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Date: 27 July 2009	
Drawn By: SJF	
Checked by: JEP	

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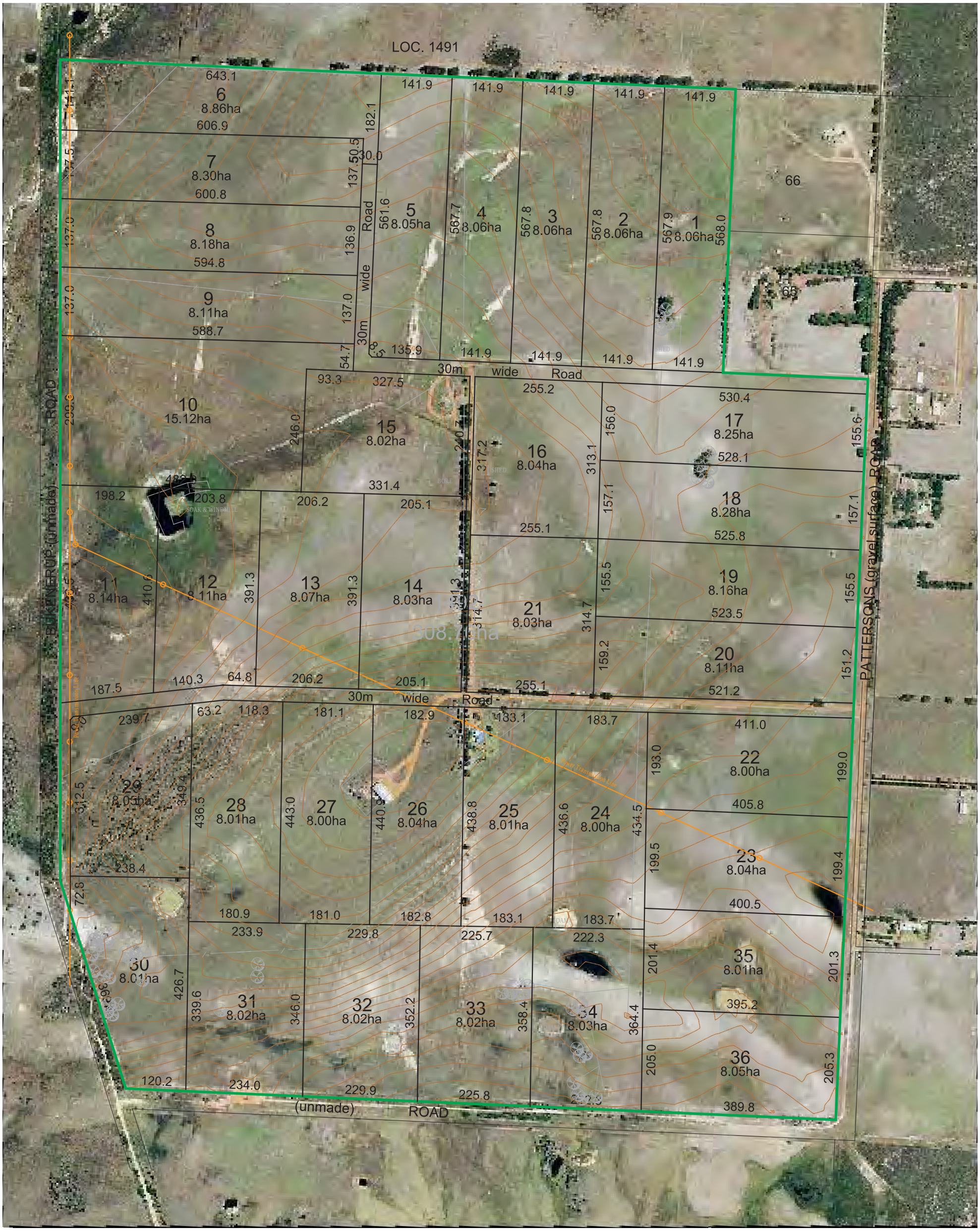
LEGEND

1. Proposed Bukenerup Road Ecological Link (Remnant Vegetation)
2. Proposed road widening for Bukenerup Road re-alignment to conserve remnant vegetation
3. Retain existing house on Lot 25
4. Paterson Road to be constructed as part of later staging (i.e. Lots 30 - 34)
5. Proposed upgrading of existing roads
6. New subdivision roads (to be constructed as part of staged development)
7. Fire emergency access road (10m wide) over existing tree lined internal gravel access road for alternative escape route
8. Areas susceptible to seasonal inundation and waterlogging not suitable for housing
- Livestock restrictions due to topography and inundation (management of land erosion)
- Indicative location of building envelopes (30m x 60m) which can be negotiated by prospective landowners
- Restricted vehicular access due to waterlogging hazard and seasonal inundation. Note alternative vehicular access to lot from other roads

SUBDIVISION GUIDE PLAN
LOT 1492 PATERSON ROAD
ESPERANCE

whelans
TOWN PLANNING



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Date: 31 July 2009	
Drawn By: SJF	
Checked by: JEP	
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All dimensions and areas are subject to survey. This plan is subject to copyright and should not be reproduced without the permission of WHELANS.	

Member Practice

PROPOSED SUBDIVISION
LOT 1492 PATERSON ROAD
ESPERANCE

75 0 75 150 225 300 375

133 Scarborough Beach Road, Mount Hawthorn WA 6016
PO Box 99, MOUNT HAWTHORN WA 6915
T: 08 9443 1511 F: 08 9444 3901
E: whelans@whelans.com.au W: www.whelans.com.au

whelans
TOWN PLANNING

Appendix B: Proposed Drainage Strategy Plan


LOC. 1491
BUKENERUP (unmade) ROAD
PATTERSONS (gravel surface) ROAD
30m wide Road
Road
(unmade) ROAD
CULVERT
CULVERT
CULVERT
CULVERT
CULVERT
CULVERT.
CATCHMENT BOUNDARY
OPEN DRAIN
ELEVATED SCENIC VIEWS FROM RIDGE OF SURROUNDING LAKES
TOPOGRAPHICAL LOW POINTS - ROCK ARMOUR & VEGETATION RECOMMENDED FOR PROTECTION.
LEGEND
Proposed Bukenerup Road Ecological Link (Remnant Vegetation)
Proposed road widening for Bukenerup Road realignment to conserve remnant vegetation
Retain existing house on Lot 25
Paterson Road to be constructed as part of later staging (i.e. Lots 30 - 34)
Proposed upgrading of existing roads
New subdivision roads to be constructed as part of staged development
Fire emergency access road (10m wide) over existing tree lined internal gravel access road for alternative escape route
Areas susceptible to seasonal inundation and waterlogging not suitable for housing
Livestock restrictions due to topography and inundation (management of land erosion)
Indicative location of building envelopes (30m x 60m) which can be negotiated by prospective landowners
Restricted vehicular access due to waterlogging hazard and seasonal inundation. Note alternative vehicular access to lot from other roads
Job Number: 13281
Sheet Name: 13281-2
Scale: 1:7500 @ A3
Date: 27 July 2009
Drawn By: SJF
Checked by: JEP
SUBDIVISION GUIDE PLAN
LOT 1492 PATERSON ROAD
ESPERANCE
whelans
TOWN PLANNING

Appendix C: Runoff Coefficients and Stormwater Quantities

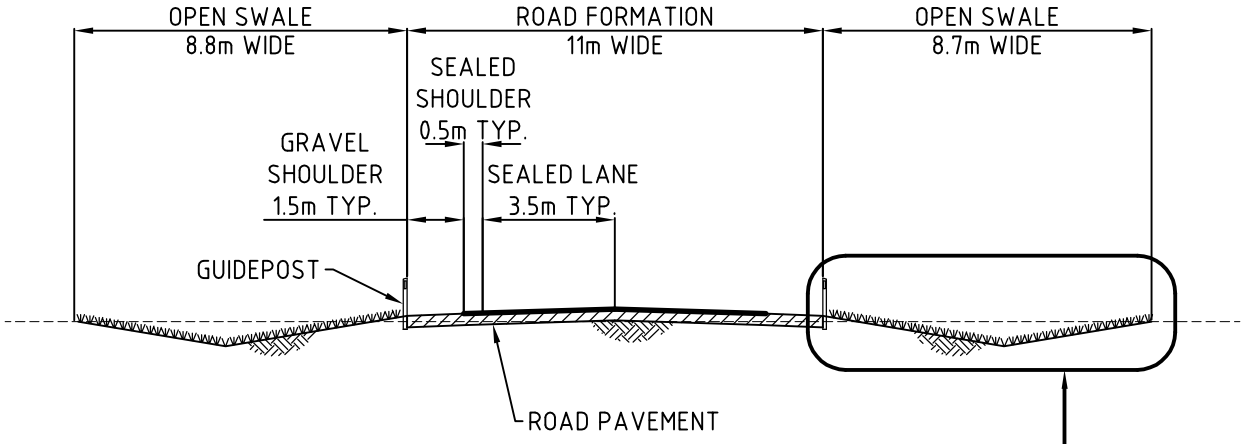
The following table indicates the catchment area, runoff coefficient, the time of concentration, the flow generated from each catchment area and the capacity of the drains for each section.

Section	Catchment Area (Ha)	Runoff Coefficient	Time of Concentration (min)	Flow Required Q ($m^{3/}s$)	Flow Capacity (m^3/s)
1	5	0.54	15	0.43	1.39
2	24	0.33	27	0.85	1.65
3	9	0.40	19	0.51	2.23
4	23	0.35	26	0.86	1.18
5	46	0.34	34	1.44	1.45
6	25	0.35	27	0.92	2.50
7	40	0.35	32	1.29	1.32
8	25	0.36	27	0.95	1.82
9	37	0.34	31	1.22	1.29
10	31	0.33	29	1.03	1.27
11	34	0.33	30	1.10	2.35
12	12	0.37	21	0.58	1.87

Each drain has sufficient capacity to accommodate flow from a 1 in 10 year ARI storm event.

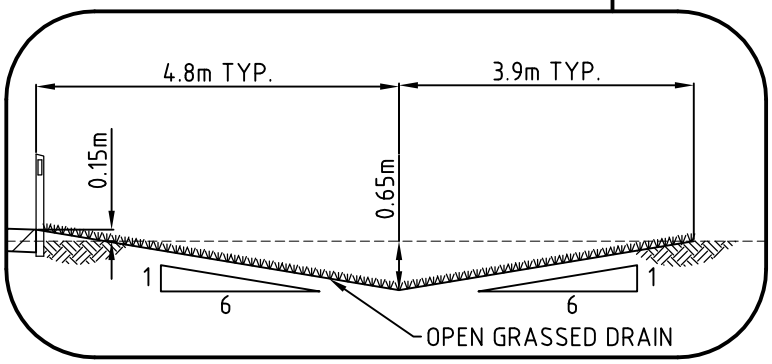
Appendix D: Typical Road Reserve Cross-section

40mm
20
0
20



TYPICAL CROWN ROAD SECTION

1:200



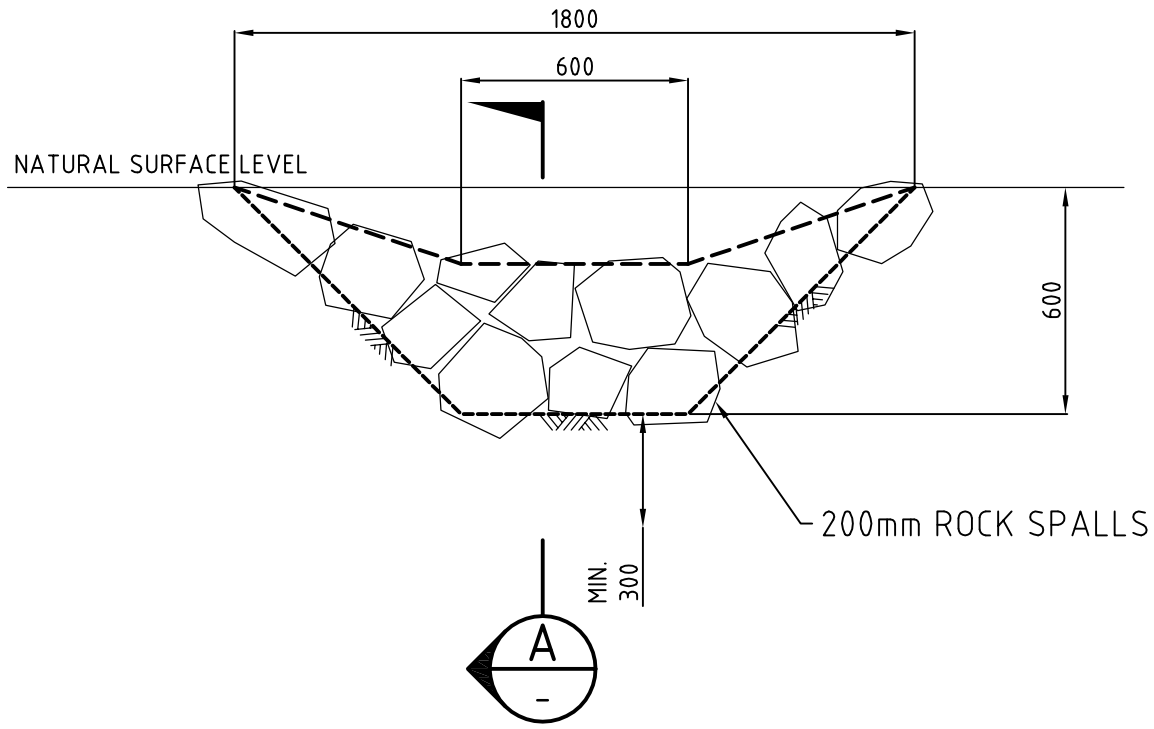
pritchard francis
civil and structural engineering consultants

WHELANS TOWN PLANNING
LOT 1492 PATERSON ROAD
ESPERANCE
ROAD AND SWALE CROSS SECTIONS

DATE	DESIGNED	DRAWN	CHECKED	JOB No.	DRG No.	REVISION
APRIL 2010	-	MJC		10-054	SK04	A

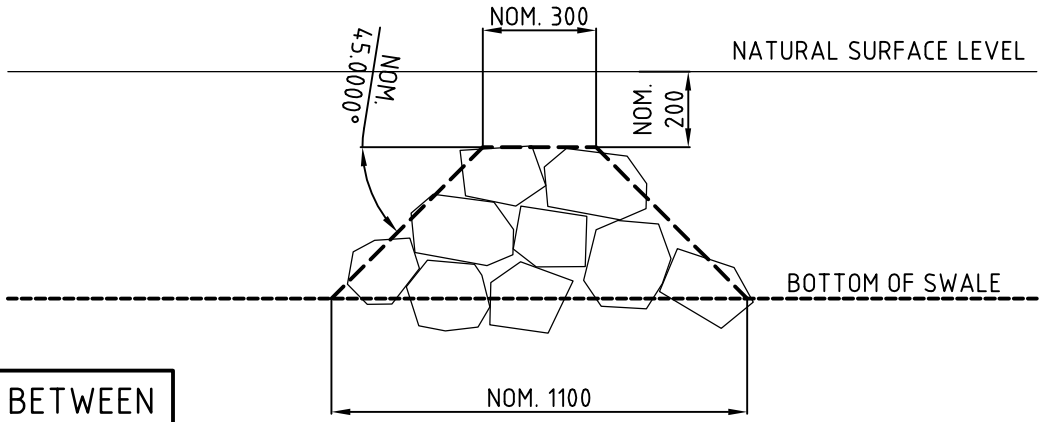
Appendix E: Typical Leaky Rock Wall and Drop Structure Arrangement

40mm
20
0
20



TYPICAL LEAKY ROCK WALL

1:20



DISTANCE BETWEEN LEAKY ROCK WALLS	
DRAIN GRADIENT	DISTANCE
2%	50.0m
3%	33.3m
4%	25.0m
5%	20.0m
6%	16.7m
7%	14.3m
8%	12.5m
9%	11.1m
10%	10.0m

SECTION A

1:20

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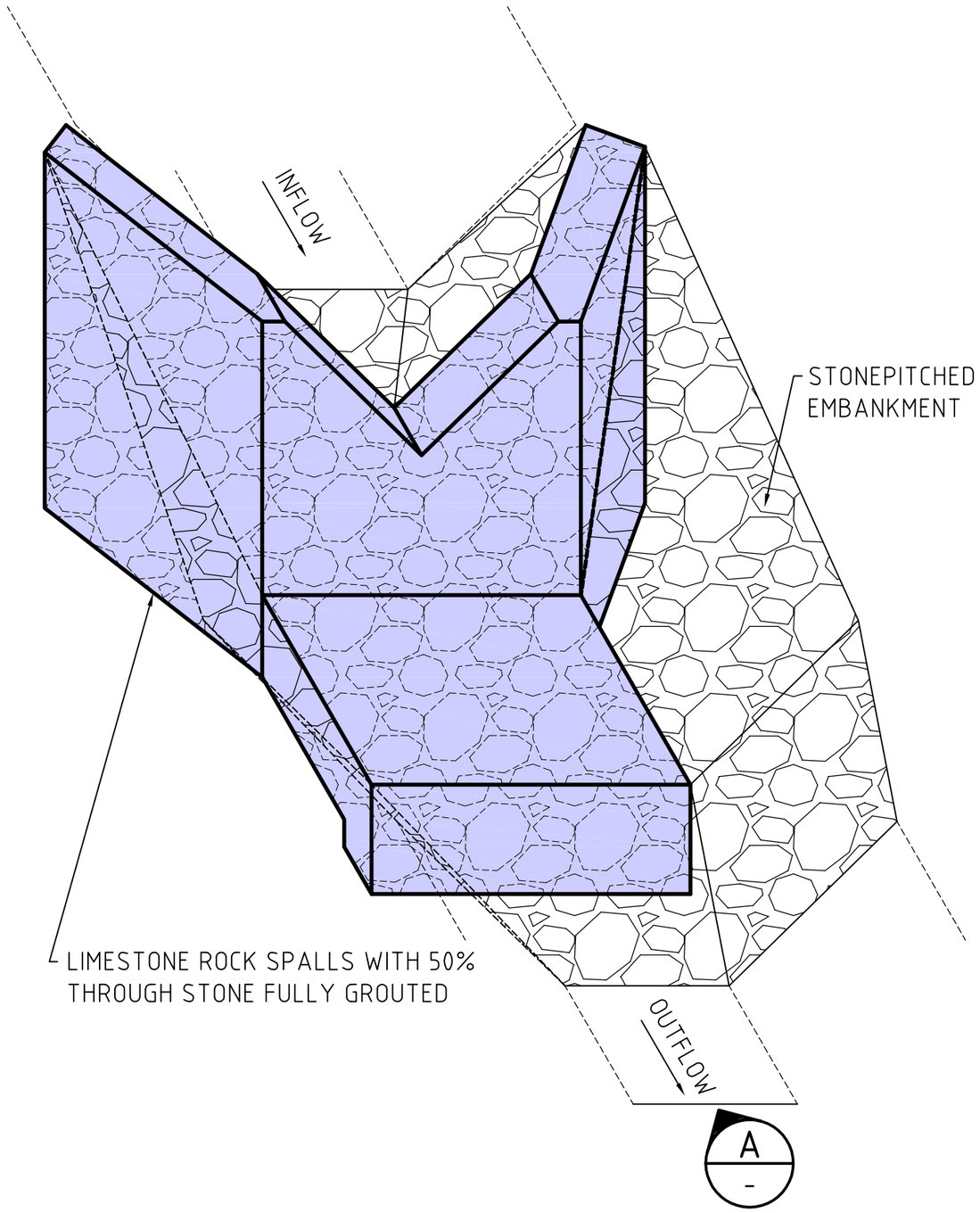
WHELANS TOWN PLANNING
LOT 1492 PATERSON ROAD
ESPERANCE
LEAKY ROCK WALL

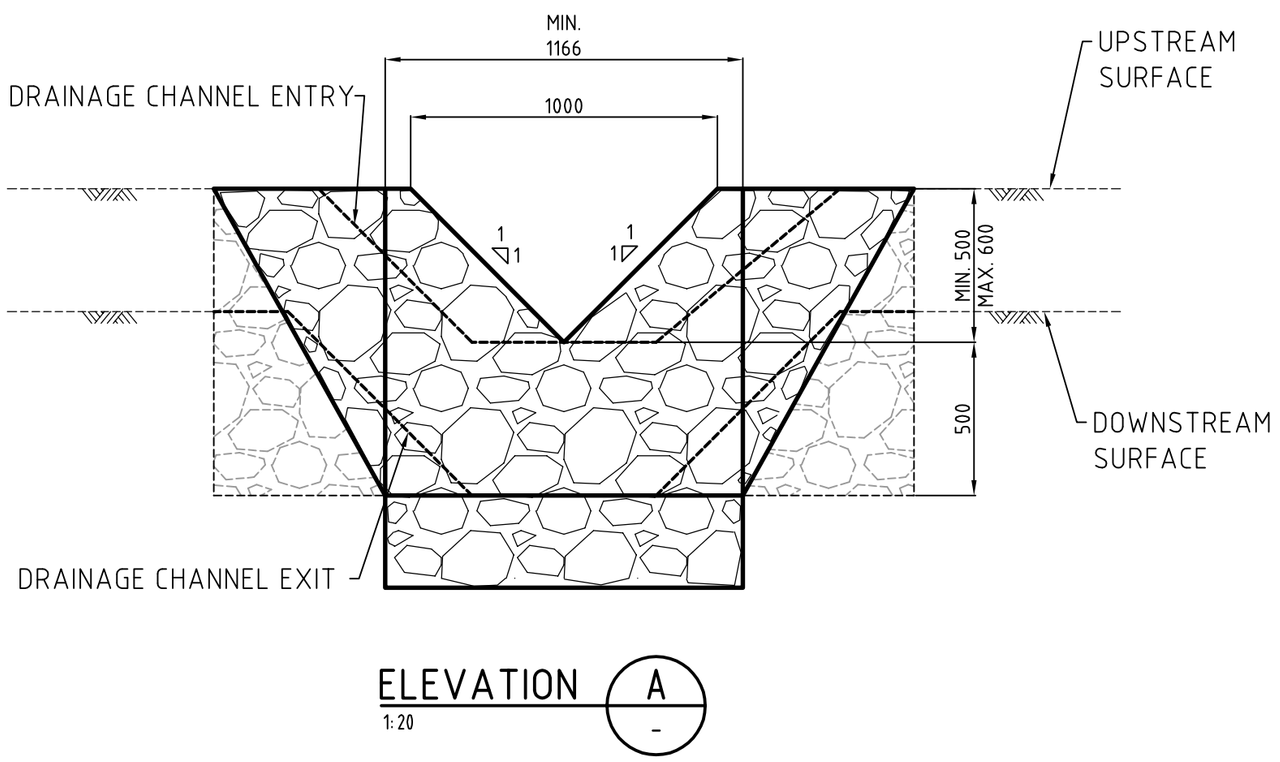
DATE	DESIGNED	DRAWN	CHECKED	JOB No.	DRG No.	REVISION
APRIL 2010	-	MJC		10-054	SK01	A

40mm
20
0
20



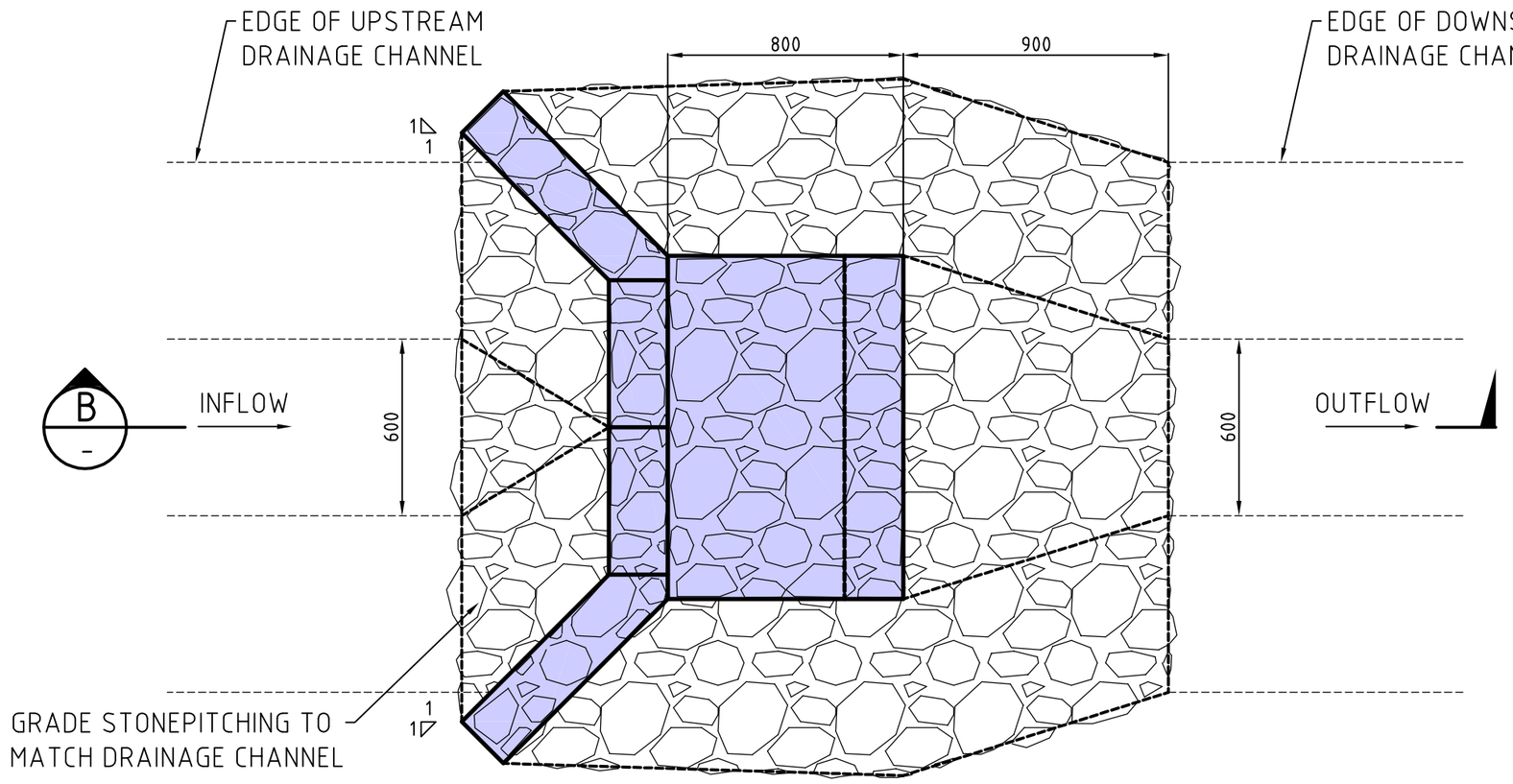
TYPICAL ENERGY DISSIPATION DROP STRUCTURE

1:20



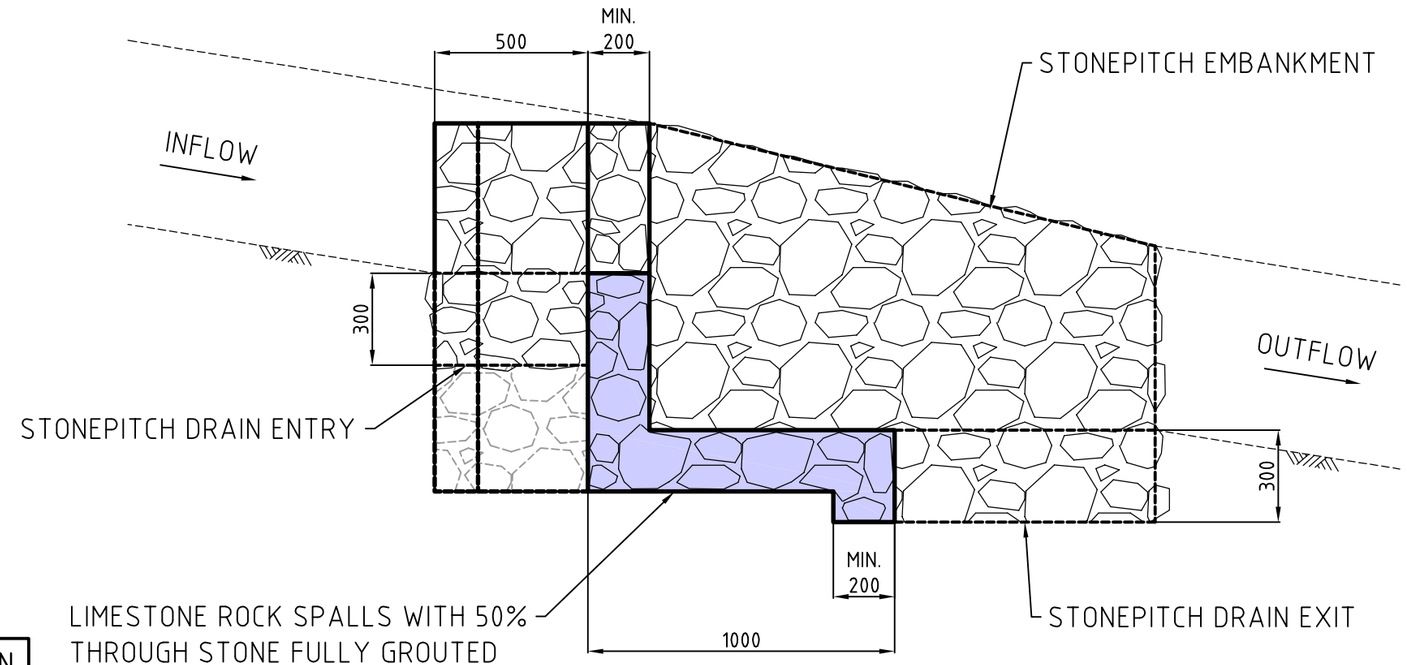
ELEVATION A
1:20

DISTANCE BETWEEN DROP STRUCTURES	
DRAIN GRADIENT	DISTANCE
2%	50.0m
3%	33.3m
4%	25.0m
5%	20.0m
6%	16.7m
7%	14.3m
8%	12.5m
9%	11.1m
10%	10.0m



PLAN VIEW - ENERGY DISSIPATION DROP STRUCTURE

1:20



SECTION B
1:20

ORIGINAL SHEET SIZE A2

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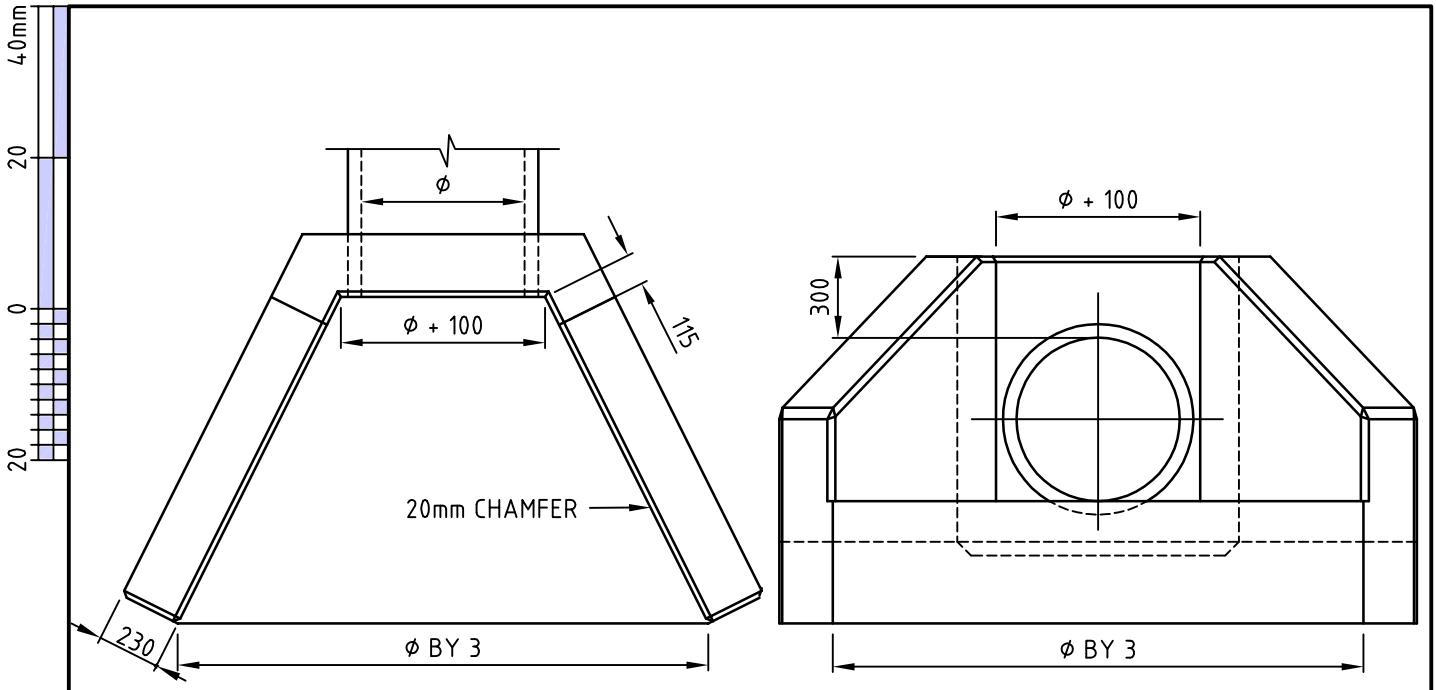
WHELANS TOWN PLANNING
LOT 1492 PATERSON ROAD
ESPERANCE
DRAINAGE DROP STRUCTURE

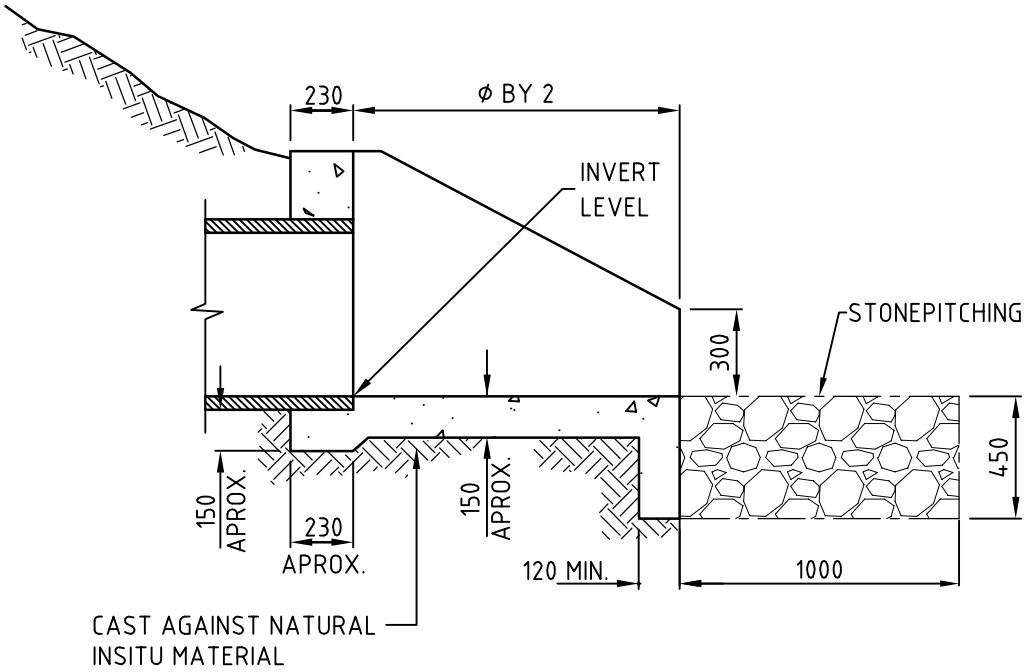
DATE	DESIGNED	DRAWN	CHECKED	JOB No.	DRG No.	REVISION
APRIL 2010	-	MJC	-	10-054	SK02	A

Appendix F: Typical Culvert Detail



PLAN
N.T.S.

ELEVATION
N.T.S.



SECTION TYP.
N.T.S.

TYP. DRAINAGE HEADWALL DETAIL

OR APPROVED EQUIVALENT

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LOT 1492 PATERSON ROAD
ESPERANCE
PRECAST CULVERT HEADWALL

DATE	DESIGNED	DRAWN	CHECKED	JOB No.	DRG No.	REVISION
APRIL 2010	-	MJC		10-054	SK03	A

APPENDIX 4

FIRE MANAGEMENT PLAN
Lot 1492 Paterson Road, Esperance

FIRE MANAGEMENT PLAN

LOT 1492 PATERSON ROAD, ESPERANCE

Prepared on Behalf of

KARINGAL PASTORAL COMPANY

By

SEPTEMBER 2010

FIRE MANAGEMENT PLAN CONTENTS

1.0 INTRODUCTION

1.1 PURPOSE OF THE MANAGEMENT PLAN

The primary purpose of this document is to outline and detail the fire management methods and requirements that are to be implemented for the proposed subdivision. The aim of the Bushfire Management Plan for Lot 1492 Paterson Road, Esperance is to reduce the threat to residents in the event of a fire within or near the subdivision.

1.2 STATUTORY FRAMEWORK

The Shire of Esperance and Western Australian Planning Commission requires the preparation of a Bushfire Management Plan for the proposed subdivision and development of Lot 1492 Paterson Road, Esperance. This document has been prepared to satisfy that requirement.

Due to fire management strategies altering over time to meet the changing environment and land use needs, landowners and occupiers are advised that the provisions of the Bush Fires Act 1954 may still be enforced in addition to the requirements under this Bushfire Management Plan.

2.0 SITE DETAILS

2.1 PROPERTY LOCATION

Lot 1492 Paterson Road, Esperance ("the subject site") is situated approximately 8 kilometres north west of Esperance town centre in the Shire of Esperance (refer to Figure 1 – Locality Plan). The landowner has submitted a proposed Outline Development Plan to subdivide the subject site into 34 rural smallholding lots at a prevailing lot size of 8.0 hectares.

2.2 LANDFORM

The property is situated on the southern boundary of the gently undulating Esperance plain where it joins with the poorly drained coastal plain with its network of swamps and lakes. The northern half which at its highest point is 52m above the low point on the southern boundary consists of undulating plains with slopes of three to five percent.

The high points are characterised by areas of outcropping granite and gneiss, the lows on the west are sedge covered drainages containing flattened zones which feed into tributary drainages and isolated salt lakes above and some 3 kilometres north of Lake Warden and Pink Lake.

The southern half is dominated by a high ridge situated about 700 metres north of the southern boundary. The drainage from the ridge feeds both north and south over slopes, variously from five to ten percent to low-lying ground. Minor areas of outcrop are found within the low-lying ground of the south. There is no incised drainage, but the lower parts of the drainage on the farm contain soaks and poorly drained areas where the water table is shallower.

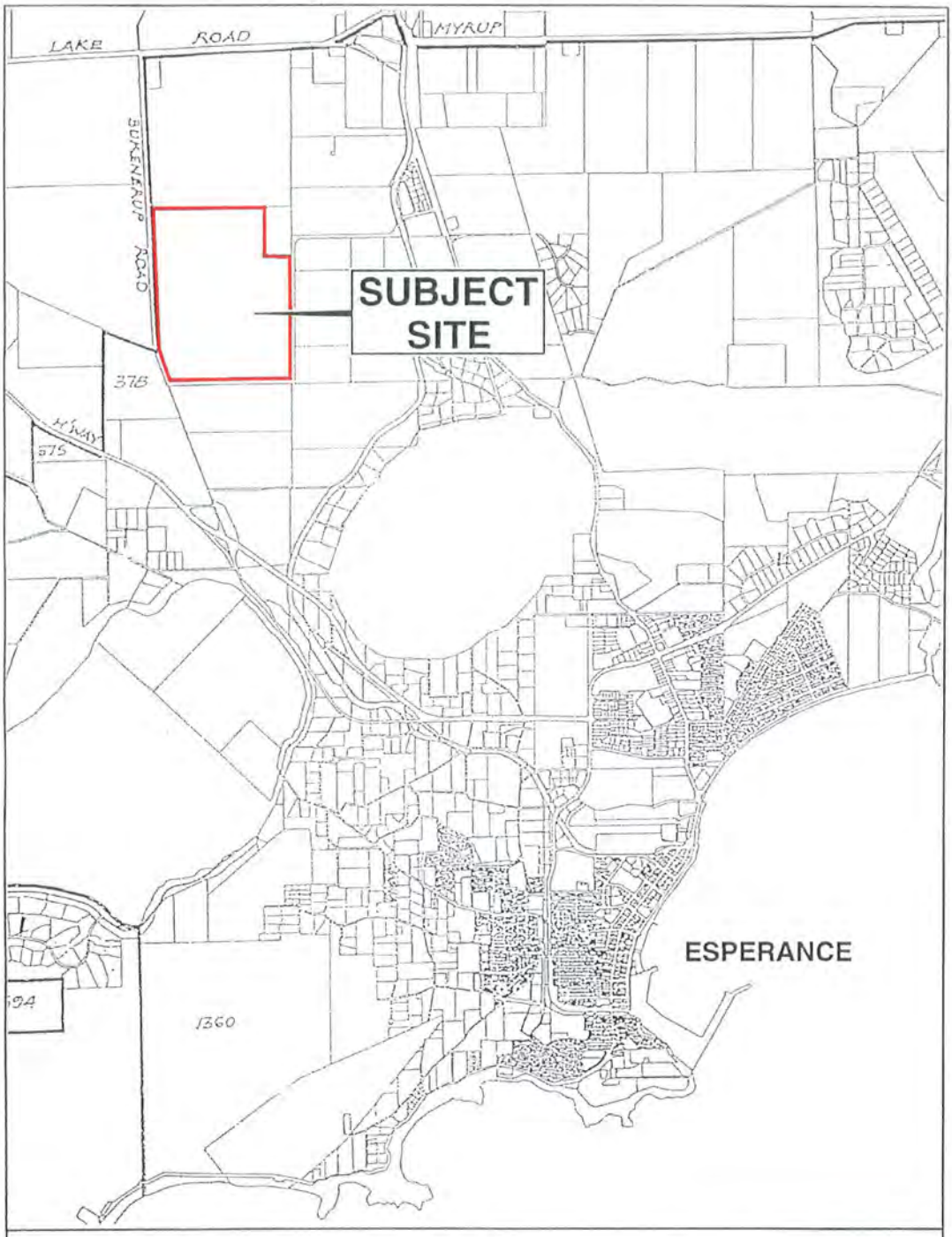


Figure 1
LOCALITY PLAN

2.2 HYDROLOGY

The land lacks incised drainage though adjoining land on the west and north-west moves in to a defined drainage which leads to the south-west. The lower parts of the land are subject to waterlogging. These areas are prone to waterlogging in the winter months and can be distinguished in the field by the sedge communities and by pronounced mottling and coloured streaking in the B horizons of the soil.

Natural drainage from the soaks in the north west and western portion of the property runs south west towards Bukenerup Lake on the western neighbouring property. The degree of flow and quantity of surface water from these soaks fluctuates seasonally, with inundation and waterlogging occurring in the wetter months of the year.

2.3 VEGETATION

There are no significant stands of remnant vegetation on the property, with the property having been predominantly cleared in the past. Pasture and to a degree sedges is the predominant vegetation communities on the property. Some re-growth of native species has occurred in isolated pockets, particularly on the northern slope of the central ridge where there are numerous grass trees. This area has been fenced to prevent disturbance by livestock.

The surrounding neighbouring properties have also been predominantly cleared for agricultural and hobby farm pursuits. Within the Bukenerup Road road reserve along the western boundary of the subject site there are stands of dense vegetation, mainly *Acacia* and *Epacridaceae* heath and scrub. To the south east is Crown Reserve 4181, which is also densely vegetated with remnant vegetation.

Plate 1. Subject land has been predominantly cleared for agricultural pursuits

Plate 2. View from the ridge where the existing dwelling is located looking south-east towards the heavily vegetated Crown Reserve 4181 in the distance

3.0 BUSHFIRE HAZARD ASSESSMENT

3.1 METHODOLOGY

For the purpose of this report, the method adopted for the assessment of bush fire hazard for the subject site is that prescribed in *Planning for Bush Fire Protection Guidelines Edition 2* (2010), which considers the Bush Fire Attack Level (BAL) for the site. This level of assessment is used at rezoning, subdivision or development proposal stage. BAL assessment requires investigation of vegetation, topography and association of these characteristics found on the land to determine the bush fire hazard level.

3.2 VEGETATION ASSESSMENT

The majority of the vegetation within the subject site is classified as "Grassland – Type G" (Cleared Open paddocks), with to a lesser extent some "Low Open Shrubland - Type G" and sparse relatively small pockets of "Open Woodland – Type B" (within cleared paddocks).

The adjacent cleared agricultural land to the north, west and east has a similar vegetation classification as the subject site. The Vegetation Risk Mapping indicates areas of High Fire Risk in the locality, in particulary, Crown Reserve 4181 which is directly south-east of the subject site. Vegetation mapping for the subject site is provided in the Appendix of this report.

3.3 SLOPE ANALYSIS

An analysis of slope was undertaken using survey data from the Land Capability Assessment. The **Topography Analysis** plan indicates that there are no slopes greater than 10 degrees, however, some of the slopes are 7 – 8 degrees in the southern portion of the subject site.

3.4 CLASSIFICATION OF BUSH FIRE HAZARD

Planning for Bushfire Protection Guidelines Ed 2 (2010) indicates that land is most suitable for new subdivision and related development where hazard levels are low. However, development can occur in areas of medium risk provided certain precautions and measures are implemented to significantly reduce fire hazard. The level of bush fire hazard (BAL) provides a measure of the likely intensity of a bush fire and the likely level of bush fire attack on a subdivision and related development (inside or outside of the subdivision). The measure therefore provides an indication of the suitability of land for subdivision and development.

Hazard levels can be assigned to a whole subdivision area or parts of a subdivision area, or even to parts of individual lots, which in turn can assist with determining suitable locations for building envelopes and buildings. The Guidelines outline three levels of bush fire hazard:

Bush Fire Hazard Levels and Performance Criteria

Level of Bush Fire Hazard	Description
LOW	Description: Areas devoid of standing native vegetation, also areas which, due to climatic conditions, do not experience bush fires
MODERATE (Bush Fire prone area)	Description: Areas containing grassland with slopes in excess of 10 degrees, open woodland and open shrubland. Also areas containing predominantly shrubs with slopes 10 degrees or less
EXTREME (Bush Fire prone area)	Description: Low shrubs on steep slopes greater than 10 degrees. Forested areas with dense understorey and areas containing predominantly tall shrubs

3.5 BUSH FIRE ATTACK LEVEL (BAL) AND HAZARD ASSESSMENT

The assessment of bush fire risk takes into consideration existing site conditions, which include vegetation, surrounding development and topography. There are no significant stands of remnant vegetation on Lot 1492, with the property having been predominantly cleared in the past. Pasture, grasses and sedges is the predominant vegetation communities on the property. Some re-growth of native species and exotic plantings has occurred within proposed Lots 28 & 29 and areas within these lots have been fenced for conservation and promotion of vegetation re-growth.

Most of the neighbouring land has also been cleared to make way for pasture and grazing. Bukenerup Road reserve and Paterson Road reserve contain remnants of native vegetation (mainly *Acacia* heath scrub). Crown Reserve 4181 presents an Extreme Bush Fire Hazard area due to the dense vegetation found on the reserve.

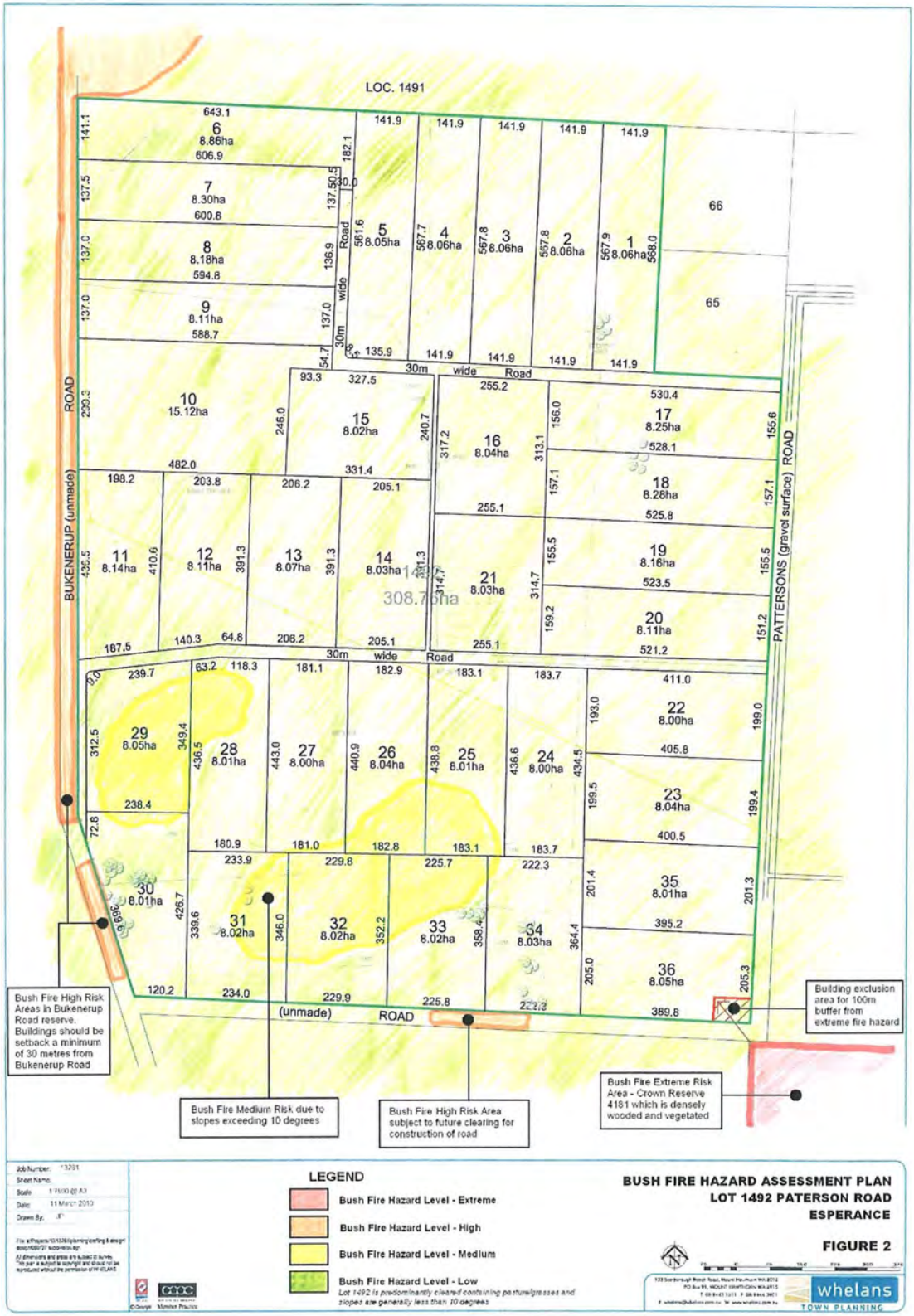
As stated in 2.2 "Landform" the subject site contains areas of sloping and undulating ground. In some parts of the property the slopes 7 – 8 degrees, which, although does not exceed the 10 degrees, can increase the bush fire hazard risk. This is particularly relevant where there is an uphill slope, unchecked grass/pasture overgrowth and favourable weather conditions for fire. A portion of the southern slopes has been identified as having potential for Moderate Fire Risk, particularly as slopes range 7 – 8 degrees and there is unchecked pastoral growth.

A bush fire hazard assessment for the property has been undertaken in accordance with the Guidelines and a Bush Fire Hazard Assessment Plan has been prepared (Figure 2).

The majority of the subject site as a **BAL – LOW** rating under the Guidelines as most of the property has been cleared and is considered "Grassland – Unmanaged". The Bush Fire Hazard Assessment for the proposed subdivision indicates a predominantly Bush Fire Hazard -

Low rating, with some isolated pockets of Medium risk as described above, including the vegetation re-growth area which occurs on an upward slope of approximately 8 degrees.

The climate experienced in Esperance is such that the majority of rain falls in late Autumn through to early Spring. This rainfall supports vegetation growth which dries in Summer/Autumn. The combination of prevailing winds and dry vegetation (even grasses) poses a fire risk and bush fire control is considered essential for the protection of life and property.


LOC. 1491
BUKENERUP (unmade) ROAD
PATTERSONS (gravel surface) ROAD
30m wide Road
(unmade) ROAD
Bush Fire High Risk Areas in Bukenerup Road reserve. Buildings should be setback a minimum of 30 metres from Bukenerup Road
Bush Fire Medium Risk due to slopes exceeding 10 degrees
Bush Fire High Risk Area subject to future clearing for construction of road
Bush Fire Extreme Risk Area - Crown Reserve 4181 which is densely wooded and vegetated
Building exclusion area for 100m buffer from extreme fire hazard
LEGEND
Bush Fire Hazard Level - Extreme
Bush Fire Hazard Level - High
Bush Fire Hazard Level - Medium
Bush Fire Hazard Level - Low
Lot 1492 is predominantly cleared containing pasture/grasses and slopes are generally less than 10 degrees
BUSH FIRE HAZARD ASSESSMENT PLAN
LOT 1492 PATERSON ROAD
ESPERANCE
FIGURE 2
whelans
TOWN PLANNING

4.0 FIRE MANAGEMENT PLAN

4.1 GENERAL

The aim of the Fire Management Plan (Figure 4) is to reduce the threat to residents in the event of bush fire within or near the subject land. The Fire Management Plan has been prepared to incorporate fire management methods:

- Roads and Emergency Egress
- Internal Firebreaks systems
- Driveways and Gates
- Hazard Separation Zone
- Building Protection Zone
- Dwelling Construction and Planting of Trees

4.2 ROADS AND EMERGENCY EGRESS

Paterson Road is proposed to be upgraded and/or constructed which will provide access to new lots. Two new internal subdivision roads are proposed as part of subdivision of the land to create new lots. Construction of roads will be of a standard to the satisfaction of the Shire of Esperance and will require clearing whether necessary.

The majority of remnant vegetation in the Bukenerup Road road reserve is proposed to be retain by either not constructing road within the reserve, or by facilitating road widening, over the subject site in the south-west corner, so as to avoid remnant vegetation. The proposed road widening for a trafficable emergency access route along the western boundary of Lots 29 & 30 (as shown on the Lot 1492 Paterson Road Outline Development Plan) will also serve to create an appropriate fire separation distance between private property and the remnant vegetation, which presents as a fire hazard.

The northern cul-de-sac road is approximately 1.3 kilometres in length, which does not comply with the Acceptable Development standards of the *Planning for Bush Fire Protection Guidelines*. Notwithstanding the property has a Low Risk Bush Fire Hazard Level rating, to ensure that the development complies with the relevant Performance Criteria, a number of design solutions are proposed. The existing tree lined gravel access track running north-south from the existing house in the centre of the property is to be retained and used as a 10 metre wide alternative emergency egress/access route.

In addition, it is proposed that future negotiations take place with the northern landowner to provide an access from the northern boundary to provide a link accessway between the two properties. An emergency egress access track would be installed from the cul-de-sac head to the northern boundary and along the future lot boundary on the neighbouring property to link

with a future road. This would enable an alternative emergency egress that would be gated and have an easement in gross in favour of the Shire of Esperance.

Emergency Egress access tracks are to be cleared to a minimum of 6.0 metres wide and have a minimum 4.0 metre wide two-wheel-drive trafficable surface and cleared vertically to 5.0 metres with passing bays every 200 metres and turn around areas every 500 metres. Gates would also be installed at either ends of emergency access routes to restrict access on a day-to-day basis.

4.3 INTERNAL FIREBREAK SYSTEM

All lots are to comply with the firebreak requirements of the Shire of Esperance Firebreak Notice in addition to this Fire Management Plan.

4.4 DRIVEWAYS AND GATES

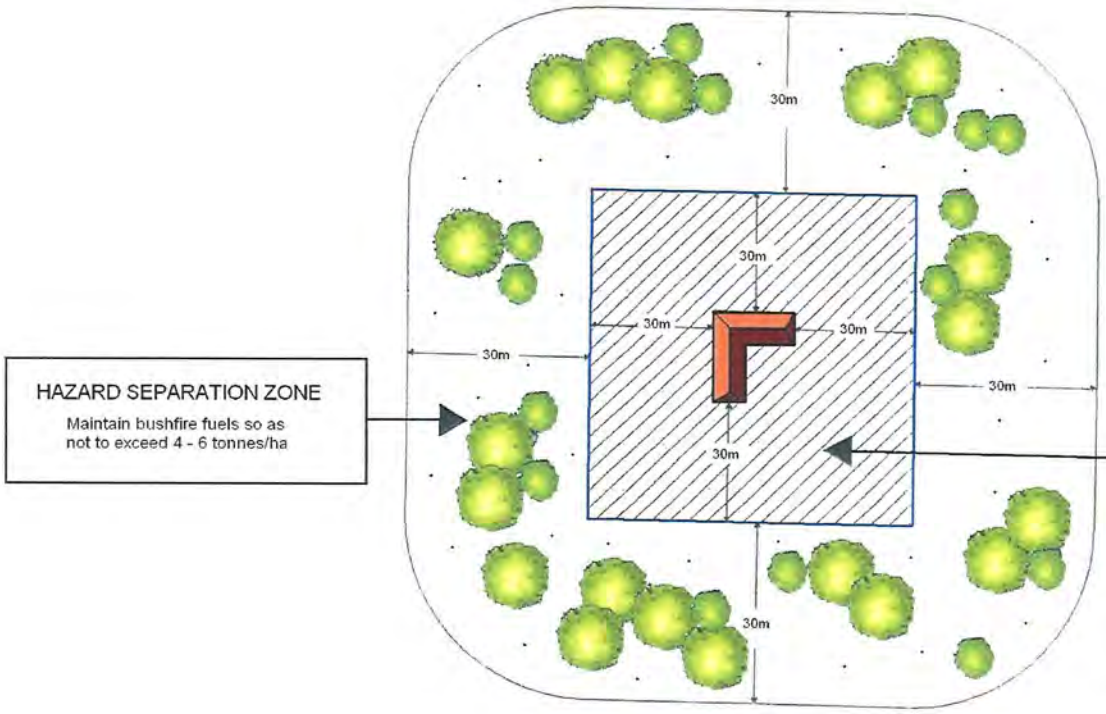
Where house sites are more than 50 metres from a public road, access to individual houses and turning areas should be available for both the conventional two-wheel-drive vehicles of residents and fire fighting vehicles. Driveways are to be cleared to a minimum width of 6.0 metres and have a minimum 4.0 metre wide two-wheel-drive trafficable surface and vertically cleared to a minimum of 4.0 metres.

Turn around areas should be located within 50 metres of a house. Passing bays should be available where driveways are longer than 200 metres and turn around areas in driveways that are longer than 500 metres. Passing bays should be a minimum length of 20 metres, with the combined width of the passing bay and driveway access being a minimum of 6.0 metres.

Gates may be used to restrict traffic on emergency access and fire service access routes. Where gates are used these should be made wide enough to accommodate fire fighting vehicles (i.e. approximately minimum 2.7 metres wide). Gates used to restrict access emergency egress routes must not be locked.

4.5 HAZARD SEPARATION ZONE

There must be physical separation between bush fire hazards and development. A Hazard Separation Zone assists in reducing fire intensity when a bush fire impacts on buildings within a subdivision. Bush fire fuel loadings must be maintained within the Hazard Separation Zone to a maximum of 4 – 6 tonnes/ha. The hazard separation zone should extend at least 30 metres around the perimeter of the Building Protection Zone or to the lot boundary as shown in Figure 3.



HAZARD SEPARATION ZONE

Maintain bushfire fuels so as not to exceed 4 - 6 tonnes/ha

BUILDING PROTECTION ZONE

30m around all primary buildings

Bush and grass not exceeding 50mm in height

5m clearance of flamable material around all buildings

All log and tree debris removed

Branches which may fall on buildings removed

Recommended separation distance of 15 metres for any planted trees

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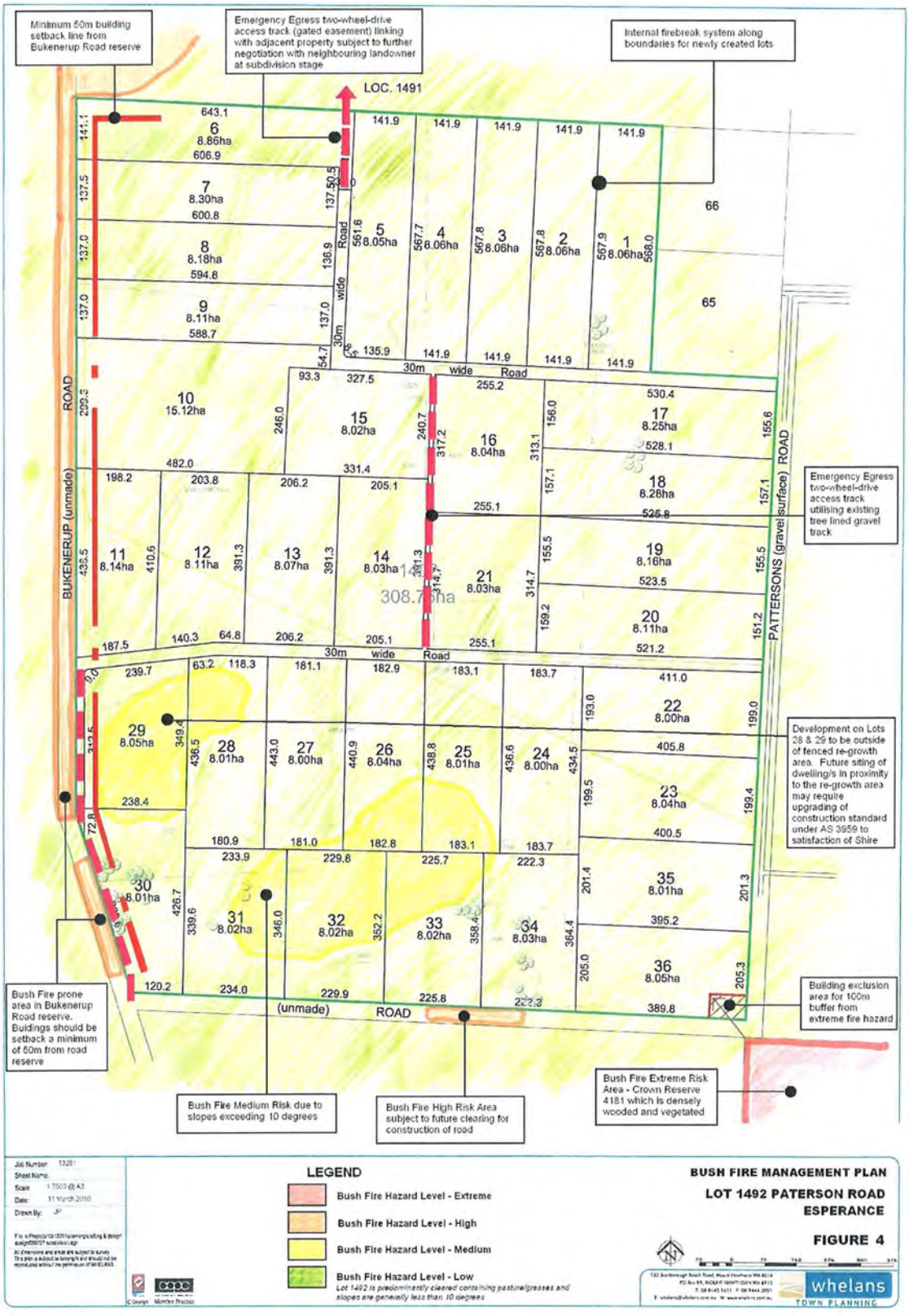
Scale : *Drawing not to scale*

RECOMMENDED BUILDING PROTECTION AND HAZARD SEPARATION ZONES

LOT 1492 PATERSON ROAD, ESPERANCE

FIGURE 3

whelans


Minimum 50m building setback line from Bukenerup Road reserve
Emergency Egress two-wheel-drive access track (gated easement) linking with adjacent property subject to further negotiation with neighbouring landowner at subdivision stage
Internal firebreak system along boundaries for newly created lots
LOC. 1491
BUKENERUP (unmade) ROAD
PATTERSONS (gravel surface) ROAD
30m wide Road
(unmade) ROAD
Emergency Egress two-wheel-drive access track utilising existing tree lined gravel track
Development on Lots 28 & 29 to be outside of fenced re-growth area. Future siting of dwelling/s in proximity to the re-growth area may require upgrading of construction standard under AS 3959 to satisfaction of Shire
Building exclusion area for 100m buffer from extreme fire hazard
Bush Fire prone area in Bukenerup Road reserve. Buildings should be setback a minimum of 50m from road reserve
Bush Fire Medium Risk due to slopes exceeding 10 degrees
Bush Fire High Risk Area subject to future clearing for construction of road
Bush Fire Extreme Risk Area - Crown Reserve 4181 which is densely wooded and vegetated
LEGEND
Bush Fire Hazard Level - Extreme
Bush Fire Hazard Level - High
Bush Fire Hazard Level - Medium
Bush Fire Hazard Level - Low
Lot 1492 is predominently cleared containing pasture/grasses and slopes are generally less than 10 degrees
BUSH FIRE MANAGEMENT PLAN
LOT 1492 PATERSON ROAD
ESPERANCE
FIGURE 4
whelans
TOWN PLANNING

4.6 BUILDING PROTECTION ZONE

The aim of the Building Protection Zone is to reduce bush fire intensity close to dwellings, to minimise the likelihood of flame contact with buildings and to minimise the likelihood of flame transfer from buildings to the surrounding property. Essentially the Building Protection Zone is a low fuel area immediately surrounding the dwelling.

Features such as driveways, garden beds, lawn of landscaped gardens (including deciduous trees) should form part of building protection zones. Isolated trees and shrubs may be retained within building protection zones. A building protection zone of 30 metres is to be constructed around all dwellings or habitable buildings and it is recommended that:

- Bush fire fuels must be maintained below a height of 50mm;
- The first 5 metres around the dwelling is to be cleared of all flammable material, excluding landscaping and garden beds;
- Between 5 – 30 metres around the dwelling the spacing of trees should be 15 metres apart to provide for a 5 metre separation between crowns;
- Where applicable, branches must be removed at least 2 metres back from the eaves of all buildings;
- Where applicable, all leaves, tall grass and clearing slash of trees must be removed from within the building protection zone areas;
- Grass should be trimmed and maintained to no more than 50mm.

4.7 BUILDING SITES, DWELLING CONSTRUCTION AND PLANTING OF TREES

There are no prescribed building envelopes in the ODP and landowners may select building site locations, except for those within building exclusion areas (i.e. waterlogging areas in the ODP and fire separation as shown on the Fire Management Plan). Individual dwellings on each lot should therefore be designed and built to conform with:

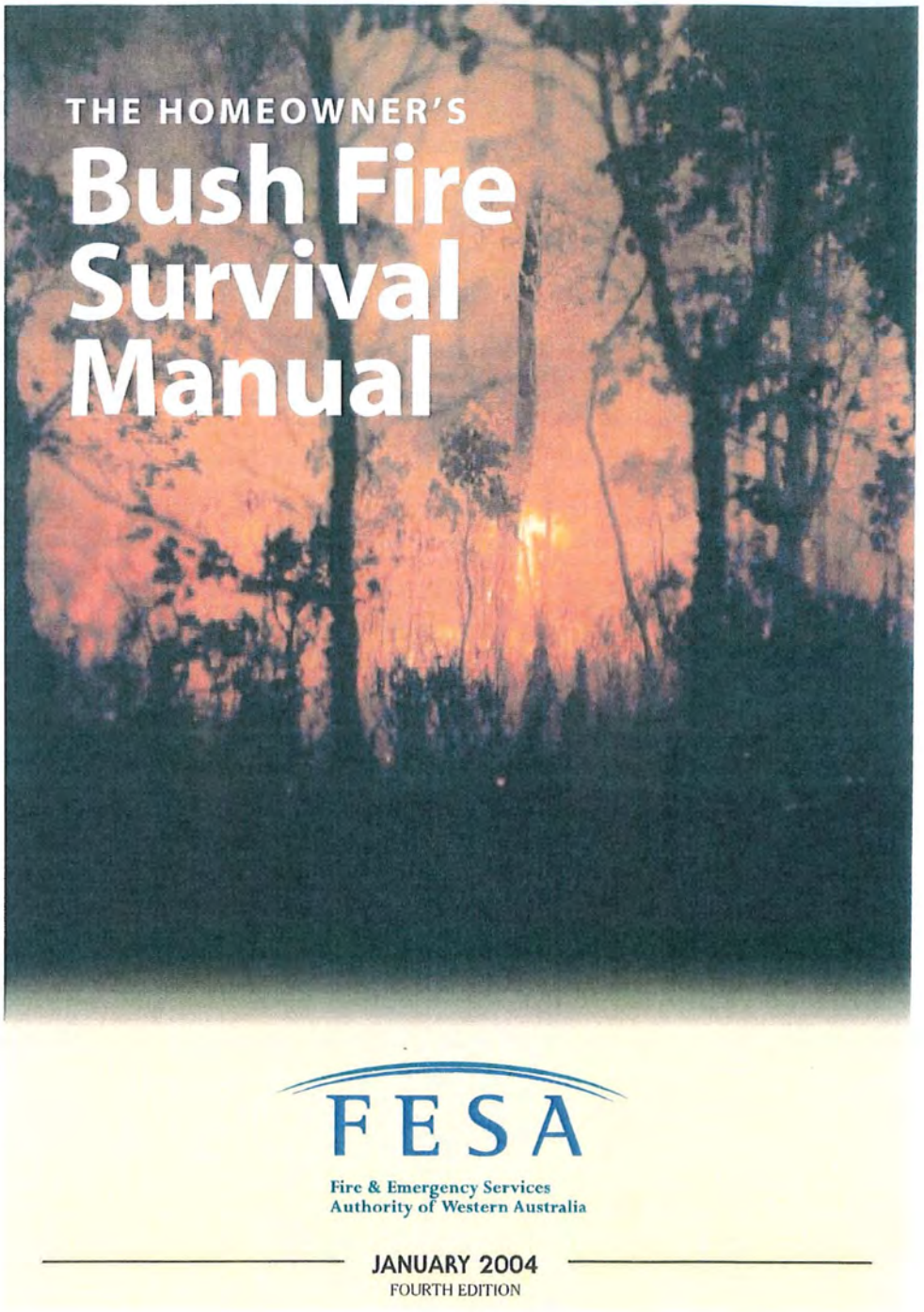
- Homeowners Bush Fire Survival Manual Guidelines;
- Shire of Esperance Building Specification and Requirements;
- Australian Standard AS 3959 "Construction of Buildings in Bush Fire Prone Areas"

In areas where future dwellings are situated within Medium Risk areas on the subject site, or in proximity to these areas, it may be necessary to upgrade the construction standard of dwelling/s in accordance with AS 3959. For instance, to reduce attack from embers and burning debris ignited by windborne embers where dwellings are located within Medium Risk

areas, construction of dwellings may need to be upgraded in accordance with AS 3959. This may particularly be required for Lots 28 and 29, which contain a significant pocket of understorey vegetation (i.e. grasstrees and shrubs). The selection of a site for dwellings will likely require a detailed bush fire hazard assessment as part of an application for planning approval.

Copies of the Homeowners Bush Fire Survival Manual or other suitable documentation will be issued to each property owner by the developer at the sale of lots.

Planting of trees is not permitted within 6 metres of the centre line of any firebreak. Trees planted within the Building Protection Zone must comply with the standard outlined in Section 4.6 of this report.



Extract Front Cover of "Homeowners Bush Fire Survival Manual"

5.0 FIRE FIGHTING FACILITIES

5.1 WATER SUPPLY FOR FIRE FIGHTING

As scheme water is not available, provision of a water tank/s within the subdivision and a standpipe or hydrant may be required to the satisfaction of the Shire of Esperance. Construction and design of the tank is to be to the satisfaction of the Shire of Esperance. An engineer's certificate is required in relation to the foundation, construction and water flow rates of the facility.

Galvanised or copper pipe must be used above ground. PVC or polypipe can only be used where pipes are buried a minimum of 300mm below ground level when measured from the top of the pipe. Where a water tank is provided, a hardstand turn around area suitable for a 3000 litres four-wheel-drive fire fighting vehicle shall be provided to the satisfaction of the Shire of Esperance. The water tank facility is to be vested in the Shire of Esperance.

In addition to a water tank (where required by the local authority), existing dams on the property may also be used as a secondary water supply for the purpose of fire fighting.

5.2 ESPERANCE FIRE SERVICES

The Six Mile Bush Fire Brigade (located on Esperance – Coolgardie Highway) would be the relevant fire brigade servicing the locality. The Pink Lake Fire Brigade is also located near the corner of Pink Lake Road and Padbury Street in Esperance township. The development site is within approximately 10 minutes travel from the fire station.

6.0 CONCLUSIONS

5.1 OVERALL FIRE THREAT

The design of the development and the facilities constructed as part of the development in association with this Fire Management Plan will ensure that the fire threat to persons and property within the subdivision is significantly reduced.

5.2 PROPERTY OWNER'S RESPONSIBILITY

To maintain the reduced level of risk and threat of fire, the owners and occupiers of the lots created will be responsible for undertaking, complying with and implementing measures to protect their own assets from the threat and risk of bush fire. These include:

- Provision and maintenance of internal firebreaks as detailed in Section 4.3;
- Maintain in good order and condition all property fencing and gates, ensuring that vegetation does not encroach into firebreaks;
- Implement and maintain the Building Protection Zone as detailed in Section 4.6;
- Implement and maintain the Hazard Separation Zone as detailed in Section 4.5;
- Install and maintain driveways as detailed in Section 4.4;
- Planting of trees to be carried out as detailed in Section 4.7

5.3 DEVELOPER RESPONSIBILITIES

Prior to subdivision being granted Final Approval by the Western Australian Planning Commission, the developer shall be required to carry out works as described below. Subsequent to Final Approval to subdivide, the developer shall have no further responsibilities to provision of fire fighting facilities on land which passes from its ownership.

- Lodging a Section 70A Notification on each Certificate of Title proposed by this subdivision. The notification shall alert prospective purchasers of land and successors in title of the responsibilities of this Fire Management Plan;

- Construction of Internal Firebreaks and Emergency Egress as shown on the Fire Management Plan;

- Installation of a water tank as prescribed by the Shire of Esperance (if required);

- Supply a copy of this Fire Management Plan and Homeowners Bush Fire Survival Manual to each property owner on sale of the allotment.

5.4 SHIRE OF ESPERANCE RESPONSIBILITIES

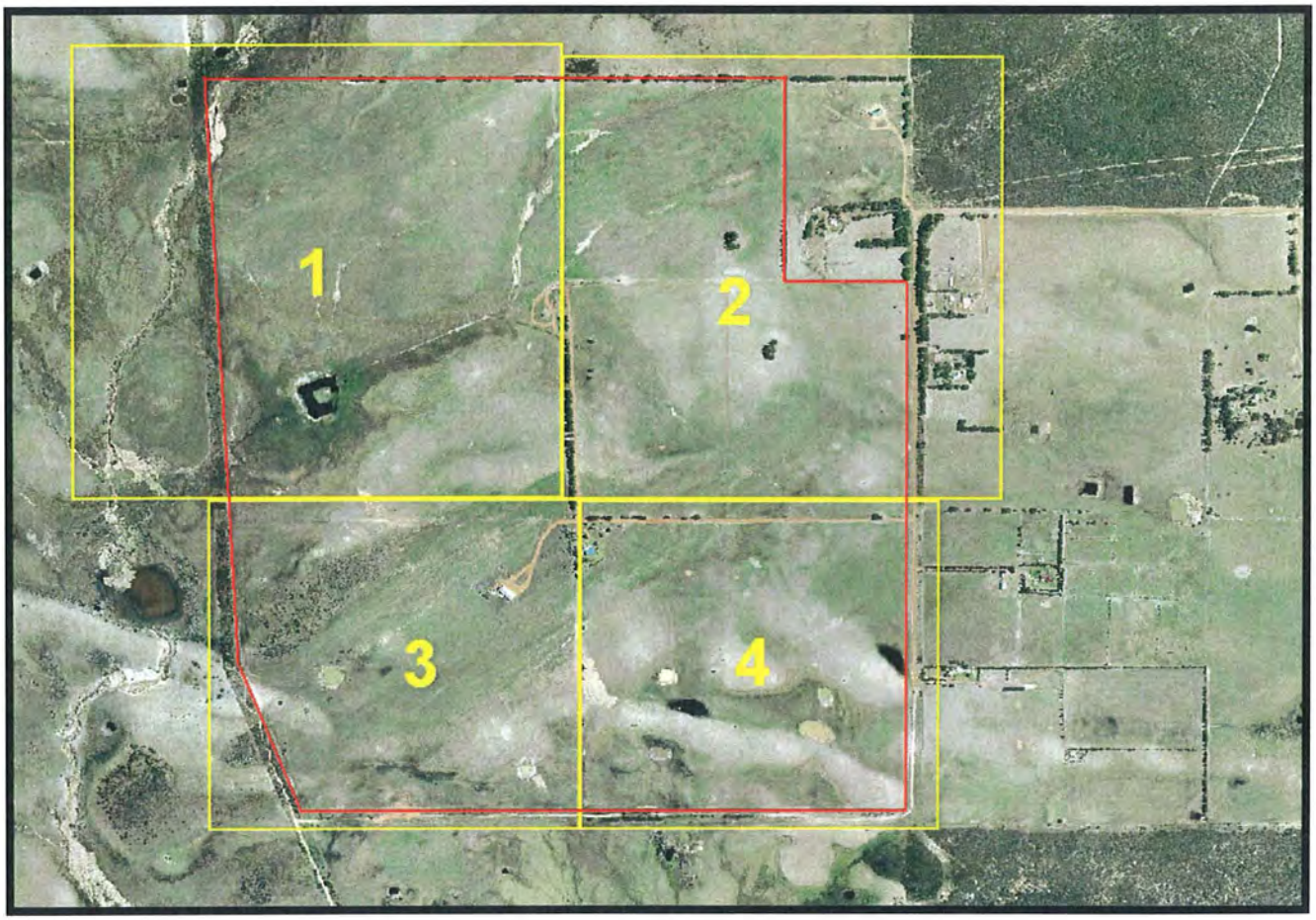
The responsibility for compliance with the law rests with individual property owners and occupiers and the following conditions are not intended to unnecessarily transfer some of the responsibilities to the Shire of Esperance.

The Shire of Esperance shall be responsible for:

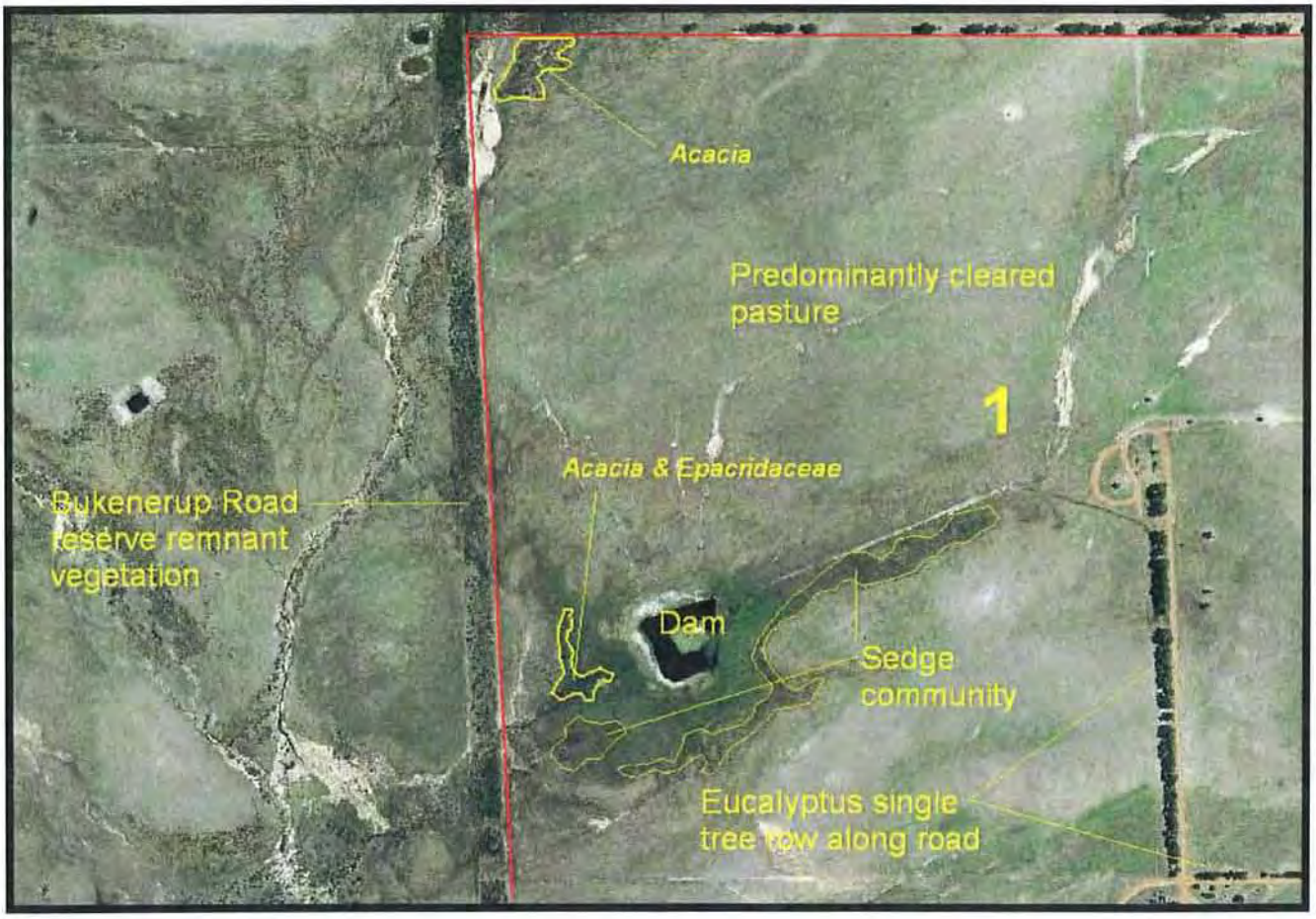
- Endorsing a Section 70A Notification on each Certificate of Title affected by this Fire Management Plan;
- Developing and maintaining District Fire Fighting Facilities and Appliances;
- Maintaining in good order the condition of the water tank (where appropriate) and the apparatus for fire fighting purposes;
- Maintaining two-wheel-drive Emergency Egress access tracks.

APPENDIX

VEGETATION MAPPING : LOT 1492 PATERSON ROAD

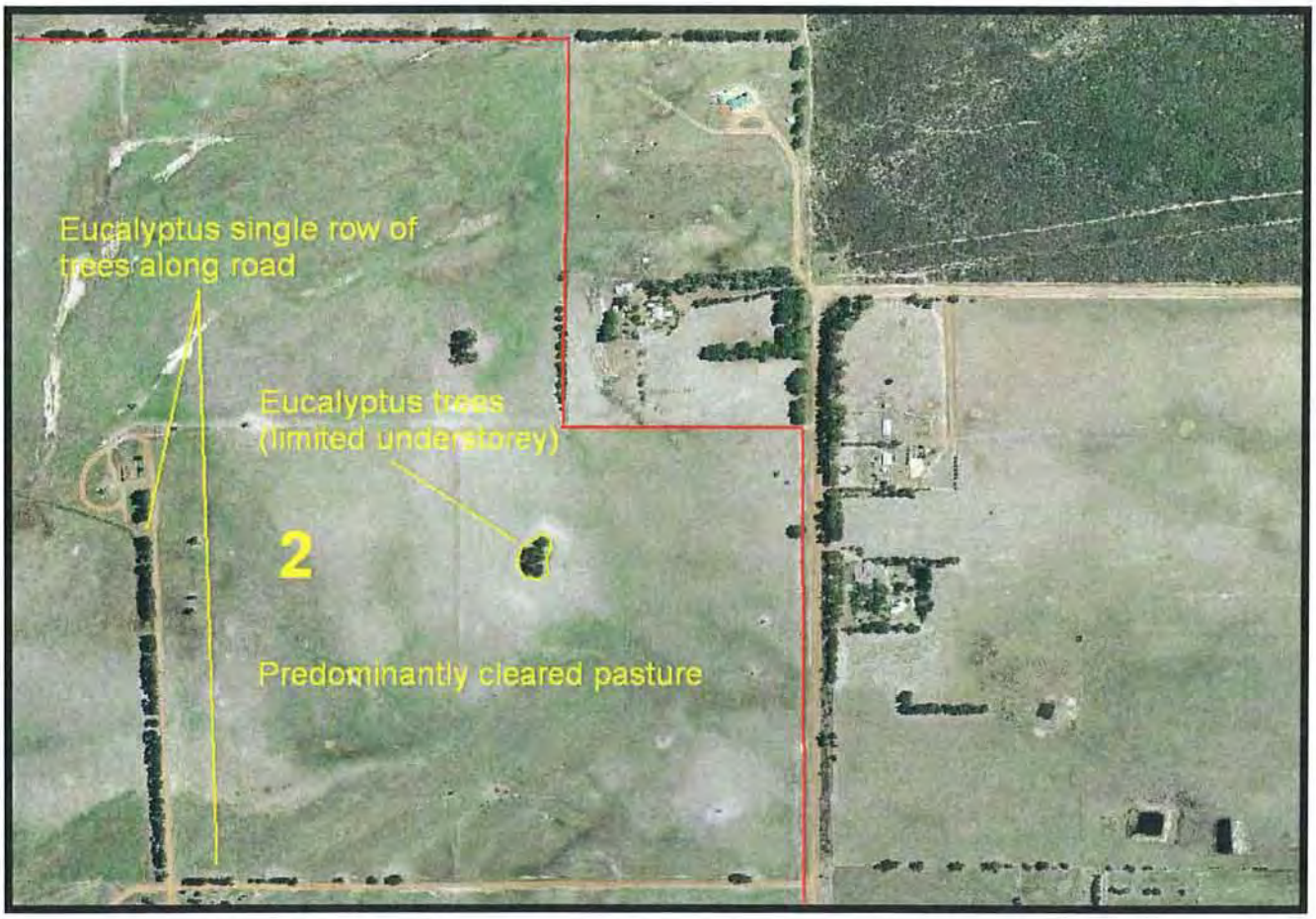


Vegetation Mapping : Lot 1492 Overview



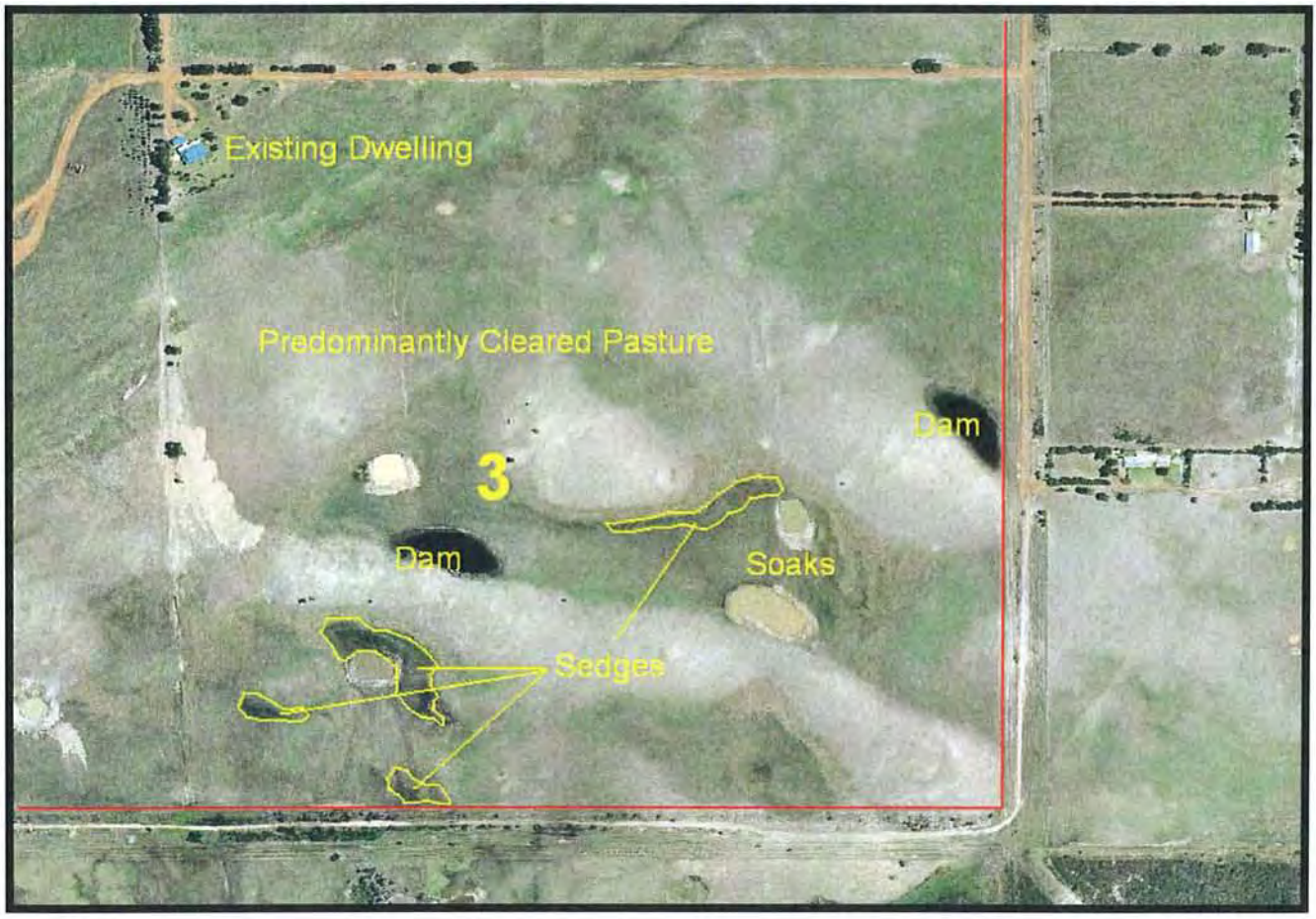
Vegetation Mapping : Lot 1492 Sheet 1

Southerly view from north-west ridge



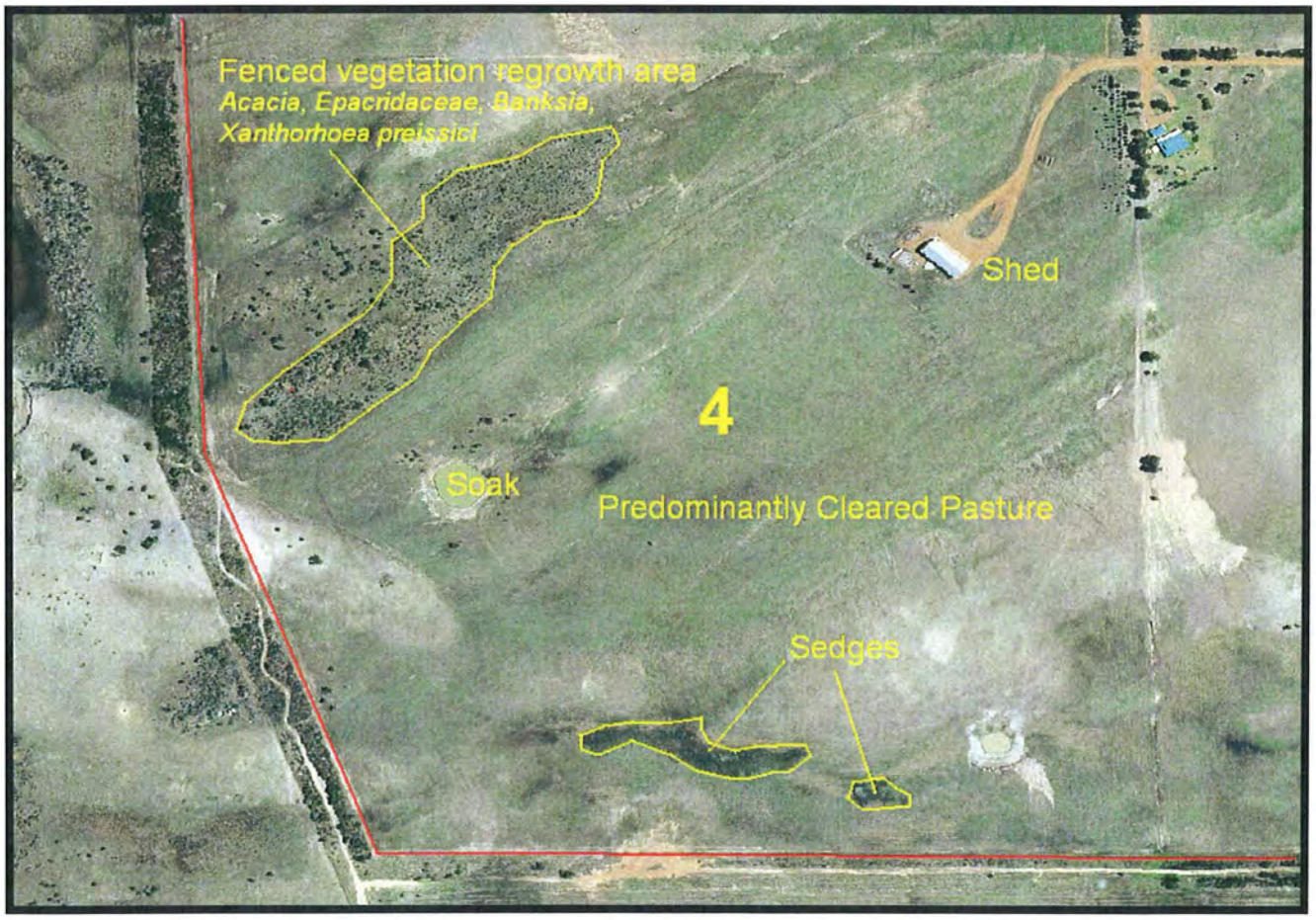
Vegetation Mapping : Lot 1492 Sheet 2

Southerly view from north-east ridge



Vegetation Mapping : Lot 1492 Sheet 3

Easterly view from existing house



Vegetation Mapping : Lot 1492 Sheet 4

East view of fenced re-growth area

APPENDIX 5

REHABILITATION MANAGEMENT PLAN
Lot 1492 Paterson Road, Esperance

LOT 1492 PATERSON ROAD, ESPERANCE

REHABILITATION MANAGEMENT PLAN

OCTOBER 2010

TABLE OF CONTENTS

1.0 INTRODUCTION

Lot 1492 Paterson Road, Esperance ("the subject land") is being developed by Karingal Pastoral Company ("landowner") for Rural Small Holdings with lot sizes generally of 8 hectares. As part of the subdivision and develop of the land, a Rehabilitation Management Plan (RMP) is required to be prepared and implemented.

This RMP has been prepared to provide a framework for site rehabilitation works together with details of rehabilitation strategies to be implemented. Rehabilitation will either be undertaken by the landowner and/or contractors.

The primary purpose of this RMP is to state the basic philosophy for rehabilitation, landscaping and other allied works together with specific works to be undertaken. As additional information to outline the landowner's background, vision and direction for the RMP, a copy of the landowner's presentation on the RMP to the Shire of Esperance Committee Meeting held on 19 October 2010 is provided in the **Appendix – Landowner Presentation**.

2.0 REHABILITATION OBJECTIVES

Rehabilitation objectives include:

- Creation of stable landform and landscape which is compatible with the surrounding environment;
- Proactive management for reduction of potential soil erosion;
- Establishment of a permanent, self-propagating vegetative cover; and
- Retention of remnant vegetation on site.

3.0 REHABILITATION PHILOSOPHY

3.1 REHABILITATION - PERENNIAL PASTURE

Research has shown that perennial based pastures (both grasses and legumes) can improve production, increase water use and provide sustainability benefits due to the following characteristics[1]:

- Ability to provide "green feed" out of season in response to summer rain or subsoil moisture;
- Deep root systems which are able to establish soil water deficits in summer/autumn;
- Capacity to reduce soil erosion;
- Ability to recycle nutrients from greater soil depths therefore reducing problems such as soil acidification;
- Displacement of broadleaf weeds; and
- Able to overcome soil water repellence as they don't rely on germination once established.

Studies have shown that kikuyu grass is highly adapted and proven to be productive and persistent in the Esperance environment[1]. Kikuyu is a temperate perennial grass species with good salt and waterlogging tolerance and is also profitable, being ideal for grazing[1].

Native pasture is increasingly recognised as an asset due to its drought tolerance, ability to grow on acidic and/or low fertility soils, nutrient value and role in sustainable grazing systems. Existing areas of native pasture within the subject land will be protected from disturbance and overgrazing wherever possible. Areas of existing pasture form a valuable component of the available pasture used for livestock and will be grazed in a sustainable manner.

Couch grass is a major native grass species and is proposed to be used in conjunction with Kikuyu grass. It is proposed to rehabilitate excessively disturbed areas and areas prone to waterlogging to pasture. The selection of pasture species (Couch and Kikuyu), may be subject to revegetation trials, where considered necessary.

1 Hopgood, L (2003) *Rehabilitation of the Esperance Downs Reasearch Station. Resource Management Technical Report No. 196*, Department of Agriculture & Food

3.2 REHABILITATION – *AMENDED EARTH*

Areas prone to waterlogging as a result of overclearing and degraded pasture are proposed to rehabilitated using a combination of *amended earth* and perennial pastures. *Amended earth* involves introducing clay and humified compost to encourage restoration of soil biology and soil structure.

An addition of compost to soils that have poor fertility, little structure and low organic carbon content has significant benefit through addition of organic matter, nutrients and enhances soil microflora. Soils with increased content of organic matter and good soil mircoflora are more productive and more resilient, allowing greater resistance to soil erosion.

The value of humus compost is:

- Increases soil heath and soil digestion;
- Improves nutrient retention (in a non-leachable form);
- Improves soil structure creating more pore space, allowing more oxygen into the soils, creating the ideal environmental for root growth and microbial multiplication;
- Contains organic sources of nitrogen, phosphorous and potassium;
- Suppresses disease – aerobic biology outcompete pathogenic microbes;
- Reduces dependency on chemical fertilizers;
- Improves health of pasture and encourages pastoral growth.

Karingal Pastoral Company has access to large amounts of compost through its own production mechanisms. The application of humified compost will significantly reduce the waterlogging issues due to the ability of the land to hold the water in a stable form. Determination of clay amounts and compost application rates may be subject to revegetation trials, where considered necessary.

4.0 REHABILITATION

4.1 REHABILITATION WORKS

As part of the subdivision and development of the subject land, rehabilitation works will involve:

- Removal of undesirable weeds and exotic vegetation in areas identified for rehabilitation;
- Fencing of the native vegetation re-growth area in the western portion of the subject land;
- Introduction of clay into the soils within rehabilitation areas to improve soil structure;
- Introduction of compost into the soils within rehabilitation areas to improve soil nutrients and encourage restoration of natural biological processes; and
- Seeding and planting of perennial pasture (kikuyu and couch grasses).

4.2 REHABILITATION ASSESSMENT AND COMPLETION CRITERIA

Rehabilitation works are progressive and can only occur when:

- Any civil and infrastructure works have ceased (if any) within or in proximity to rehabilitation areas;
- Appropriate machinery and labour is available;
- Weather and ground conditions are favourable; and
- Seasonal factors allow.

Traditionally, the progressive nature of rehabilitation dictates that area are completed in blocks and hence vegetation can have different levels of advancement. Rehabilitation monitoring will be divided into initial earthworks/preparation/seeding, initial establishment and after establishment review.

It is proposed that assessment of rehabilitation will include:

- Evaluating condition of topsoil profile for structure and quality prior to introduction of imported materials (i.e. clay and compost);
- Evaluating condition of topsoil profile for structure and quality following introduction of imported material and ground preparations;
- Observation of drainage after rain events to determine whether improvements can be made to rehabilitation areas via any channeling or other modifications to reduce localised water logging;
- Assessing germination success (establishment and abundance);
- Assessing the need for supplementary sowing/plantings;
- Assessing the degree of pastoral ground cover, structure and survival rate for sown species by type and location;
- Recording observations including photographic record and file notations for Shire of Esperance development records;
- Evaluating when and where it is considered that the introduction of livestock is beneficial to reduce significant pasture growth (principally to reduce the risk of a "hot fire" which would pose as a Bush Fire Hazard Risk); and
- Other observations, measurements or similar deemed to be valuable to achieving successful rehabilitative outcomes.

Where deficiencies are observed within rehabilitated areas which require remedial works, such works will be undertaken at the earliest possible opportunity, subject to resource availability, season, ground condition, access and other considerations.

Completion criteria will reference the rehabilitation objectives and will require Shire of Esperance satisfaction that the developer has met rehabilitation undertakings and rehabilitation has achieved a standard whereby subdivision clearance or similar condition of development can be granted.

4.3 REHABILITATION GUIDE PLAN

A **Rehabilitation Guide Plan** has been prepared as part of this RMP to provide a conceptual strategy for the rehabilitation of identified areas on the subject land.

The plan is at this stage a draft (particularly with reference to the proposed subdivision and development) as the proposed development is pending appropriate planning approval.

However, the general rehabilitation intent is indicated for the subject land, with implementation details to be finalised based on the framework provided under this RMP.

5.0 REHABILITATION OF DEGRADED LAND

Where significant areas of degraded land are identified, the following measures would be implemented:

- Removal or exclusion of stock from the immediate area until pasture can be successfully rehabilitated to a sustainable level;
- Where necessary, stabalisation of soils with contour banks or other suitable sediment and erosion control measures if required; and
- Seeding with suitable improved or native pasture, such as Kikuyu and Couch.

6.0 CONTROL OF PESTS AND NOXIOUS WEEDS

6.1 PEST CONTROL

The aim of pest control is to minimise the potential adverse impacts pests may have on the productivity of grazing lands and on the stability of non-grazing land (including grazing pressure on pasture, soil erosion and direct impacts on grazing animal numbers). The main species to be targeted include rabbits, cats and foxes.

All control measures adopted will be carried out with due regard to the welfare of the animals involved. Methods used will be designed to ensure the lowest level of suffering consistent with effective control.

Prospective landowners occupying the subject land will be required to assist in pest control measures consistent with the general principles stated above. All procedures used will be consistent with procedures recommended by the Department of Agriculture WA for destruction, capture and handling of feral animals.

6.2 WEED MANAGEMENT

Many weed species are effective competitors for resources and have the potential to exclude native species from the landscape, resulting in changes in composition and structure of plant communities. Effective management of weeds on the subject land would include the following:

- Identification of weeds via site inspections;
- Mechanical removal of identified weeds and/or the application of approved herbicides in affected areas;
- Follow-up site inspections to determine the effectiveness of eradication programmes; and
- Minimisation of seed transportation to and from identified weed infested areas (if any) during site inspections and development construction through the use of vehicle wash down procedures.

7.0 HABITAT AND LANDSCAPE ENHANCEMENT

Habitat is enhanced where opportunities arise. Actions are proposed to be undertaken by this RMP during rehabilitation and development construction works in order to improve habitat and landscape values. These include:

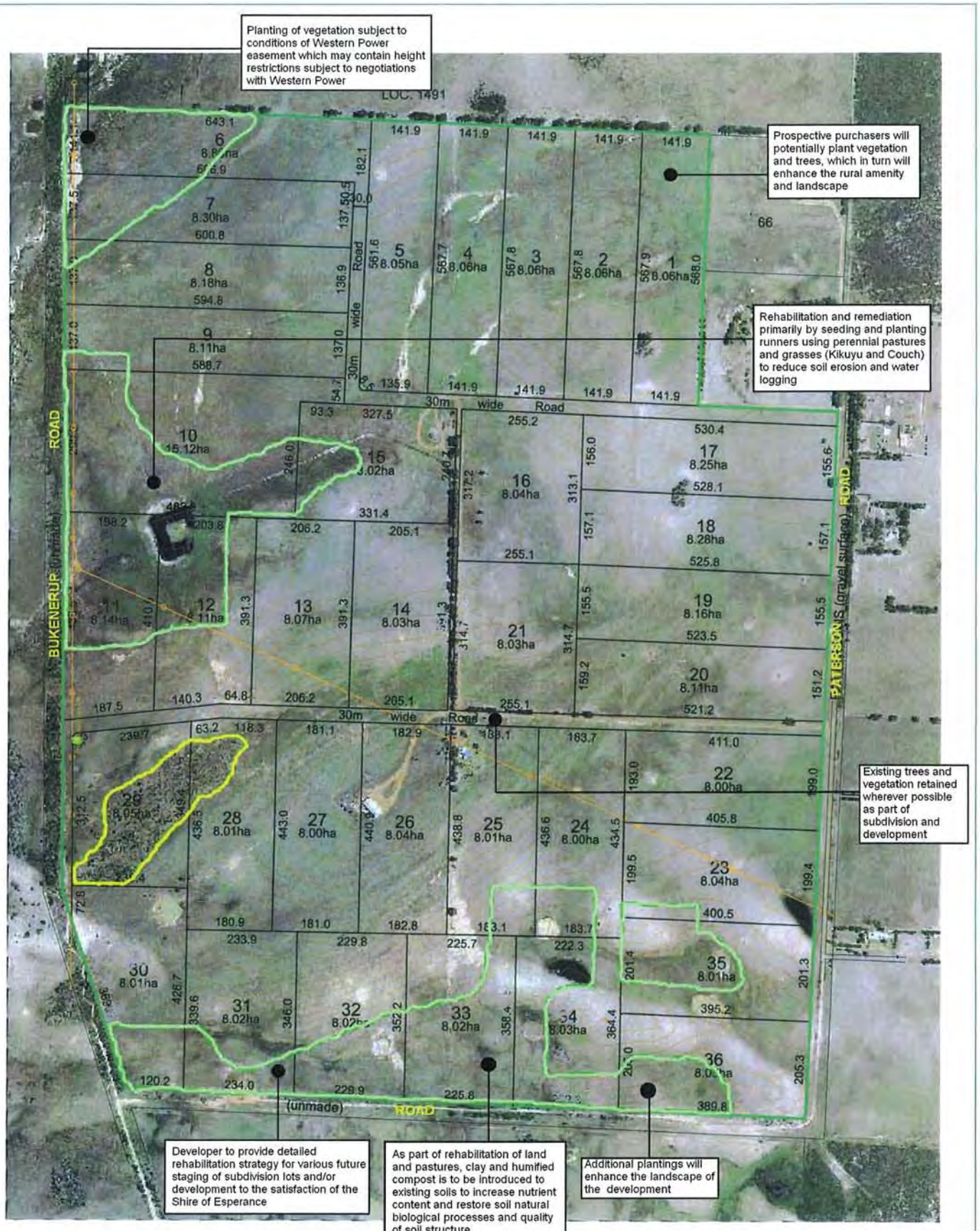
- Retention of live trees wherever possible consistent with the Small Rural Holdings use of the subject land;
- Retention of dead trees wherever possible as nesting places for birds and fauna;
- Exclusion of livestock from areas where existing vegetation is to be protected;
- Recovery (and re-use) of tree hollows from timber felled during any clearing works (i.e. road and civil construction) and placement of hollows in adjacent Bukenerup Road reserve for fauna habitat;
- Restriction of light vehicles within rehabilitation areas;
- Feral animal control and noxious weed management; and
- Opportunities for irrigation to promote re-growth of pastures.

8.0 CONCLUSIONS

The purpose of this RMP is to provide a framework for site rehabilitation works together with details of the rehabilitation strategies to be implemented.

The framework contained in this RMP sets out the basic philosophy for rehabilitation, landscaping and other associated works to be undertaken. Rehabilitation will either be undertaken by the landowner and/or contractors.

Implementation of this RMP has the capacity to improve the landscape and land management of the subject site, including waterlogging, rehabilitation of degraded pasture and retention of remnant and re-growth native vegetation.



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Date:	16 March 2010
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LEGEND

Primary areas identified for rehabilitation which are to be rehabilitated using a combination of introduced clay and compost followed by re-vegetation with perennial pasture/grasses

Area to be fenced and set aside for conservation to allow retention and re-growth of native vegetation

REHABILITATION GUIDE PLAN
LOT 1492 PATERSON ROAD
ESPERANCE

133 Scarborough Beach Road, Mount Hawthorn WA 6016
PO Box 99, MOUNT HAWTHORN WA 6915
T: 08 9443 1511 F: 08 9444 2901
E: whelans@whelans.com.au W: www.whelans.com.au
whelans TOWN PLANNING

APPENDIX 1

LANDOWNER'S PRESENTATION TO SHIRE OF ESPERANCE COMMITTEE ON 19 OCTOBER 2010

LOT 1492 PATERSON ROAD : OUTLINE DEVELOPMENT PLAN

Presentation by landowner to Council Committee Meeting 19 October 2010

Introduction

Good Afternoon committee. My name is David Campbell and I farm with my wife Linda and family on 15,000ha at Scaddan and Munglinup. We are farmers and land managers, you could call us property developers. We develop farms. We have managed significant problems in the past including salt problems, wind eroded areas, non wetting sands, water logging and planted over 500,000 trees. We won the western Australian Tree farmer of the year in 1999. We are very pro-active in our approach to land management.

I make these points to re-iterate the fact that we are not against planting trees and using the correct land management systems in the right place.

In regard to our outline development plan for subdividing lot 1492 into smaller lots, we agree with the ODP except for the rehab management plan, this is where our past experience over the last 35 years, mixed with the latest technology in soil and nutrient management will give us the ability to make a significant difference.

Benefits of proposed Rehabilitation Management Plan

Our plan is to significantly increase the soils holding capacity of water and nutrients. This is to be done with the use of clay and humified compost.

We are well aware of potential nutrients leaching into Lake Warden and for that matter nutrients leaching from all soils around the world.

We are taking a very active approach to this problem and intend to showcase our approach on this property. We believe from our research that we can significantly reduce NPK leaching by holding these elements in the soil with humus technology. This humified compost has the capacity to hold these nutrients and store more water up on the recharge areas, in turn we will be able to grow more biomass, better roots, use more water and decrease the water logging and nutrient run off. By establishing this land management technique we aim to make more land owners aware of this system and hope to make a very significant impact on reducing nutrients leaching into all water systems. Integrated stocking practices will be used as well

I would like to submit a sample of humified compost for you to look at (further samples can be provided on request). This product which we are in the process of being licensed with the DEC and the Shire has the ability to do some amazing things to the soil. Thank you for your time and I would be happy to answer any questions.