



Alliance Business Park  
165 - 195 O'Herns Road, Epping:  
Matted Flax-lily Translocation Plan

Prepared for Alliance Business Park Pty Ltd

05 February 2019

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## Summary

Biosis Pty Ltd was commissioned by MAB Corporation (MAB) to prepare a Matted Flax-lily *Dianella amoena* Translocation Plan for the salvage of 23 plants recorded within the Alliance Business Park (east) at 165 -195 O'Herns Road, Epping. The site is proposed to be developed into an industrial estate.

The 23 Matted Flax-lily within the development footprint of Alliance Business Park (East) are proposed to be translocated to the Epping North Conservation Reserve (ENCR). This location was identified in consultation with the Mark Williams, Acting Team Leader Conservation Management for the City of Whittlesea and Jock Wilson, Program Manager, Natural Environment Programs, Port Phillip Region, Department of Environment, Land, Water and Planning (DELWP).

Alliance Business Park Pty Ltd is responsible for implementing the actions outlined in this plan until the relocated individuals of Matted Flax-lily are considered to be established at the translocation recipient site.

Each plant will be considered established at the recipient site when a minimum of two of the four clones planted for over 90% of the 23 salvaged plants (i.e. 21 plants) have survived for a minimum period of five years. This target is expected to be achieved in 2024.

# 1. Introduction

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## 1.1 Project background

This plan provides the approved Matted Flax-lily *Dianella amoena* (MFL) translocation plan under both EPBC 2017/7930 (Condition 4) and Planning Permit 716886.

### 1.1.1 Approvals for Alliance Business Park (east)

The approval for the development of Alliance Business Park (East) at 165 - 195 O'Herns Road Epping was subject to a number of conditions under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval (2017/7930) and Planning Permit 716886 (Whittlesea Planning Scheme).

Conditions relating to the translocation of MFL provided by the Department of Environment and Energy (DoEE) are outlined in Condition 4 of EPBC 2017/7930 as follows:

*The approval holder must submit a Matted Flax-lily Translocation Plan for the salvage of all Matted Flax-lily plants to be removed as part of the action, and translocation of those plants to the recipient sites. The approval holder must not commence the action until the Matted Flax-lily Translocation Plan has been approved by the Minister. Once approved, the approved Matted Flax-lily Translocation Plan must be implemented. The Matted Flax-lily Translocation Plan must include but is not limited to the following requirements:*

- a. *selection criteria to determine appropriate nursery (if required) and recipient site(s) for the translocation Matted Flax-lily*
- b. *a map and description of the chosen recipient site(s) and surrounding land uses, including evidence of consultation with the manager of the recipient site*
- c. *pre-clearance surveys for the project area*
- d. *protocols and timeframes for the salvage and translocation of the impacted Matted Flax-lily*
- e. *post-translocation management actions for the nursery (if required) and recipient site(s), including protection measures for the translocated Matted Flax-lily*
- f. *roles and responsibilities (clearly stating who is responsible for activities)*
- g. *translocation failure risk assessment*
- h. *a monitoring and adaptive management program for at least five years after translocation of the Matter Flax-lily plants, which must include:*
  - i. *Performance indicators (clear and concise criteria against which achievement of outcomes are to be measured), which are capable of accurate and reliable measurement*
  - ii. *Outcomes (time bound outcomes as measured by performance indicators), including milestones (interim outcomes) where applicable*
  - iii. *Monitoring requirements (timing and frequency of monitoring to detect changes in the performance indicators, to determine if outcomes are being achieved, and to inform adaptive management)*
  - iv. *Trigger values for corrective actions*
  - v. *Corrective actions to be implemented if trigger values are reached, including timeframes, and how environmental incidents will be managed.*

These conditions also include that the development not disturb more than 9.89 hectares of MFL habitat and the site be subject to a pre-clearance survey to confirm the total number of plants to be impacted and translocated.



Biosis (2019) completed the pre-clearance survey and identified a total of 23 plants within the development footprint. This was an increase of 5 plants on the original 18 plants identified within the development footprint by Biosis (2017a).

Planning Permit 716886 (Whittlesea Planning Scheme) requires that:

*Condition 11. Prior to native vegetation removal, an approved Matted Falx-lily Translocation Plan is to be implemented to the satisfaction of the Responsible Authority, in consultation with DELWP.*

## **1.2 Pre-clearance Survey**

Prior to the salvage of plants from Alliance Business Park (East) the site was subject to a targeted survey to detect any additional individuals of MFL which may have been overlooked by the initial assessment (Biosis 2017). This pre-clearance survey (Biosis 2019) was conducted in a manner consistent with the requirements and procedures outlined by the Biodiversity Precinct Structure Planning Kit (DSE 2010) for MFL.

The pre-clearance survey was conducted while local populations of MFL were in flower and fruit to provide for the maximum observability of individuals within the Alliance property. The results of the pre-clearance survey have been documented and a report provided to DELWP and DoEE (Biosis 2019). This survey satisfies the requirements of Condition 5 of EPBC 2017/7930.

The known population of 23 plants within the development footprint for Alliance Business Park (East) will be subject to translocation.

## **1.3 Selection Criteria**

### **1.3.1 Nursery**

A nursery will be selected on the basis of its experience in the cultivation and storage of indigenous flora, particularly in relation to the flora of the Victorian Volcanic Plains bioregion (VVP) and MFL.

### **1.3.2 Recipient site**

The recipient site will be selected based on its suitability to provide for the known habitat requirement of MFL within the VVP. This includes physical, topographical, soil and administrative characteristics. A recipient site should:

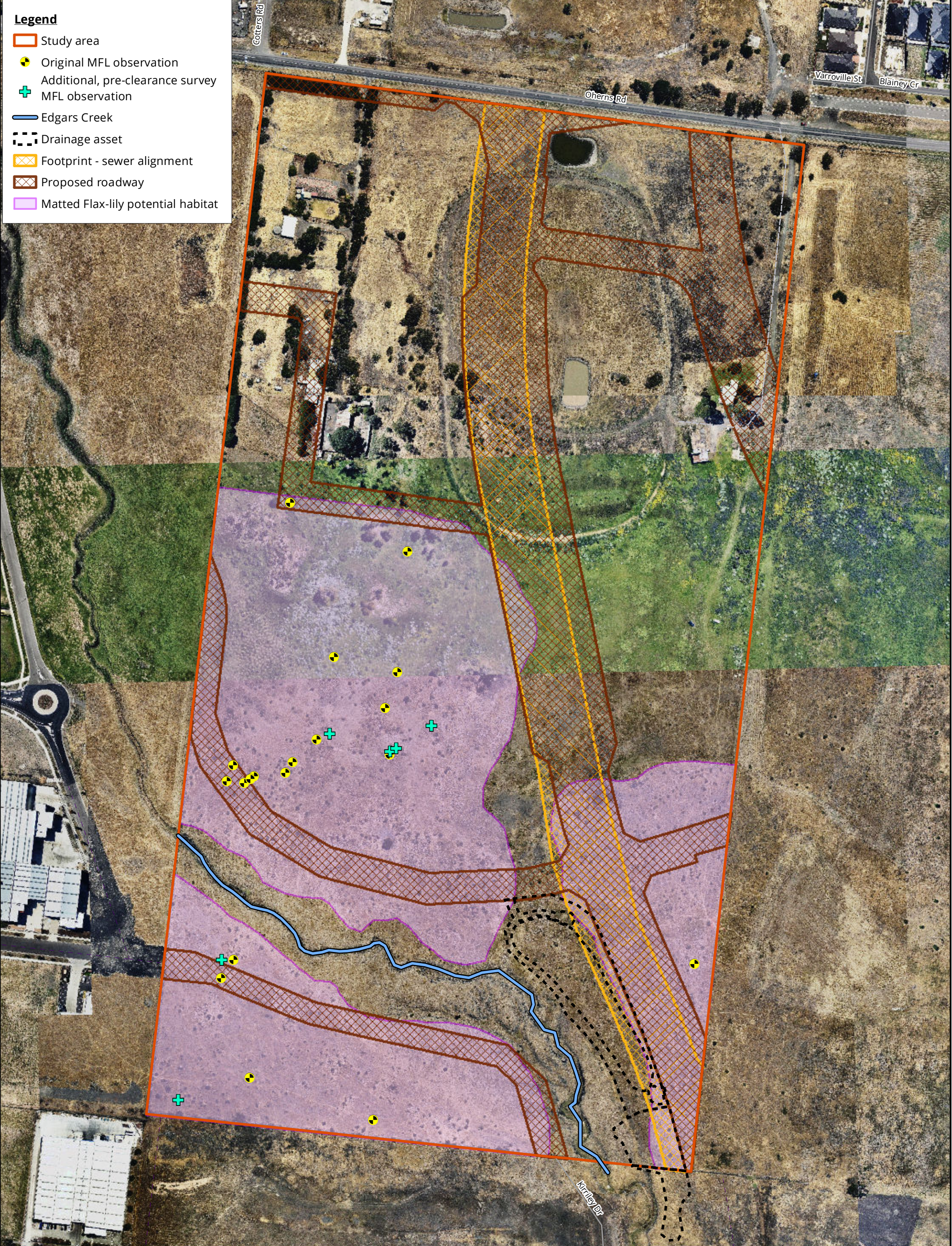
- be of gentle relief (plains) or stony knolls with well-drained or moderately draining soils (surface rocks should be a dominant feature)
- have moderately friable, clays Soils with the heavier cracking clays being less suitable
- support vegetation such as Plains Grassland, Plains Grassy Woodland or Stony Knoll Shrubland
- be within an area of public land designated for biodiversity conservation or otherwise permanently protected and managed for conservation purposes.

## **1.4 Salvage of MFL**

The known population of MFL within the development footprint for Alliance Business Park (East) (23 individuals) is to be salvaged prior to the start of development works (Figure 1). Salvaged plants will be propagated and maintained at an appropriate nursery.



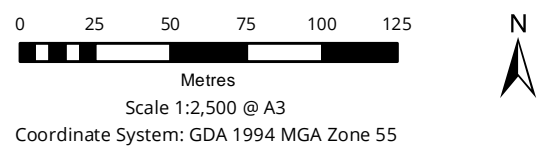
- Legend**
- Study area
  - Original MFL observation
  - + Additional, pre-clearance survey MFL observation
  - Edgars Creek
  - Drainage asset
  - Footprint - sewer alignment
  - Proposed roadway
  - Matted Flax-lily potential habitat



**Figure 1 Location of 23 Matted Flax-lily plants to be salvaged from Alliance Business Park (East), 165 - 195 O'Herns Road, Epping Victoria)**

Acknowledgements: Vicmap ©State of Victoria; Imagery (c) Nearmap 2017

Matter: 28455,  
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 Checked by: SGM, Drawn by: JPT, Last edited by: Jturner  
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The nursery selected is Grey Box and Grasslands Indigenous Nursery, Balliang East, Victoria 3340. This nursery also operates propagation facilities at the Newport Lakes Native Nursery at 2 Lakes Drive, Newport Victoria 3015. This nursery specialises in the propagation of flora indigenous to the VVP and has previously conducted salvage and storage operations for at least two other successful MFL translocation operations including at Larundel in Bundoora (Mueck and Brown 2005) and for the Melbourne Wholesale Markets Project in Epping (Biosis 2017b).

This nursery will maintain 10 clones of each of the plants salvaged in a manner that allows the clones of each individual to be identified separately. These clones will be supplied to the translocation program in accordance with this plan.

The location of each individual of MFL within Alliance Business Park is documented in Biosis (2019) and outlined in Figure 1.

## 1.5 Nominated Recipient Site

The recipient site was selected in consultation with Mark Williams, Acting Team Leader Conservation Management for the City of Whittlesea and Jock Wilson, Program Manager, Natural Environment Programs, Port Phillip Region, Department of Environment, Land, Water and Planning (DELWP) (see correspondence provided in association with this plan).

The Epping North Conservation Reserve (ENCR) at 100 Lyndarum Drive Epping satisfies all the relevant selection criteria and was therefore nominated and subsequently selected as the recipient site. This site is approximately 22 kilometres north of the Melbourne CBD, and 2.2 kilometres north east of Alliance Business Park (Figure 2).

## 1.6 Summary of the Translocation Proposal

Details of the translocation proposal are provided in this plan. However, key points are summarised below:

Material from plants salvaged from the Alliance Business Park (East) will be replanted within the Epping North Conservation Reserve (ENCR). Material will be salvaged from the 23 plants outside the Edgars Creek Corridor (Figure 1) and will be propagated in a nursery to provide 10 clones from each plant (230 tube-stock plants).

From this material, 4 clones (tubes) sourced from each of the original 23 plants will be planted in pairs into the selected reserves in an attempt to establish two clones from each original plant. For each plant the remaining six clones will be retained in a nursery as a backup to replace any planted clones which die.

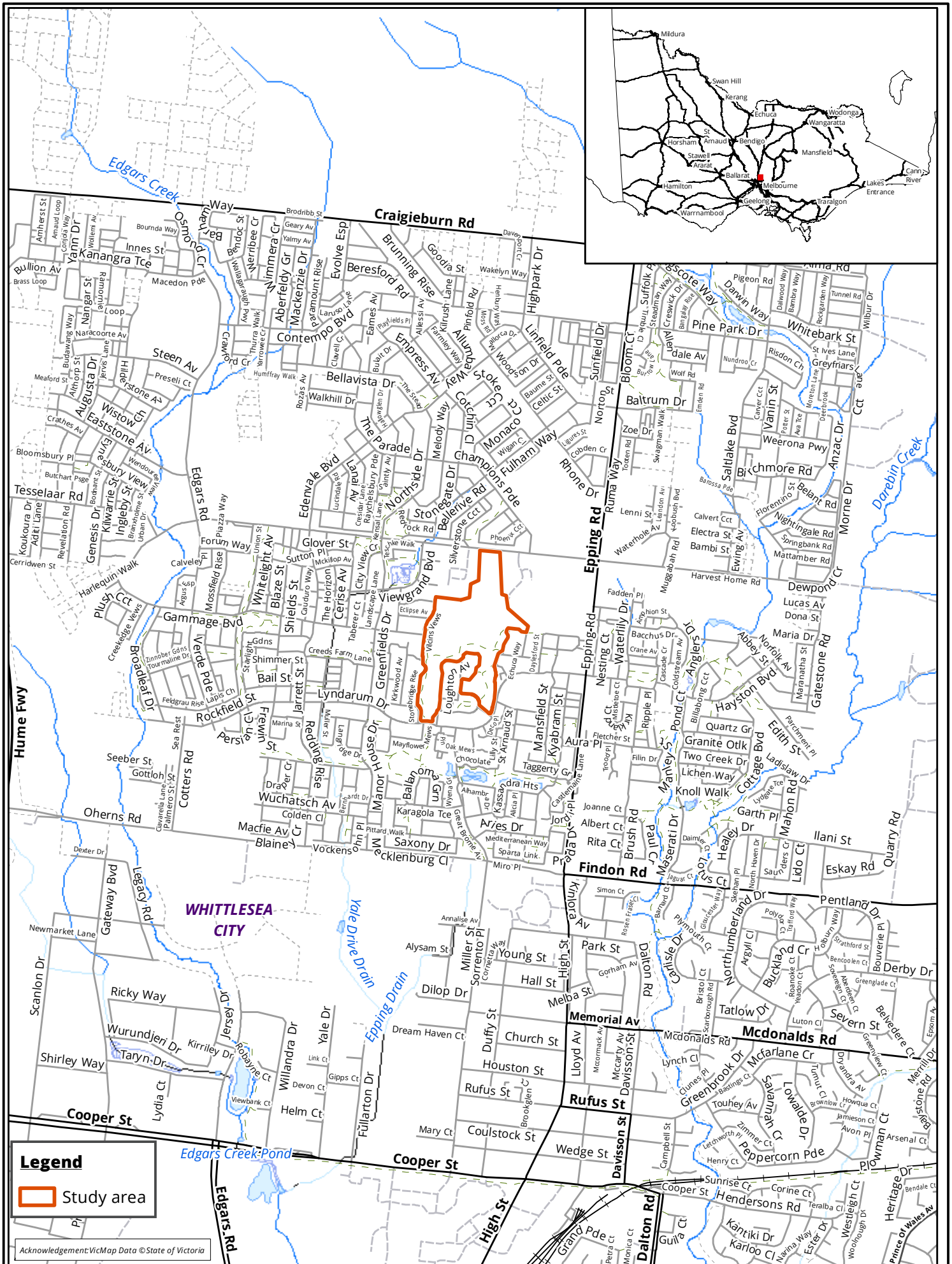
Where a clone from the nursery backup is used to replace plants within the ENCR, the remaining nursery plants will be divided to maintain the backup of six clones per plant.

The establishment of two clones from each plant using the salvaged material will be taken as the successful translocation of that individual. An individual clone will be considered established if the planted material survives within the planting area for a period of five years.

The translocation program will be considered completed when 21 of the 23 translocated plants (over 90% of the original population) are represented by two established plants.

Translocated plants will be subject to a MFL monitoring program until they are considered to be established.



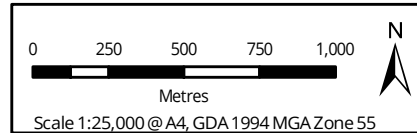


**Figure 2 Epping North Conservation Reserve - the translocation recipient site for Matted Flax-lily plants to be salvaged from Alliance Business Park**

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## 1.7 Recipient site (Description)

The Epping North Conservation Reserve is located on the northern side of Lyndarum Drive in Epping North (Figure 3). It is currently bounded to the north by the Harvest Home Recreation Reserve and is otherwise surrounded by urban development. Other adjacent roads include Stonebridge Rise, Loughton Avenue, Echuca Way and Country Fields Boulevard.

The reserve is managed for conservation as a remnant of the ecological vegetation class (EVC) Plains Grassy Woodland (EVC 55) by the City of Whittlesea. The site supports some remnant indigenous understorey although it also supports significant infestations of exotic grasses such as Chilean Needle-grass *Nassella neesiana* and Toowoomba Canary-grass *Phalaris aquatica*.

On-going management activities conducted by the City of Whittlesea include weed and biomass control works.

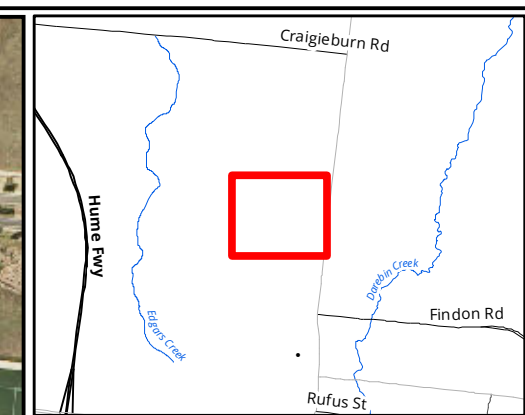
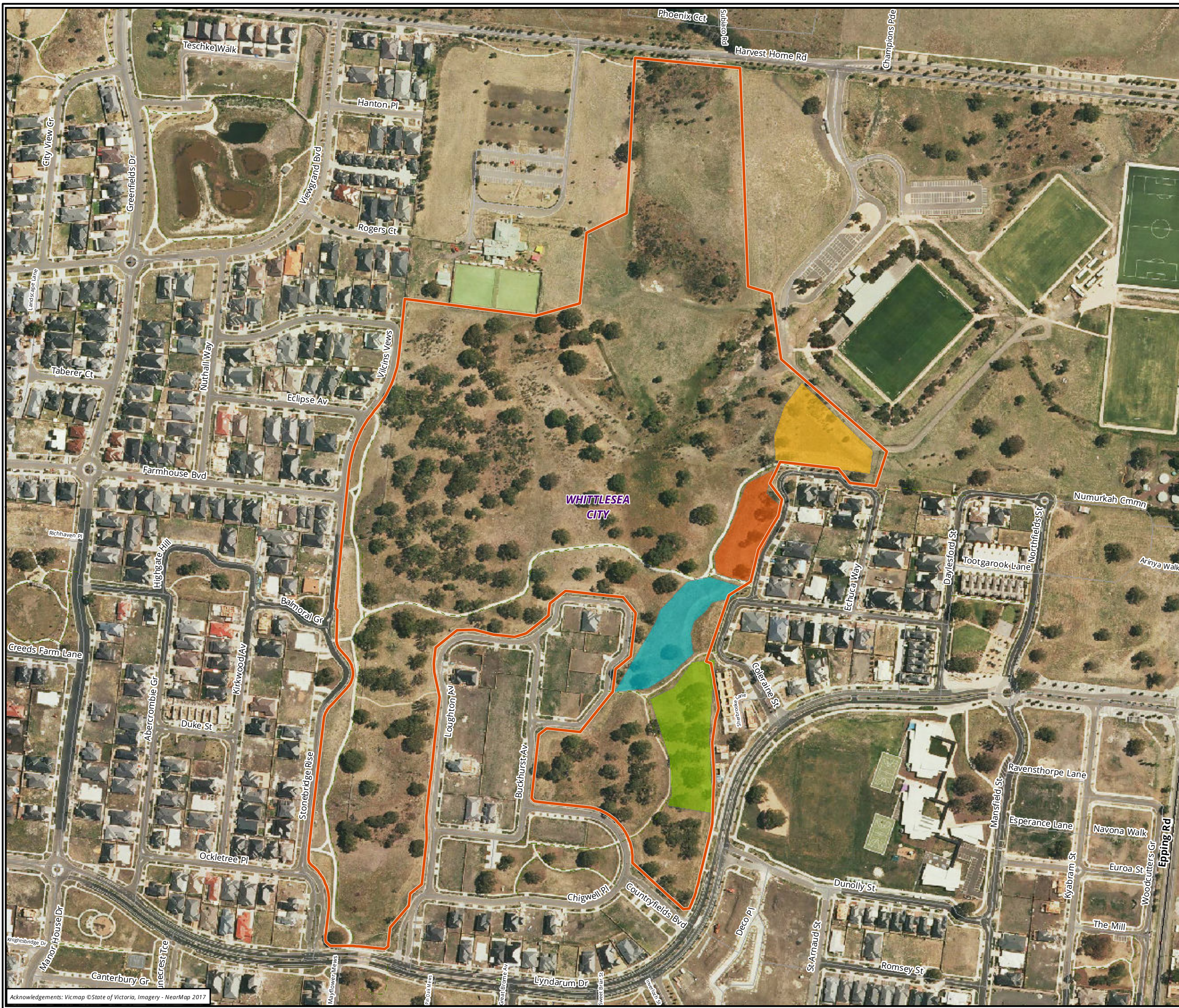
Specific areas for planting the MFL salvaged from Alliance Business Park (East) have been selected in consultation with the relevant Parks Environmental Manager (Mark Williams). Site selection has focused on weed dominated areas in close proximity to areas supporting more native vegetation. This will ensure none of the existing MFL population is impacted and works will augment the existing natural values of the reserve as well as increase the existing small MFL population.

## 1.8 Timeframe and implementation

The translocation program will commence as soon as this plan is approved (anticipated to be February 2019) and will follow the timetable outlined in Table 1. Preparation of the proposed recipient site within the selected Conservation Reserve will also begin as soon as this plan is approved, with selection of planting sites and initial weed control.

The 230 plants required (10 clones of each plant) will be held at a nursery until required. Once the translocation plan reaches the defined success rate (survival of two clones from each plant for five years) then the nursery plants will no longer be required. Excess plants that may then be transferred to other projects will no longer be the responsibility of Alliance Business Park Pty Ltd.

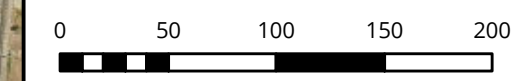




**Legend**

- Study area
- Site 1
- Site 2
- Site 3 (first preference)
- Site 4 (second preference)

**Figure 3: Location(s) within the Epping North Conservation Reserve selected for planting of Matted Flax-lily plants salvaged from Alliance Business Park**



Metres  
 Scale: 1:3,500 @ A3  
 Coordinate System: GDA 1994 MGA Zone 55

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Acknowledgements: Vicmap © State of Victoria, Imagery - NearMap 2017



**Table 1.** Summary of actions and timing

Step	Timing	Action
1	March 2019 – May 2019	Preparation of recipient site(s) within the ENCR commences.
2	End of May 2019	Preparation of Conservation Reserve recipient site completed.
3	End of May 2019 (when soil moisture conditions are appropriate)	Planting of salvaged plants into ENCR.
4	May 2019	Ongoing weed control, weekly monitoring and other management actions as specified continued in ENCR. Water plants as required. Replace any clones that die.
5	May 2019 to April 2020	Monthly monitoring of translocated plants in the ENCR. Water plants as required and increase the frequency of monitoring if considered necessary (i.e. during summer or extended dry periods). Replace any clones that die.
6	May 2020 to April 2021	Monitoring every three months of translocated plants in the ENCR. Monitoring of plants established for two years will be incorporated into an annual MFL monitoring program. If at the end of April 2024 two clones from over 90% of the original plants (23 individuals) have survived then the translocation program is considered successful and this translocation plan will be considered completed. If some clones have died then monitoring of replanted individuals needs to return to Step 5 until the five year survival goal is achieved.
7	November / December each year from 2021.	Include translocated plants which have survived at least two years into an annual MFL monitoring program conducted in December of each year. Submit annual report to DELWP on the outcomes of the Translocation Plan.
8	<b>April 2024*</b>	<b>Submit final report to DELWP &amp; DoEE on the outcomes of the Translocation Plan with recommendations.</b>

\* another report may be required after this if it takes longer to establish these plants.

## 2. Translocation Requirements

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This translocation plan must be approved by the DoEE and DELWP prior to its implementation.

The translocation recipient site must provide a similar environment/habitat type to that at 165 - 195 O'Herns Road Epping and ongoing conservation management is required to provide habitat security. These requirements include:

- The site needs to be managed on an ongoing basis to maintain the populations indefinitely;
- Long term management arrangements need to be identified;
- The site will be located on the Victorian Volcanic Plains within the Whittlesea or Hume municipalities;
- Should be on public land or land with sympathetic management agency or structure;
- Be of gentle relief (plains) or stony knolls with well-drained or moderately draining soils (surface rocks should be a prominent feature and gilgai soils may be present)
- Soils should be moderately friable, cracking clays;
- Vegetation should be Plains Grassland, Plains Grassy Woodland or Stony Knoll Shrubland;
- Grazing by domestic stock should be excluded;
- Sites should be fenced for protection;
- Weed control is a requirement for site preparation and is also an ongoing management requirement; and
- Plant must be monitored to ensure their establishment.

The translocation site selected within the ENCR and the associated management protocols defined within this plan and the Lyndarum Estate, Epping Conservation Management Plan (Ecology Australia 2007) satisfies all of these requirements.



## 3. Translocation Proposal

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The successful translocation of the plants salvaged from Alliance Business Park (East) will be achieved as follows:

### Sound and detailed translocation planning

Details of the translocation plan are provided in Section 4.

### Commitment and Expertise

Biosis Pty Ltd (or an equivalent consultant) will provide ecological expertise to the translocation project from the initial planning stages through to ongoing monitoring and site management. All work will be undertaken by qualified ecologists, supervised by senior staff with previous experience in translocation and vegetation management.

Biosis has designed and supervised a number of projects for translocation and management of threatened flora besides Matted Flax-lily. These projects include:

- Salvage of Matted Flax-lily, re-establishment of propagules, and ongoing management and monitoring at Larundel Grassland reserve, Bundoora (Mueck 2004, Brown and Mueck 2006);
- Salvage, direct translocation and ongoing management of Matted Flax-lily at South Morang Flora and Fauna Reserve, South Morang (Yugovic 2005);
- Machine salvage and direct translocation of Spiny Rice-flower at the former Laverton RAAF Base, Laverton (Mueck 2000);
- Tree-spade salvage and direct translocation of Spiny Rice-flower and mixed grassland species at Cairnlea, the former Albion Explosives Factory (Costello unpublished data);
- Salvage by hand and propagation of rare or threatened cranesbills (*Geranium* sp. 1, *Geranium* sp. 3, *Geranium* sp. 14, *Geranium solanderi*) and Arching Flax-lily *Dianella* sp. aff *longifolia* (Benambra), from the Broadmeadows to Craigieburn Railway Reserve, Broadmeadows (Costello 2004, Costello and Koehler 2004);
- Salvage by hand for direct translocation and propagation of grassy wetland species and tree-spade salvage and direct translocation of Smooth Rice-flower *Pimelea glauca* and mixed grassland/grassy wetland species into Epsom Conservation Reserve, Mordialloc (Costello 2000, 2002, 2005).

The on-ground aspects of the project will be undertaken by indigenous vegetation management specialists and include ecological burning, weed control and the control of pest animals. This will either be conducted by a conservation management team appointed by the City of Whittlesea or the appointment of management specialists via a tender process. Tenders may be sought periodically and appointees selected on both cost and reliability criteria.

### Funding

The manager of the ENCR (City of Whittlesea) has committed to management of the selected reserve guided by a comprehensive reserve management plan (Ecology Australia 2007). The reserve is within an urbanised environment which excludes the presence of domestic stock and has been otherwise fenced to exclude non-management vehicles. ENCR has been managed by the City of Whittlesea since 2008 and ongoing funding for the ecological management requirements of the reserve is provided by this municipality.

Funding arrangements for the management of the plants in accordance with this plan will be provided by Alliance Business Park and will be subject to negotiation with the City of Whittlesea.

### **Removal and ongoing control of threatening processes**

The most immediate threats to the viability of the recipient site are as follows:

- Weed invasion, particularly by tall-growing perennial grasses such as Toowoomba Canary-grass *Phalaris aquatica* and Chilean Needle-grass *Nassella neesiana*;
- Inappropriate burning regimes/biomass control (i.e. biomass accumulation outside that defined by the approved management plans); and
- While grazing by domestic stock is no longer a threat, grazing by Eastern Grey Kangaroos and rabbits may become a threat in future. Rabbits are currently being controlled in the reserve by baiting.

Management of the Conservation Reserve is detailed in Ecology Australia (2007) and summarised in Section 4. This active ecological management will continue to be undertaken by experienced native vegetation management contractors.

Management actions include fencing of the reserve, installation of signage and pathways for controlled public access, weed control and biomass control.

Management of the Conservation Reserves for its biodiversity values is an ongoing and permanent requirement.

### **Timing**

This translocation plan will apply until two clones from over 90% of the salvaged plants (i.e. at least 21 of the 23 plants) have become established. Establishment for each clone is defined as the survival of a planted clone for a period of five years. However management of the conservation reserve and the salvaged plants will continue in perpetuity, albeit at a lower intensity. After plants are established, management will comprise periodic biomass reduction as needed, weed control and maintenance of fencing, gates, pathways and signage. Once translocated plants have survived for two years, these clones will be incorporated into an annual MFL monitoring program conducted within the reserve.



## 4. Translocation Process

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### 4.1 Introduction

Matted Flax-lily is a tufted, mat-forming perennial lily, which spreads vegetatively by underground rhizomes. The species is fully described in Carr and Horsfall (1995). Each plant consists of sparse to dense tufts of leaves, which are narrow, 4–12 mm wide (Carr and Horsfall 1995), blue-green in colour, and usually have small ‘teeth’ on the upper edges and mid-rib. The leaf tufts may be widely spaced along the rhizome (up to 30 cm), making it difficult to accurately determine the number of individual plants within an area. Matted Flax-lily flowers during late spring – summer. The flowering inflorescence is a spreading panicle, often 50–60 cm in height, with scented pale mauve to blue flowers. Blue fleshy berries containing the seeds are produced after flowering.

The species is known from grassland and grassy woodland in Victoria, and there are historic records from Tasmania, where the species may still occur (Carr and Horsfall 1995). There are believed to be approximately 1400 plants remaining, in 120 separate populations (Carter 2010). This is likely to underestimate the actual total population, as additional populations continue to be recorded as further survey is conducted in areas of suitable habitat on the urban fringe of Melbourne.

A recovery plan for the species has been prepared (Carter 2010).

Carr and Horsfall note that recruitment for Matted Flax-lily is believed to be non-existent. Populations are clearly fragments of much larger populations that have persisted in highly degraded vegetation. Seedlings have not been seen in the wild (Carr pers. comm. in Carter 2010). Buzz pollination by native bee species is required for seed production, hence the habitat requirements for these species is important. The species is self-compatible.

Matted Flax-lily is readily propagated by division and seed, although it may be difficult to collect large quantities of seed, as the berries are often sparse and drop quickly once ripe. The plants proposed to be salvaged from Alliance Business Park are small but could still be divided to form many new plants after plants are established and grown in a nursery.

### 4.2 Recipient Site

The ENCR has been identified as the recipient site and this has been accepted by DELWP and the City of Whittlesea.

The initial planting in the ENCR will include four plants (clones) from each of the salvaged parent plants.

The most intact areas of the conservation reserve will not be used as a recipient site, given the potential for disturbance that can result from transplant operations and ongoing management. Instead, a moderately disturbed area within the reserve has been identified as the primary receptor area. This area will be subject to intensive weed control and revegetation works with an objective of re-establishing a native Plains Grassland community incorporating the translocated population of MFL. Weed control works will commence as soon as possible with the objective of planting the MFL in April 2019.

Broad recipient areas include all land within the area specified in Figure 3. Within this area, particular planting sites will be identified and marked on-ground by a botanist in consultation with the relevant council Parks Environmental Manager. These will be located to avoid disturbance to any existing indigenous plants.

### 4.3 Translocation Stages

The following stages and issues in translocation are discussed below:

- Preparation of nursery clones
- Site preparation
- Replanting
- Management
- Monitoring
- Performance targets

#### 4.3.2 Preparation of Nursery Clones

Direct translocation into the reserve is not proposed, given the need to prepare the recipient site and the potential for re-introduction of weeds in the salvaged material. Plants will be held in a suitable nursery for maintenance and growing on.

A minimum of ten clones is required for each salvaged plant. Of each group of ten clones, four will be planted out to contribute to the wild population and six will be held in the nursery as a security measure.

The nursery holding the plants required for this translocation will be responsible for maintaining the security plants as long as required. The total length of time for holding plants will be determined by the time taken to identify and prepare all recipient sites and for the plants to become established. Once the plan is deemed successful the excess nursery plants will no longer be required. Any additional plants remaining after the translocation plan has been completed will no longer be the responsibility of Alliance Business Park.

Detailed actions are as follows:

1. Plants will be hardened off (i.e. acclimatised to local conditions) before planting into the conservation reserve.
2. Clones from each original salvaged plant will be planted into the nominated reserve with the aim of these plants augmenting an existing small population of MFL.

#### 4.3.3 Site preparation

The recipient site within the ENCR will be identified by a botanist in consultation with the relevant ENCR manager. Preparation of these areas will begin within one month of the approval of this translocation plan (no later than October in any year before the translocation occurs). Each site will be large enough to allow four clones of each plant to be planted, for ease of monitoring and ongoing management and to provide for potential cross-pollination. The recipient site has been selected such that access for planting, management and monitoring is possible without trafficking more intact sections of the reserve. The site will be marked with star pickets or similar to allow translocated plants to be easily monitored and protected during management works.

Weed control in the planting areas will be satisfactorily completed before plants are installed. The cover of perennial weeds within a minimum one metre radius of each planting site will be <1%.

Land within five metres of the receptor planting site will be subject to extensive revegetation works using locally indigenous species with the objective of establishing the vegetation as an area of Plains Grassy Woodland dominated by indigenous species over a period of five years.



#### 4.3.4 Replanting of MFL

1. Replanting will occur during the cooler months (autumn to mid-spring). Planting sites will be accessed with minimal disturbance to the reserve from vehicles and equipment.
2. The minimum spacing between plants and between plants and the reserve boundary will be five (5) metres, to allow for vegetative expansion.
3. At each recipient site, the planting hole will be dug by hand with minimal disturbance to the surrounding soil, and any excavated soil will be removed from the reserve. Watering of the planting hole is recommended before planting.
4. Each plant will be planted with the final soil level approximately equal or slightly lower than the natural surface and will be thoroughly watered.
5. Each plant will be labelled (with a durable metal label) and numbered for record keeping and monitoring purposes.
6. The location of the recipient site will be recorded using GPS and the data transferred onto the reserve map.

Additional relevant data will be recorded including the name of the person undertaking the work, date, time of day and prevailing climatic and other conditions (e.g. temperature, recent rainfall, frosts, fires, natural soil moisture and any other features that might affect the survival of the plant).

#### 4.3.5 Management and Monitoring

Reserve management actions and issues are described by this plan and the Lyndarum Estate, Epping Conservation Management Plan (Ecology Australia 2007).

Monitoring and specific management guidelines are as follows:

1. The planted flax-lilies will be inspected weekly for at least the first month (as determined by the supervising botanist), then monthly for a total of one year and then every two months till the end of two years post planting. This will allow for prompt management actions / responses as necessary to maximise the chance of survival. Records of inspections will be kept and include descriptions of the condition of the plants, and will include inspections of the naturally occurring plants for comparison. Translocated plants will be photographed every six months for two years and then annually until plants are considered established.
2. Watering may be required periodically during the first summer, as determined by monitoring. If the plants are deemed to be declining in health due to moisture stress, watering will be organised promptly. Additional monitoring may be required if watering is required over a prolonged period. Records of watering events will be kept. Alternative watering options will also be considered and will include establishing an onsite water tank and drip watering system.
3. Vegetation competition (native or exotic) will be controlled for a minimum of one metre around each plant.
4. Vegetation species composition and the cover of weeds and native species will be monitored before the selected recipient site is subject to any management, at planting, at six monthly intervals post planting for one year and then annually during spring until the end of five years.
5. Weed control works will be conducted throughout the receptor sites to facilitate the establishment / maintenance of a native vegetation community. Weed control works will initially occur monthly for three months post planting and bimonthly thereafter for the first 12 months. Control works will then

be continued at a frequency as required to maintain the low weed levels within five metres of each plant. All weeds will be targeted for control within five metres of planted MFL;

6. Revegetation works will incorporate a variety of techniques including direct seeding and planting tube-stock with a goal of establishing a minimum 25% cover (as a percentage of total vegetation cover) within five metres of each planting at the end of five years.
7. Any competing vegetation will be regularly controlled using appropriate techniques. These may include hand weeding, brush-cutting or careful application of selective herbicide. Removal of weeds may require action each month during the spring growing season.
8. Any other threats, such as grazing by rabbits or kangaroos will be monitored and managed as required. Any control activities undertaken will be recorded.
9. Any significant decline in the population (greater than or equal to 20% of the total population of planted individuals) will be reported to DoEE within two months with an explanation of the remedial management actions planned and taken.
10. In addition to the regular inspections to assess management requirements, the plant survival and growth will be assessed annually, at the same time each year (between 1 October and 1 March) up until plants are considered established. The dimensions of each patch and number of leaf tufts will be recorded, and production of flowering stems noted. Observations of seed set, germination of Matted Flax-lily plants and the fate of seedlings will be recorded.
11. Any dead plants will be promptly replaced from the nursery with clones from the same parent plant. The nursery plant will also be replaced as back up.
12. Plants are considered established and independent after surviving for five years.
13. Once two clones from a plant are considered established then this translocation plan will no longer apply to any clones of that plant and that plant will be managed in line with the ongoing Reserve Conservation Management Plan and be incorporated into an annual MFL monitoring program.
14. Replaced plants will be monitored until two clones from that plant are considered established.
15. The translocation plan is considered to be complete when a minimum of 90% of plants (21/23) are considered established.

#### **4.3.6 Performance Targets**

The over-riding objective of this translocation plan is the long term conservation of genetic material from the salvaged population and a long-term increase in the local population of the species. Based on previous translocation exercises associated with this species it is anticipated that the large majority of plants will be able to successfully establish within the reserve within the nominated establishment period.

The translocation program will be deemed a success if it meets the following criteria:

1. When over 90% of salvaged plants become established (91% of the 23 known individuals equates to 21 plants). A plant is considered established when two clones from that plant have survived after planting out for a period of five years;
2. Weed cover within five metres of each clone within the receptor site is maintained at a low level (less than 5% cover), such that competition from weeds does not reduce the potential expansion of each transplanted flax-lily and other native ground flora increase in cover;
3. The receptor site has been revegetated to the extent where the cover of indigenous species is greater than 25% of the vegetation cover present within five (5) metres of each planted clone; and
4. The success of the translocation project has been regularly reviewed and management adjusted as required to maintain the health of plants.



In the unlikely event the criteria for success have not been met within 10 years from the date of approval of this plan then Alliance Business Park will provide the DELWP and DoEE with an assessment of the translocation program that examines the reasons why the program was unable to meet its performance targets. This assessment will be provided within 10 years and 6 months from the date of approval of this plan.

#### **4.4 Rolls and responsibilities**

Alliance Business Park is responsible for the implementation of this translocation plan. Salvage of the plants and their propagation in a nursery will be outsourced to a commercial native plant nursery with experience in the salvage and propagation of native plants, particularly MFL.

Similarly the on-ground pest plant and animal control works associated with the post planting care for MFL would be outsourced to an experienced bushland management contractor. This includes the revegetation works outlined in this translocation plan (Section 4.8).

Monitoring of the survivorship of translocated plants will be outsourced by Alliance Business Park to a suitably experienced ecological consultant. That consultant would also provide the required reports on plant survival and provide any recommendations in situations where performance targets are not being met.

Alliance Business Park can also outsource the entire translocation plan implementation process to the City of Whittlesea. However, Alliance Business Park will remain ultimately responsible for the implementation of this plan.

#### **4.5 Risk Assessment**

Previous translocations of MFL have reported a high degree of success for the procedure outlined in this translocation plan. While planted individuals may succumb to various environmental stresses, the maintenance of a nursery population of at least 6 clones of each plant results in a very low risk assessment for the complete loss of any one plant or the failure of the translocation exercise. For this to occur both planted and nursery material would need to die either simultaneously or within a short period of time. This is considered to be a very low probability event.

Selecting the correct habitat to plant salvaged material into is a critical first step. While there is a low risk that this selection process will identify an inappropriate area for the translocation, this is mitigated by the retention of the nursery population.

Large scale unexplained death of planted material (greater than 30% of plantings) would result in a review of the selected location for the translocation and the selection of an alternate location within the selected reserve (or potentially a different reserve). Again, previous experience with this process outlined in this plan suggests this is unlikely.

#### **4.6 Corrective Actions**

The potential for survival of planted material is considered high if the protocols outlined above are adhered to. However corrective actions would be required if less than 80% of planted individuals are alive at any one time. Responses to this scenario include more frequent monitoring and a response to the suspected reason for such low survivorship (i.e. death from drought stress would require more frequent watering).

Potential threats and associated corrective actions are outlined in Table 2.

## 4.7 Reporting

The results of the translocation process and ongoing monitoring will be reported to the relevant authorities (DELWP and DoEE) by Alliance Business Park on an annual basis. The final report will include an evaluation of the success of the program, methods used and recommendations for future programs. The report will also provide recommendations for the ongoing management of the translocated Matted Flax-lily plants.

**Table 2.** Trigger responses for corrective action timing

Response Trigger	Corrective Action
<b>More than 20% of plants die from drought stress</b>	Replace plants which have died and increase frequency of monitoring and watering. Re-establish nursery population of six clones per salvaged plant
<b>More than 20% of plant die from high soil moisture levels</b>	Review the planting location of impacted plants. Replant individuals in areas less likely to be subject to seasonal / periodic inundation.
<b>Plants become diseased in the field and the infection appears to be spreading</b>	Remove and destroy infected plants. Replace infected plants with nursery individuals when field observations fail to detect any new infections after two weeks.
<b>Plants become diseased in the nursery and the infection appears to be spreading</b>	Where recovery is not considered feasible, destroy infected plants and isolate surviving clones of each plant. Implement additional infection control measures including prevention and rehabilitation. If all clones of an individual are lost, re-establish the nursery population from the field planted material.
<b>More than 20% of plants physically destroyed in the field (i.e. pest animal disturbance, vandalism)</b>	Review the suitability of the reserve to provide a secure translocation site. Select another reserve if threats cannot be controlled.
<b>Weed levels within 5 metres of planted individuals are greater than 20%.</b>	Increase weed control activity and frequency. Increase habitat monitoring to monthly until weed levels decline to less than 10%.



## References

- Biosis 2017a. *165-195 O'Herns Road Epping: Biodiversity Assessment*. Report for MAB Corporation. Authors: Mueck S, & Gilmore D Biosis Pty Ltd, Melbourne. Project no. 23682.
- Biosis 2017b. *Annual monitoring of Matted Flax-lily: Aurora, Epping (Year 9: 2016–17)*. Report to Development Victoria. Author: Simkin, R & Dredge, T, Biosis Pty Ltd, Melbourne. Project no. 23922.
- Biosis Research 2012. *275 O'Herns Road, Epping, Victoria: Flora, fauna and habitat hectare assessment*. Report to MAB. Authors: Mueck, S., Byrne, A. & Gilmore, D., Biosis Research, Melbourne. Project no. 13806.
- Carr G.W. and Horsfall P.F. 1995. Studies in Phormiaceae (Liliaceae) 1: New species and combinations in *Dianella* Lam. Ex Juss. *Muelleria* **8(3)**: 365–378.
- Carter, O 2010. *National Recovery Plan for the Matted Flax-lily Dianella amoena*. Department of Sustainability and Environment (DSE) Victoria.
- DSE 2010. *Biodiversity Precinct Structure Planning Kit*. Department of Sustainability and Environment, Melbourne.
- Ecology Australia 2007. *Lyndarum Estate, Epping. Conservation Management Plan*. Unpublished report for A.V. Jennings, Author Geoff Carr, Ecology Australia, Fairfield, Victoria.
- Mueck S. & Brown L. 2005. *Vegetation Monitoring for the Larundel Grassy Woodland Reserve, Bundoora, Victoria*. Biosis Research Pty. Ltd.
- Mueck S. 2000. Translocation of Plains Rice-flower (*Pimelea spinescens* ssp. *spinescens*) Laverton, Victoria. *Ecological Management and Restoration* **1(2)** 111-116.
- Yugovic J. 2005. *South Morang Flora and Fauna Reserve Management Plan*. Biosis Research Pty. Ltd.