

**LOTS 202 & 203 WANDENA ROAD
AND
LOTS 204 & 205 GREAT NORTHERN HIGHWAY
CHITTERING

LANDSCAPE MASTER PLAN**

Prepared for

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TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
2.0 EXISTING LANDSCAPE	2
3.0 LANDSCAPING STRATEGY	3
4.0 LANDSCAPING ZONES	4
4.1 Great Northern Highway	4
4.2 Wandena Road	4
4.3 Bioretention Swales	4
4.4 Lots	5
5.0 SPECIES SELECTION AND PLANTING DENSITY	6
5.1 Swales and Basins	6
5.2 Effluent Irrigation Areas	6
5.3 Lot Landscaping	7

LIST OF FIGURES

Figure	Title
1	Mucnea Employment Node Structure Plan
2	The Project Area and Surroundings
3	Subdivision Concept
4	Views of the Project Area
5	Landscape Master Plan
6	Bioretention Swales
7	Lot Example

1.0 INTRODUCTION

The owners of Lots 202 & 203 Wandena Road and Lots 204 & 205 Great Northern Highway, Chittering (the project area) have applied to the Shire of Chittering for the lots to be rezoned from Agricultural Resource to General Industry. The draft Muchea Industrial Park Structure Plan 2019 (MIPSP) shows Lots 204 and 205 as part of Precinct 2 (General Industry Core) and Lots 202 and 203 as part of Precinct 4 (Light Industry following completion of quarrying). Figure 1 shows the location of the project area within the draft Muchea Industrial Park Structure Plan area.

The owners have submitted a Local Structure Plan (LSP) for the project area. The total area of the rezoning and LSP is approximately 82 hectares. Figure 2 shows an aerial view of the project area and surroundings. Figure 3 shows a preliminary conceptual plan of subdivision for the project area.

The Muchea Industrial Park will form the southern gateway to the Shire of Chittering. A priority of the Shire Council is that the MIP should present an attractive visual landscape for observers travelling on the main approaches into Chittering. This includes preserving native vegetation (mostly roadside trees and some paddock trees) where possible, landscape plantings, building design and layout of development within lots.

The Shire of Chittering has set out its priorities in its *Muchea Industrial Park Design Guidelines* (2018). The Guidelines deal with development layout within lots, streetscaping, landscaping, bushfire management, fencing, signage and building design. The Shire of Chittering Town Planning Scheme No. 6 also contains provisions relating to landscape within industrial zones. This Landscape Master Plan recognises and reflects the recommendations of the Design Guidelines and the Scheme provisions.

2.0 EXISTING LANDSCAPE

The project area is visible from Great Northern Highway and Wandena Road. The view from Great Northern Highway is mostly open, with some screening by trees planted within the Project Area. The view from Wandena Road is obscured by heavy vegetation and terrain except for about the southernmost 140m of the site and about 100m to the south. Figure 4 shows views from Great Northern Highway and Wandena Road.

The landscape of Lots 202 and 203 is a mix of uncleared Wandoo woodland and a former clay quarry, which is currently being backfilled prior to rehabilitation. The landscape of Lots 204 and 205 consists of cleared paddocks with scattered trees and buildings associated with the Scenic Lodge horse stud.

3.0 LANDSCAPING STRATEGY

Landscaping of the project area will focus on the use of species with low water demand. Plantings will include bioretention swales and basins, landscape buffers (to a minimum of 10% of the area of each lot) and street trees. The plantings will not be irrigated after the establishment phase. No turf grass will be planted in public areas, although individual lot owners may choose to plant grass. Lawn areas will not count towards the landscaping requirement on each lot.

Fertiliser use will be minimal. New tube stock plantings will be fertilised with slow-release nitrogen and phosphorus tablets on establishment and thereafter will be unfertilised.

The bioretention basins and swales will be densely planted with inundation and drought tolerant native species including sedges and low shrubs in order to stabilise the swales and maximise their ability to immobilise nutrients and sediments from the water.

The total area to be planted is approximately 13.7 hectares. If all of this area were planted simultaneously during the establishment phase, approximately 62 ML of water would be required to irrigate the new plantings in the first year. As the project area is likely to be developed in a number of stages, the requirement for irrigation water is likely to be spread out over a number of years, with only a small part of the total demand being required in any one year.

The density of planting will be controlled to keep flammable ground fuel loads below 8 tonnes/ha, in accordance with the Bushfire Management Plan (Eco Logical Australia, 2021).

Figure 5 shows an overview of the Landscape Master Plan.

4.0 LANDSCAPING ZONES

4.1 Great Northern Highway

The Great Northern Highway road reserve includes a cleared verge 10m wide adjacent to Lots 204 and 205.

The road reserve is mostly classed as “Grassland” under the Bushfire Management Plan, with a moderate fire hazard rating. An exception is the western side of the road reserve opposite the south-west corner of the site, which due to its greater tree density is classed as “Woodland” with an extreme fire hazard rating.

No landscape planting is proposed in the Great Northern Highway road reserve, in line with Main Roads WA advice (A. Rao, MRWA 2021 pers. comm.).

4.2 Wandena Road

The Wandena Road reserve includes a 3m to 8m partly-vegetated verge adjacent to Lots 202 and 203. The verge supports remnant native trees including Wandoo and Marri. The understorey is sparse and includes some low native shrubs and large areas of open ground.

The Wandena Road reserve is currently classed as “Excluded” under the Bushfire Management Plan, with a moderate fire hazard rating. This classification is due to the spacing of the existing trees, the separation of canopies and the absence of a mid-storey. The fire hazard would be increased by any substantial increase in the overstorey canopy density or by an increased understorey.

Landscaping in the Wandena Road reserve will be limited to retention of existing trees and weed control.

4.3 Bioretention Swales

Bioretention swales 4m wide will be located on one or both sides of all roads within the project area, as well as several dedicated 10m wide drainage easements. The swales and easements will carry road runoff and excess lot runoff.

The swales and easements will be densely planted with native sedges, small (<2m) shrubs and widely-spaced small trees to stabilise the swales, slow the water flows and maximise the uptake of sediments and nutrients from the water. Figure 6 shows conceptual profiles of the roadside swales.

4.4 Lots

The Shire of Chittering's Design Guidelines set out the Shire's requirements and recommendations for landscaping within lots. Other requirements arise from provisions for drainage and effluent disposal within the lots.

The general landscaping within lots will include:

- a minimum 2m wide landscape buffer on the primary road frontage;
- a minimum 1m wide landscape buffer on secondary road interface and side boundaries extending to the building setback line;
- one shade tree per four car parking bays;
- one tree per 10m of road frontage;
- a bioretention basin to hold the 1-year ARI 1-year storm, typically measuring about 3% of the total area of the lot;
- an effluent disposal area (probably ATU irrigation area) planted with low shrubs, with size depending on the lot workforce (about 23m² per full-time employee); and
- other landscape plantings to a total of 10% of the area of the lot.

Plantings within lots will generally feature sedges and other ground covers, low shrubs (<2m) and widely-spaced trees in order to comply with the requirements of the Bushfire Management Plan. It is noted that the Design Guidelines' requirement for one tree every 10m of road frontage may, depending on the size of the trees, exceed the permissible canopy density for "Shrubland" under the Bushfire Management Plan. It is proposed instead to space trees 15m apart in all areas within 100m of lots.

Figure 7 shows an indicative layout of landscape plantings for a typical lot.

5.0 SPECIES SELECTION AND PLANTING DENSITY

Species to be planted in the project area will be local native species, with species for specific areas selected for their height and inundation and/or drought tolerance. Recommended species for each situation are listed below:

5.1 Swales and Basins

- Includes in-lot 1-yr ARI basins, roadside swales and drainage easements.
- Planting area approx. 6.4ha.
- Densely planted with sedges, herbs, low shrubs and scattered small trees.
- “Shrubland” classification.

Sedges & Herbs

- Planting density 10,000/ha (1m spacing)
- Recommended species:

<i>Baumea articulata</i>	<i>Juncus kraussii</i>
<i>Baumea juncea</i>	<i>Juncus pallidus</i>
<i>Conostylis aculeata</i>	<i>Lepidosperma longitudinale</i>
<i>Dasyogon bromeliifolius</i>	<i>Lyginia imberbis</i>
<i>Gahnia trifida</i>	<i>Patersonia occidentalis</i>
<i>Hypolaena exsulca</i>	<i>Phlebocarya ciliata</i>

Shrubs (<2m)

- Planting density 2,500/ha (2m spacing)
- Recommended species:

<i>Acacia lasiocarpa</i>	<i>Phyllanthus calycinus</i>
<i>Hibbertia hypericoides</i>	<i>Regelia ciliata</i>
<i>Hypocalymma angustifolium</i>	<i>Xanthorrhoea preissii</i>

Tall Shrubs (>2m) and Trees

- Planting density <50/ha (15m spacing).
- Recommended species:

<i>Acacia saligna</i>	<i>Melaleuca raphiophylla</i>
<i>Casuarina obesa</i>	<i>Viminaria juncea</i>
<i>Melaleuca preissiana</i>	

5.2 Effluent Irrigation Areas

- Planting area approx. 1ha (depending on workforce on individual lots).
- Planted with dense low shrubs, sedges & herbs.
- “Shrubland” classification.

Sedges & Herbs

- Planting density 10,000/ha (1m spacing).
- Recommended species:

<i>Hypolaena exsulca</i>	<i>Lyginia imberbis</i>
<i>Juncus kraussii</i>	<i>Patersonia occidentalis</i>
<i>Lepidosperma longitudinale</i>	<i>Phlebocarya ciliata</i>

Low Shrubs (<2m)

- Planting density 2,500/ha (2m spacing).
- Recommended species:

<i>Acacia lasiocarpa</i>	<i>Phyllanthus calycinus</i>
<i>Hibbertia hypericoides</i>	<i>Regelia ciliata</i>
<i>Hypocalymma angustifolium</i>	<i>Xanthorrhoea preissii</i>

5.3 Lot Landscaping

- Planting area approx. 6.3ha.
- Includes front & side boundary landscape buffers and other plantings to total 10% of lot area.
- Planted with sedges & herbs, low shrubs and scattered trees.
- “Shrubland” classification.

Sedges & Herbs

- Planting density 2,500/ha (2m spacing).
- Recommended species:

<i>Hypolaena exsulca</i>	<i>Lyginia imberbis</i>
<i>Juncus kraussii</i>	<i>Patersonia occidentalis</i>
<i>Lepidosperma longitudinale</i>	<i>Phlebocarya ciliata</i>

Low Shrubs (<2m)

- Planting density 2,500/ha (2m spacing).
- Recommended species:

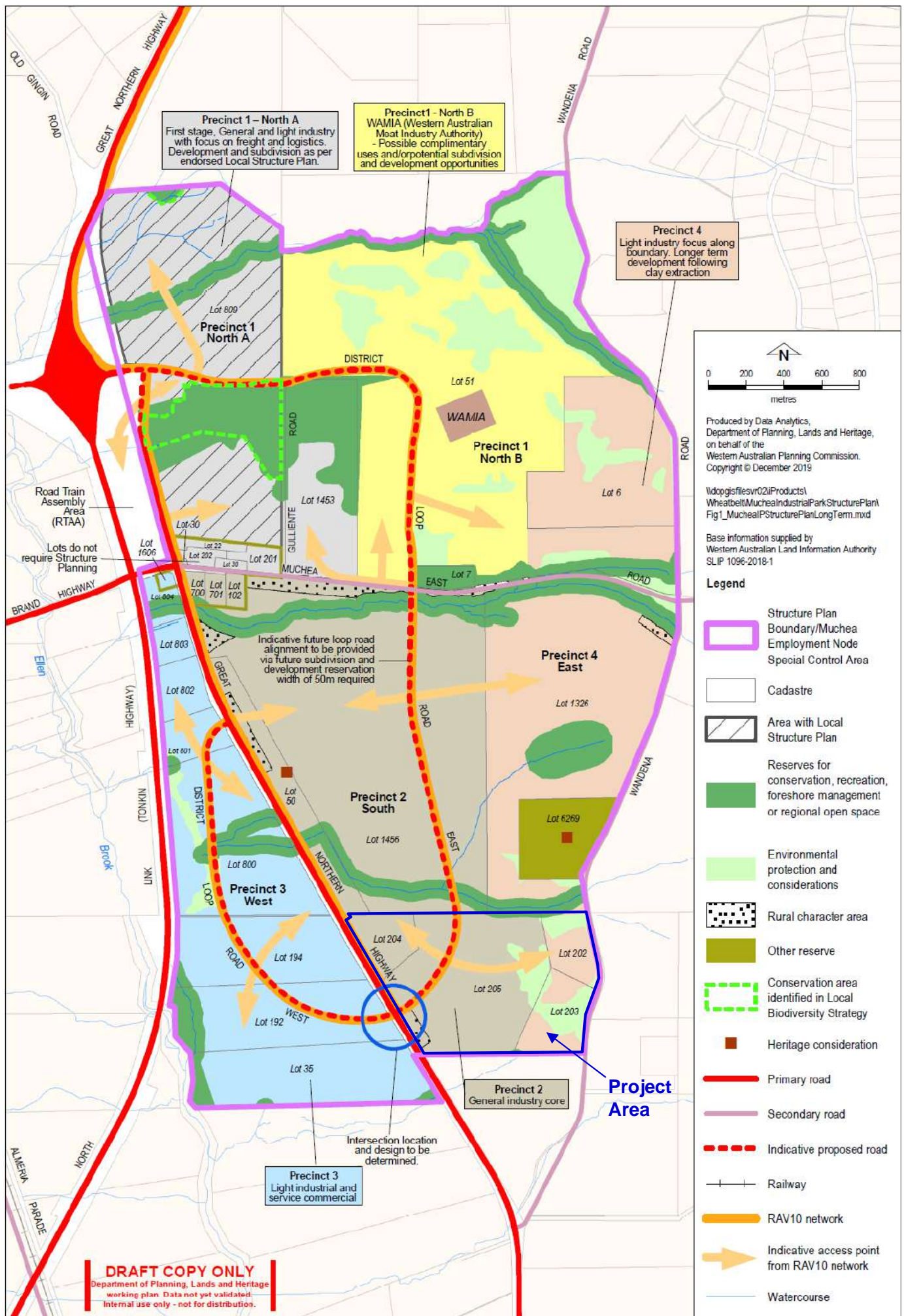
<i>Acacia lasiocarpa</i>	<i>Phyllanthus calycinus</i>
<i>Hibbertia hypericoides</i>	<i>Xanthorrhoea preissii</i>
<i>Hypocalymma angustifolium</i>	

Tall Shrubs (>2m) and Trees

- Planting density <50/ha (15m spacing).
- Recommended species:

<i>Allocasuarina fraseriana</i>	<i>M. teretifolia</i>
<i>Casuarina obesa</i>	<i>M. preissiana</i>
<i>Corymbia calophylla</i>	<i>M. raphiophylla</i>
<i>Eucalyptus rudis</i>	<i>Gastrolobium ebracteolatum</i>
<i>E. wandoo</i>	<i>Viminaria juncea</i>
<i>Melaleuca incana</i>	

Figures



Source: WAPC, 2019

Figure 1

DRAFT MUCHEA INDUSTRIAL PARK STRUCTURE PLAN



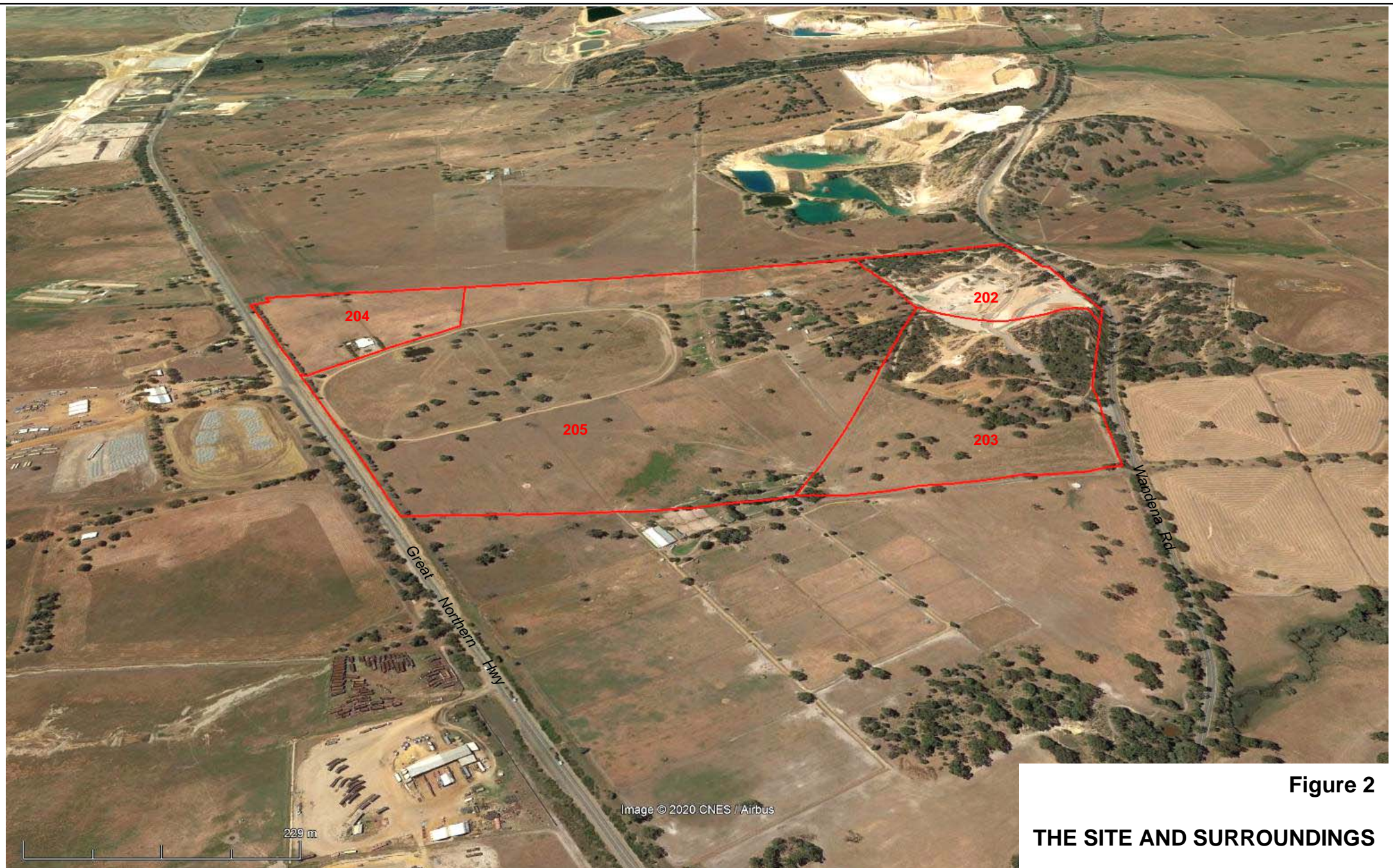


Figure 2

THE SITE AND SURROUNDINGS



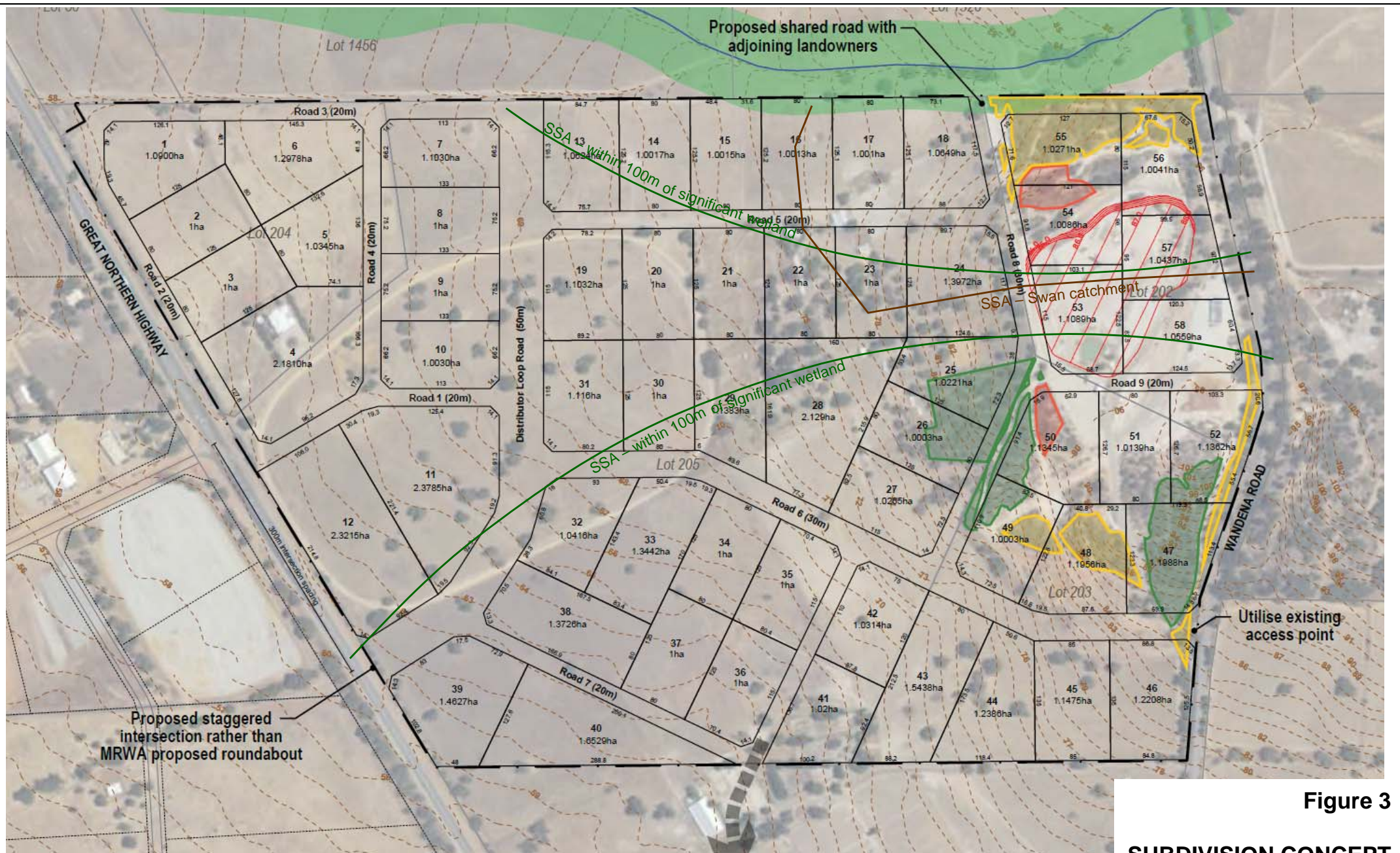


Figure 3
SUBDIVISION CONCEPT



1 Wandena Rd looking north-west into Lot 203



2 Wandena Rd looking north-west into quarry entrance



3 Wandena Rd looking north-west towards Lot 202



4 Great Northern Hwy looking north-east into Lot 205



5 Great Northern Hwy looking east into Lot 205 entrance



6 Great Northern Hwy looking south-east into Lot 204



Images: Google (2017)

Figure 4
VIEWS FROM GREAT NORTHERN HIGHWAY
AND WANDENA ROAD

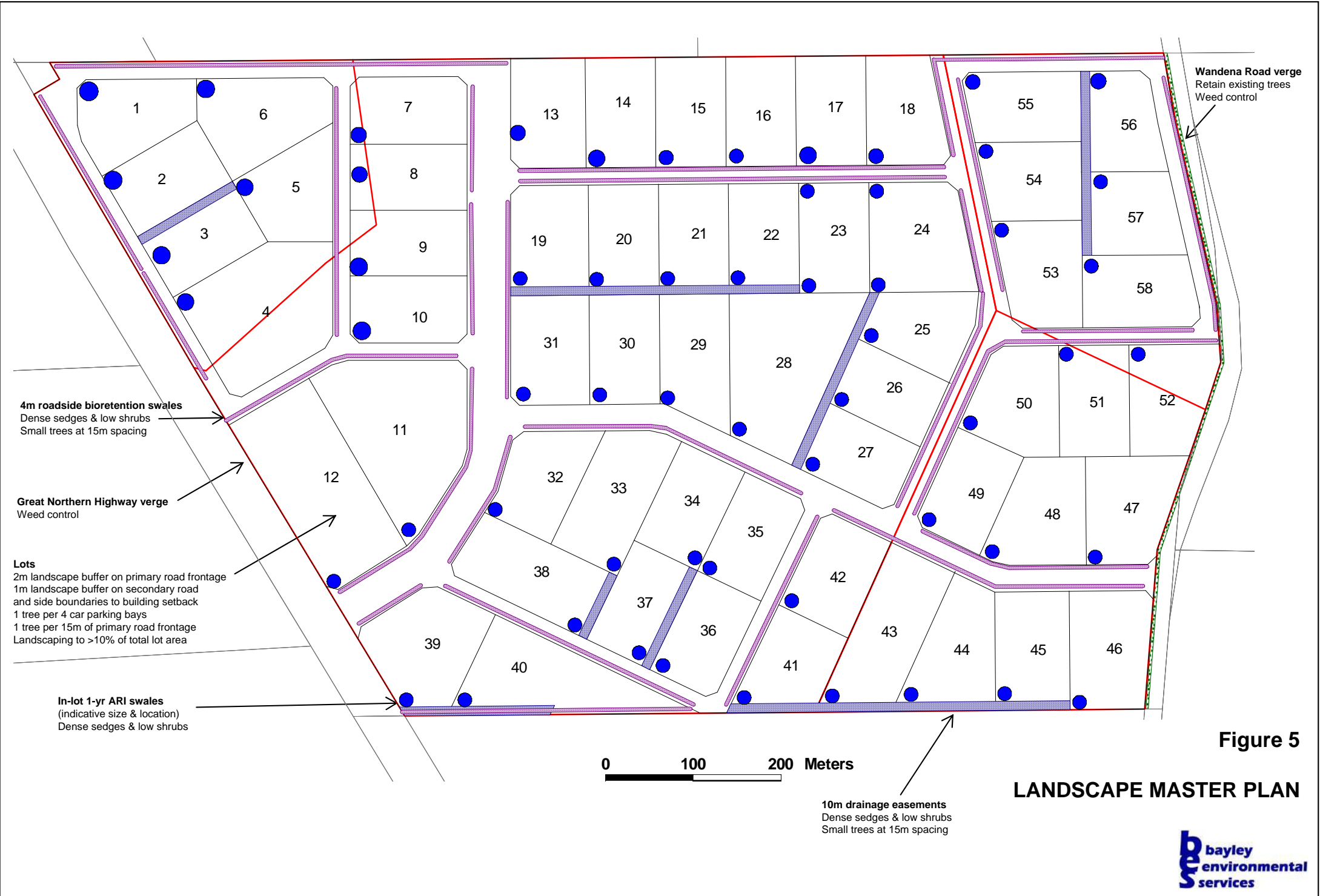


Figure 5

LANDSCAPE MASTER PLAN

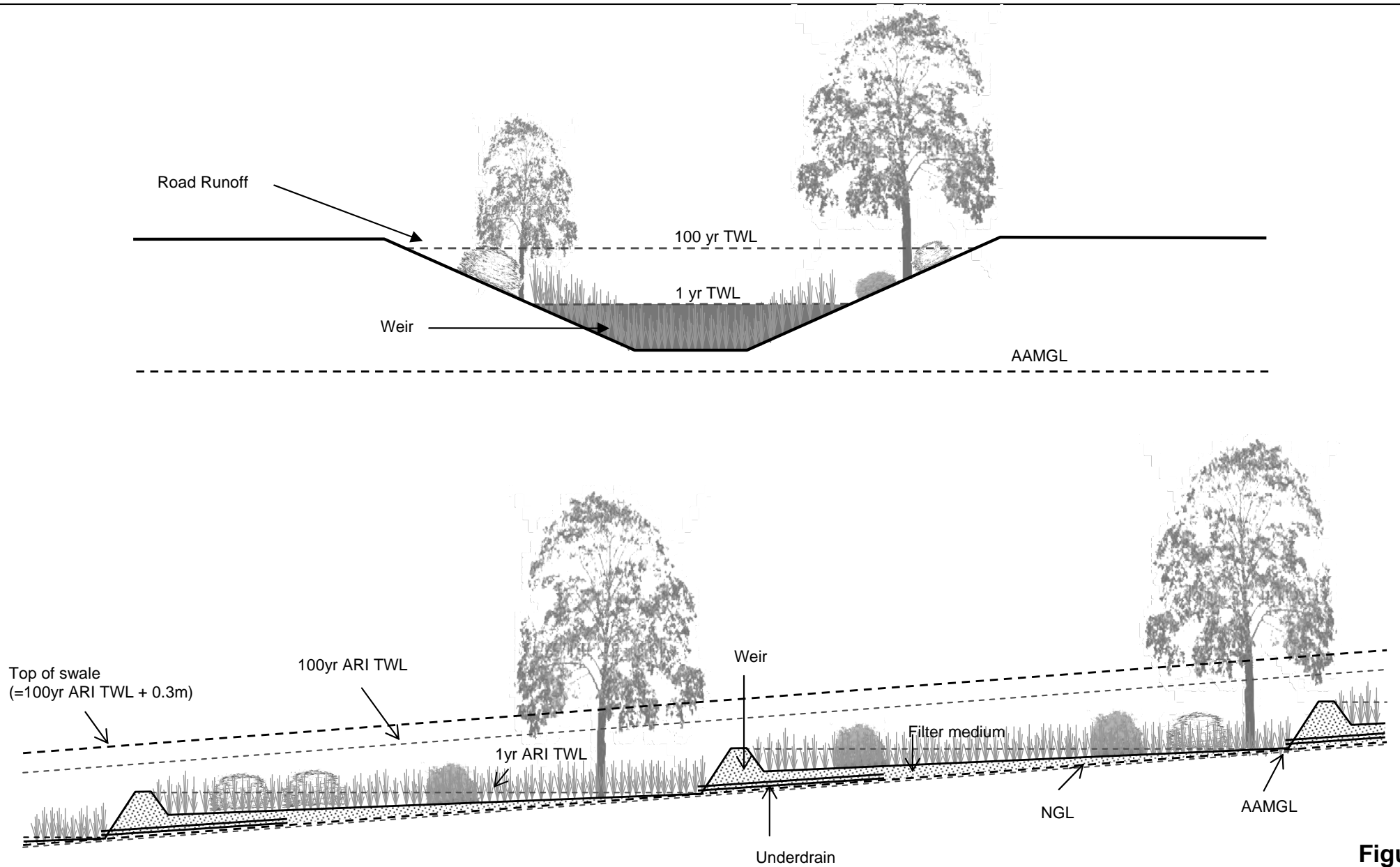


Figure 6

BIRETENTION SWALES

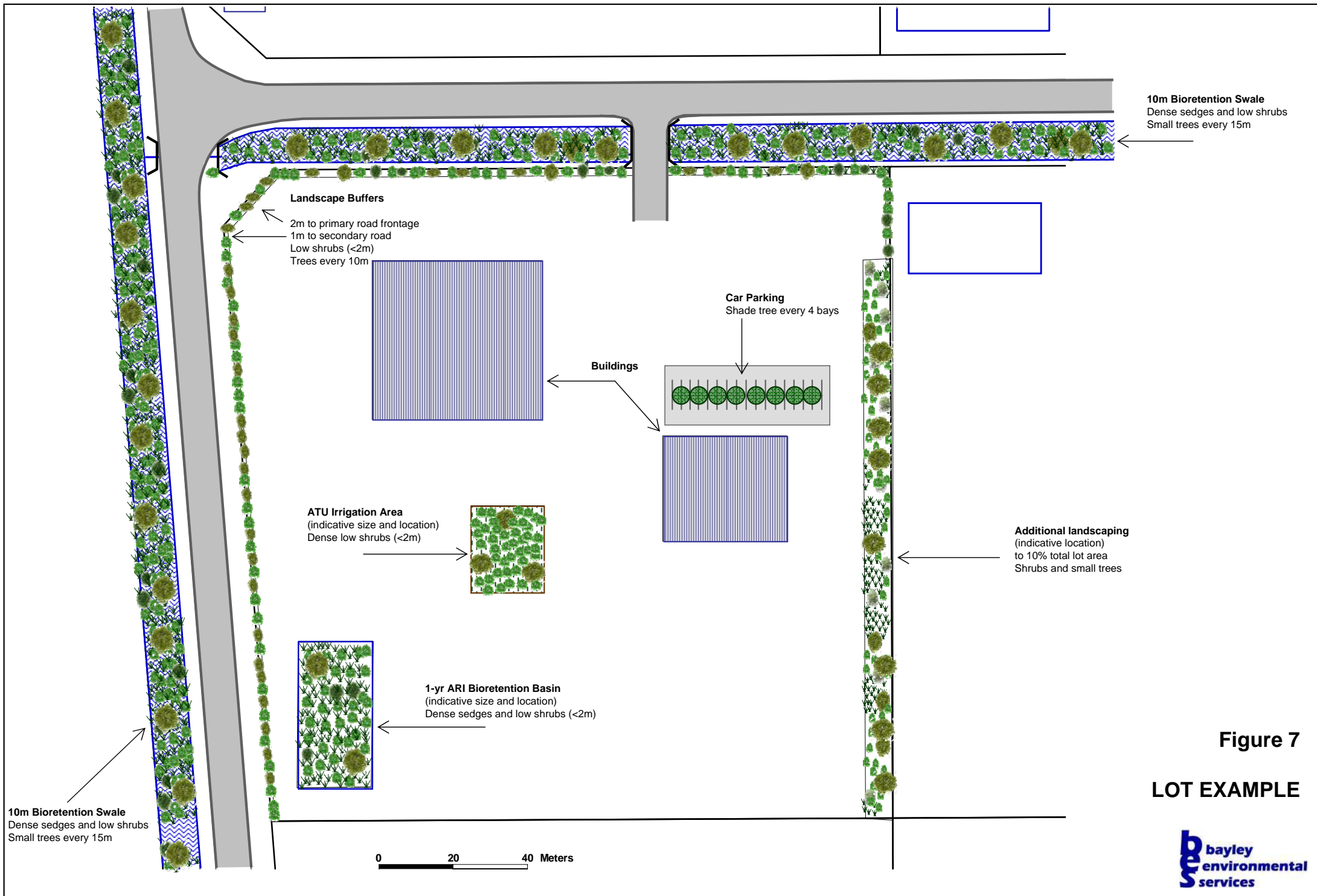


Figure 7
LOT EXAMPLE