

4.0 Recommendations for Ecological communities and species

4.1.0 Introduction

An analysis of the Strategic Impact Assessment Report undertaken included comparing consultants' reports with information in the report, and then included assessing the Mitigation Objectives, Strategy, Outcomes and associated prescriptions with Strategic Impact Guidelines for EPBC species and communities. General comments have been made earlier regarding the comprehensiveness of the report. This section summarises the VNPA's alternative recommendations for Mitigation for where a significant impact would be likely.

Three species identified to be present and potentially significantly impacted by the Program have their own significant impact guidelines (Golden Sun Moth, Growling Grass Frog and Spiny Rice Flower). These guidelines specify impact thresholds.

All other communities and EPBC listed species (excepting Grassy Wetland of the Victorian Volcanic Plain, which is not yet listed) are addressed by the EPBC Act Policy Statement 1.1 Significant Impact Guidelines (May 2006). The relevant criteria are listed below.

4.1.2 Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of a population
- reduce the area of occupancy of the species
- fragment an existing population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of a population
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat introduce disease that may cause the species to decline

interfere with the recovery of the species.

4.1.3 Issues & Recommendations

The majority of the mitigation activities rely on undertaking surveys for almost all species on a precinct-by-precinct basis prior to developing each Precinct Structure Plan.

We propose that these surveys be undertaken upfront before the Precinct Structure Planning process to guide an upfront planning process for entire Growth Areas, rather than piecemeal during successive Precinct Structure Planning. The process should employ best expert advice and optimal survey techniques. This would be more efficient and allow for more upfront discussion and negotiation on a strategic level through the establishment of an 'Ecological Structure Plan', which would inform the precinct planning process.

We also recommend that survey data be combined with relevant expert opinion to develop strategic plans for the management of all ecosystems of nationally significance. In the table below, we identify that a plan should be developed for each species, but naturally there are locations where species share habitat, and these should be addressed by an overall plan that meets all their life-cycle requirements and then drives the Precinct Structure Planning - not the other way around.

We recommend the protection of all the priority locations contained in this submission, and further to this the following:

- Protect all waterways with a minimum of 200m buffers on each side of the waterway
- Protect all wetlands with minimum buffers as prescribed by Birds Australia (2009)
- Protect all grassy woodland remnants; allow 100m buffers and optimise links.

Recommendation: *That all high conservation significant priority locations be retained and that there be specific prescriptions developed for all ecosystems and species of national significance in line with Significant Impact Guidelines and best available ecological advice where guidelines do not exist, including, but not limited to:*

- *Protecting all waterways with a minimum of 200m buffers on each side of waterways*
- *Protecting all wetlands with minimum buffers as prescribed by Birds Australia (2009)*
- *Protecting all grassy woodland remnants; allow 100m buffers and optimise links.*

Recommendation: *That a more detailed 'ecological structure plan' be developed based on detailed on-ground surveys to proceed and inform any precinct structure plans*

Table 7 Threatened fauna species listed under the EPBC Act identified as potentially occurring within the study area & Recommendations

Matter for Target	EPBC listing	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Natural Temperate Grassland of the Victorian Volcanic Plain	Crit. End.	Actions associated with Melbourne @ 5 million are likely to have a significant impact on the natural temperate grasslands of the Victorian Volcanic Plain, particularly in Melbourne's west. It is likely that up to 6918 ha could be cleared... Mitigation objectives are: 1. Retain 15,000ha of the largest and best areas of habitat in grassland reserves. 2. Manage native grassland reserves. This will generate gain to offset the loss from clearing. 3. Monitor and manage adaptively. A Prescription is only provided for within the current urban growth boundary which states that 'retention of grassland areas will be determined on a case by case basis but any retained remnants must be manageable and demonstrably able to retain their values in the long term - that is, part of a contiguous area of native vegetation under the same type of management typically of at least 150 ha including adjacent areas outside the precinct and priority will be given to areas that support other nationally significant species....	The prescriptions for grasslands are not in line with current science or policy for the protection of biodiversity and communities and need to be revised to allow key high value sites within the urban growth boundary to be retained as part of the 'urban conservation network'. Grassland sites irrespective of size should be retained within the proposed and existing UGB, particularly if they have multiple values and can be logically managed as part of the urban conservation network. We have recommended a series of high priority sites to be incorporated into an enforceable 'ecological' structure plan, which outlines an urban conservation network for the growth areas and informs Precinct Structure Planning.
Grassy Eucalypt Woodland of the Victorian Volcanic Plain.	Crit. End.	The actions associated with the Program are likely to result in significant impact on grassy woodlands of the Victorian Volcanic Plain at some sites in the north. It is likely that up to 924 ha will be cleared. Mitigation objectives are: 1. Retain large and better quality areas in a network of areas within the Melbourne North Growth Area ensuring maximum connectivity between reserves and private land; 2. Progressively secure the long-term protection of retained areas on private land within the Melbourne North Growth Area by donation to the Crown or private land management agreements; 3. Investigate establishing a large reserve south-west of Whittlesea and a larger contiguous area further east and linking it with the proposed Quarry Hill reserve area; 4. Manage retained and reserved Grassy Eucalypt Woodlands; 5. Monitor and manage adaptively. A prescription has been developed to guide the precinct structure planning process.	Retain all locations of Grassy Woodland identified for each Growth Area in this submission. Ensure Grassy woodland locations have a buffer of 100m within areas subject to urban development. Optimise links between patches. Minimum widths required are 600m where feasible.
Temperate Lowland Plains Grassy Wetland	Nominated for listing	The likely extent of unavoidable impact is not yet known with certainty (as it is thought difficult to map given its dependence on seasonal conditions). Further survey will be undertaken during the Precinct structure planning process. It is likely that the primary mechanism for mitigating impacts will be through offsetting.	No loss of wetland habitat. Apply appropriate buffers to edge of wetland habitat: Nationally Significant wetlands; 100m with a 1.5m fence at edge of buffer. Urban development to be >200m from edge of wetland. Other wetlands: 50m buffer with a 1.5m fence at edge of buffer. Urban development to be >100m from edge of wetland.

Mammals	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	Vulnerable	Can be assumed to be an occasional visitor in suitable foraging habitat in study area. Refer text for discussion.	The study area does not contain the two existing colonies, any known satellite sites or any specific foraging areas that are important for this species. The actions associated with the Program are unlikely to impact upon Grey-headed Flying-fox habitats and extant populations.	Retain all locations of Grassy Woodland identified for each Growth Area in this submission. Ensure Grassy Woodland locations have a buffer of 100m within areas subject to urban development. Optimise links between patches. Minimum widths required are 600m where feasible.
Southern Brown Bandicoot (SBB) <i>Isodon obesulus obesulus</i>	Endangered	Recent records south-east of Melbourne including in Cranbourne area. Importance of particular sites will need to be determined.	Impacts on SBB will only occur within the Melbourne South-East Investigation Area. Direct impacts resulting from future urban development inside the new UGB are likely but will be of a relatively local scale if key mitigation measures are taken. Mitigation Objectives: 1. Exclude major areas of suitable habitat from development; 2. Retain, upgrade and connect existing habitats within proposed precincts and outside UGB, including the important population at the Royal Botanic Gardens Cranbourne; 3. Secure and manage retained habitat and linkages to conserve SBB; 4. Monitor retained habitat and new habitat and adjust management accordingly; 5. Carefully plan and construct urban development within precincts to minimise impacts on species. A mitigation Strategy has been developed which states that one quarry site will be retained after quarrying operations cease. Minimising will be addressed through precinct structure planning and a prescription is provided.	Targeted survey is required in the South-east Growth Area in spring. Locations identified for protection and habitat links identified for the south-east in this submission should be protected and enhanced. Management and enhancement plan to be developed and implemented before (not as part of) the Precinct Planning Process, addressing wider landscape links and habitat management.

Birds	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
<p>Wetland specialist migratory EPBC - listed. Australasian Shoveller; Australian Pelican; Australian Reed-warbler; Australian White Ibis; Blue-billed Duck; Cape Barren Goose; Cattle Egret; Crested Tern; Eastern Great Egret; Fairy Tern; Hardhead; Musk Duck; Pied Cormorant; Purple Swamphen; Royal Spoonbill; Straw-necked Ibis</p>	Migratory		<p>It is possible that nationally significant numbers of shorebirds use some of the wetlands on and adjacent to the Investigation Areas, particularly those within the western grassland reserves and those associated with Merri Creek in the north. The actions associated with the Program may impact on migratory bird species either through direct loss of wetland habitat or the disturbance and modification of habitat that may occur from increased urban development. However, current knowledge of bird usage and habitats within the study area indicate that it is not likely that impacts on migratory species will be significant. It is estimated that 342 ha of wetland habitat may be lost as a result of the Program. Mitigation Objectives: 1. Avoid loss of wetlands where possible, including ephemeral wetlands and surrounding habitat; 2. Provide buffers of 100m around key wetlands; 3. Limit indirect disturbances (such as dogs) within 200m of identified wetlands; 4. Retain and manage a variety of wetland types throughout the urban and non-urban areas of Melbourne; 5. Recreate new wetlands for multiple objectives including bird habitat; 6. Limit run-off pollution to wetlands. A prescription has been prepared.</p>	<p>No loss of wetland habitat. Apply appropriate buffers to edge of wetland habitat: Nationally Significant wetlands; 100m with a 1.5m fence at edge of buffer. Urban development to be >200m from edge of wetland. Other wetlands: 50m buffer with a 1.5m fence at edge of buffer. Urban development to be >100m from edge of wetland.</p>
Australasian Bittern	Migratory		Addressed via response to migratory species above.	<p>A high level of impact is expected if buffers are not retained. Habitat buffer and disturbance buffer - 100m. Requires 1.5 m fence around wetland. Urban development buffer 200m.</p>
Australian Painted Snipe	Vulnerable	Previously recorded within the study area	<p>Three locations within the study area where Australian Painted Snipe have been recorded will be excluded from the UGB and included within the proposed western grasslands reserve. It is possible that the species uses other areas within the proposed UGB.... however, suitable habitats for the species in this area are few and are generally more likely to be present further west (or elsewhere). Overall significant impacts on the Painted Snipe are not likely to result from actions under the Program, assuming that known or newly discovered habitat for the species is protected and managed appropriately. No mitigation strategy or prescription is provided.</p>	<p>Suitable habitat found in Investigation Areas, particularly Cane Grass Wetland, Lignum Wetland and Plains Grassy Wetland. These EVCs are mainly south of Ballan Road. Survey is recommended but only when seasonal conditions fill the wetlands (Biosis 2009). A high level of impact is expected if buffers are not retained. Habitat buffer and disturbance buffer - 100m. Requires 1.5 m fence around wetland. Urban development buffer 200m.</p>

Birds	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Latham's Snipe <i>Gallinago hardwickii</i>	Migratory		Addressed via response to migratory species above.	A high level of impact is expected if buffers are not retained. Habitat buffer including reeds and long grass - 100m. Disturbance buffer of 100m including a 1.5 m fence around long grass. Urban development buffer 100m.
Plains Wanderer <i>Pedionomus torquatus</i>	Vulnerable	Previously recorded within the study area. Preferred habitat is grassland vegetation.	It is not considered likely that actions under the Program will cause a significant impact on the Plains Wanderer. No prescription provided.	Recorded across the Investigation Area. A previous study indicated large clusters south of Ballan Road in Live Bomb Range region breeding successfully. Also north of Bulban Road. Rumours of its extinction locally without data are unfounded. A specimen was collected in 2008 from the Werribee area north of Ballan Rd. Targeted survey recommended (Biosis, 2009). Ensure the Western Grassland Reserves are established and reserved within the National Reserve System. Targeted survey for this species in the North and West is required.
Woodland Specialist, EPBC migratory species: Black-faced Cuckoo-shrike; Brown Goshawk; Flame Robin; Horsfield's Bronze-cuckoo; Little Raven; Pallid Cuckoo; Rufous Fantail; Sacred Kingfisher; Silvereye; Tree Martin; Welcome Swallow; Whistling Kite. Migratory			Not addressed.	
Swift Parrot <i>Lathamus discolor</i>	Endangered/ Low Low-	Suitable foraging habitat present in the area but only very few individuals observed during annual surveys.	The Melbourne North Investigation area contains habitat and the species has been recorded in the area. The key impact from the Program will be the removal of red gum grassy woodland in the south of the Melbourne North Investigation Area as urban development progresses. Creating a grassy woodland reserve in the north and protecting extensive adjacent woodland areas further east will be a positive action for the Swift Parrot. No mitigation strategy or prescription provided.	Retain all locations of Grassy Woodland identified for each Growth Area. Ensure Grassy Woodland locations have a buffer of 100m within areas subject to urban development. Optimise links between patches. Minimum widths required are 600m where feasible.

Reptiles	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Grassland Earless Dragon <i>Tympanocryptis pinguicollis</i>	Endangered	The last confirmed sightings in Victoria were from the Rockbank area in 1968 and the Geelong area in 1969 (Robertson and Evans 2004). Sightings between 1988 and 1990 not confirmed despite survey effort.	Actions under the Program are not likely to cause a significant impact on the Grassland Earless Dragon. It is also unlikely the species will be detected during urban development. However, if the species is found during Precinct Structure Planning or during construction, animals will be caught and translocated to secure habitat elsewhere under the direction of DSE.	Few surveys have ever been conducted for this species within the Investigation Areas. Likely to be restricted to high quality grassland areas, although possibly widespread (Biosis, 2009). According to the National Recovery Plan, an unpublished sighting was recorded in Holden Flora and Fauna Reserve. Protection of all high priority grassland sites identified in this submission is required as a minimum. Targeted survey is required as a high priority. Any locations containing this species require protection and a management plan should be developed and implemented prior to Precinct Planning, in order to guide this process.
Striped Legless Lizard <i>Delmar impar</i>	Vulnerable	Can be assumed to be present as resident or regular user of suitable habitat. Relatively easily detected during general/standard field assessments.	The actions associated with the Program are likely to impact directly on Striped Legless Lizard habitats and extant populations, particularly in the west and possibly in the north. Although current knowledge indicates that significant impacts on important populations are unlikely, they cannot be ruled out.	Likely to be widespread. Native and exotic grassy vegetation that has not been subject to substantial disturbance/rock removal (Biosis, 2009). Protection of all high priority grassland sites identified in this submission is required as a minimum. Targeted survey is required as a high priority. Any locations containing this species require protection and a management plan should be developed and implemented prior to Precinct Planning, in order to guide this process.

Amphibians	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
<p>Growing Grass Frog (GGF) <i>Litoria raniformis</i></p>	<p>Vulnerable</p>	<p>Can be assumed to be present as resident or regular user of suitable habitat. Relatively easily detected during general/standard field assessments. Management protocol still required should additional populations be found during precinct planning surveys.</p>	<p>Significant impacts on some important populations are expected, particularly in the short to medium term, as well as local scale impacts at some sites. The degree and scale of such impacts will depend on how well habitat connectivity is maintained and enhanced in key areas and on ensuring that this connectivity is in place before major new developments start. Mitigation objectives include: 1. Protect Merri Creek's important population; 2. Retain, upgrade and connect or buffer some existing habitats within proposed precincts with 200m buffers around waterbodies and 100m buffers along connecting waterways; 3. Create new habitat within precincts; 4. Manage suitable habitat within proposed western grassland reserves specifically for GGF; 5. Manage hydrology and aquatic vegetation carefully to avoid the introduction of predatory fish; 6. Monitor retained and new habitat, and adjust management accordingly. The mitigation strategy includes the extension of a sub-regional strategy for GGF in the South-east Growth Area. A prescription has been developed to guide the precinct structure planning.</p>	<p>Suitable habitat is found throughout the Investigation Area (Cane Grass Wetland, Lignum Wetland and Plains Grassy Wetland and associated drainage lines of Lollypop and Kororoit Creeks). Most extensive habitat is south of Ballan Road, Kororoit Creek drainage system of the Desktop Investigation Areas and the North section of the Native Vegetation Investigation Area (Biosis, 2009).</p> <p>In line with the Impact Thresholds provided in EPBC Draft Policy Statement 3.1.4, all creeks require a conservation buffer of 200m on each side (total at least 400m). No removal of suitable wetland habitat (this combines with supporting migratory shorebird/wetland dependent bird species). Wetlands should be subject to appropriate buffers (as prescribed for birds above). Targeted survey for GGF is required in spring in appropriate habitat across all growth areas. Sub-regional conservation plans be developed for all known locations of GGF. Habitat and water quality considerations be addressed in conservation planning and implementation commenced prior to any development.</p>

Fish	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Australian Grayling <i>Prototroctes maraena</i>	Vulnerable	This species has been recorded within the Melbourne South-East Investigation Area in Cardinia Creek (Backhouse et al. 2008).	It is not expected that the Program will result in a significant impact to the Australian Grayling.	All creeks require a conservation buffer of 200m on each side (total at least 400m). A sub-regional strategy is required for management of Australian Grayling, Dwarf Galaxias and GGF. Recommendations for water quality and habitat management are to be addressed in the strategy and implemented prior to the commencement of development.
Dwarf Galaxias <i>Galaxiella pusilla</i>	Vulnerable	Likely to occur in creeks within the Melbourne South-East Investigation Area.	DSE fish experts believe it may be present in swamps and wetlands within the Melbourne South-east Investigation Area. Surveys will be conducted during the Precinct Structure Planning Investigation.	All creeks require a conservation buffer of 200m on each side (total at least 400m). A sub-regional strategy is required for management of Australian Grayling, Dwarf Galaxias and GGF. Recommendations for water quality and habitat management are to be addressed in the strategy and implemented prior to the commencement of development.
Invertebrates				
Golden Sun Moth <i>Synemon plana</i>	Critically endangered	Can be assumed to be present as resident or regular user of suitable habitat. Importance of particular sites will need to be determined.	Actions associated with Melbourne @ 5 Million are likely to have significant impact on the Golden Sun Moth at some sites, particularly in the west, and possibly in the north. Up to 6918 ha of grasslands and 1015 ha of grassy woodlands are likely to be cleared. Populations at small isolated sites are not likely to persist in the long term without intensive management inputs. Mitigation proposed: Retain largest (best) habitat areas in grassland reserves, plus a proportion of smaller sites scattered across the range according to the following statewide target: Protection (through appropriate agreed management) of at least 80% of the total area of places where 'high contribution to species persistence' and 'confirmed habitat' intersect. Manage retained areas of native grassland to improve the quality and connectivity of existing habitat, such as by removing barriers, and actively manage open-tussock grassland structure. Connect suitable unoccupied habitat to occupied habitat. Monitor and manage adaptively, and Undertake broader targeted surveys for the species across its historic range to provide context for land-use decisions.	Recorded at a number of locations in the Investigation Areas. Probably widespread but patchily distributed throughout (Biosis, 2009). Protection of all high priority grassland sites identified in this submission is required as a minimum. For a large or contiguous habitat area (>10 ha): There should be no habitat loss, degradation or fragmentation >0.5 ha. For a small or fragmented habitat area (<10 ha): No habitat loss, degradation or fragmentation, where fragmentation of a population refers to the introduction of a barrier to dispersal. Barriers to dispersal could include: breaks in habitat of >200 m; structures that prohibit movement (e.g. buildings, solid fences). Targeted surveys are recommended in grassland areas in spring.

Plants	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Adamson's Blown-grass <i>Lachnagrostis adamsonii</i>	Endangered	Some recent records from Greater Melbourne area, but no recent records in study area.	Actions under the Program are not considered likely to cause a significant impact on this species.	A targeted survey is recommended in the North and West Investigation Areas in locations likely to contain habitat. Locations containing Adamson's Blown Grass require protection and a management plan should be developed and implemented prior to Precinct Planning, in order to guide the process.
Button Wrinklewort <i>Rutidosia leptorrhynchoides</i>	Endangered	Some recent records from within the study area.	Actions under the Program are unlikely to cause a significant impact on this species and populations are unlikely to be detected during more detailed surveys for Precinct Structure Planning.	A targeted survey is recommended in the North and West Investigation areas in locations likely to contain habitat. Locations containing Button Wrinklewort require protection and a management plan should be developed and implemented prior to Precinct Planning, in order to guide this process.
Clover Glycine <i>Glycine latrobeana</i>	Vulnerable	Grows mainly in grasslands and grassy woodlands (Jeanes 1996). Found in Greater Melbourne area.	Current information indicates that actions under the Program are not likely to significantly impact this species, unless additional populations are located during detailed surveys for Precinct Structure Planning.	A targeted survey is recommended in the North and West Investigation areas in locations likely to contain habitat. Locations containing Clover Glycine require protection and a management plan should be developed and implemented prior to Precinct Planning, in order to guide this process.
Cream Spider-orchid <i>Arachnorchis orientalis</i> (syn. <i>Caladenia fragrantissima</i> ssp. <i>orientalis</i>)	Endangered	Previous range extended from the eastern shores of Port Phillip Bay to Wilsons Promontory. Grows in coastal environments. Now known at Rosebud, Wonthaggi, Cape Patterson and Walkerville (Todd 2000). No recent records from the study area, but may potentially occur in Cranbourne area.	This orchid could potentially be present within the Cranbourne area, although this is not considered very likely. Searches for this species will take place as part of Precinct Structure Planning investigations. Suitably qualified botanists will need to search for the species at the appropriate time of year. If found a protocol will be developed.	Targeted survey required in spring. Focus on areas of likely habitat. Ensure conservation of all sites and implement appropriate management as suggested in recovery plan.

Plants	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Curly Sedge <i>Carex tasmanica</i>	Vulnerable	Is now known in only nine sites of remnant grassland in Victoria: at Craigieburn; Lake Condah; and near Portland (DSE 2004a). Recent records within the Greater Melbourne area but not the study area. Importance of particular sites will need to be determined.	In Melbourne it is only associated with Curly Sedge Creek which runs though the Craigieburn Grasslands Reserve. Important population sites within the Melbourne North Investigation Area will be protected from development. Management arrangements will also be put in place to ensure the ongoing conservation of Curly Sedge along the creek and its margins. This will require monitoring and appropriate hydrological and vegetation management. If these management measures are taken it is unlikely that Curly Sedge will be significantly impacted by actions under the Program.	DSE appear to have missed many other sites known to contain Curly Sedge. A targeted survey is recommended in the North and West Investigation areas in locations likely to contain habitat. Locations containing Curly Sedge require protection and a management plan should be developed and implemented prior to Precinct Planning, in order to guide this process.
Green-striped Greenhood <i>Pterostylis chlorogramma</i>	Vulnerable	Grows in moist areas in open forest. No records from the study area (see Fig 35), but may potentially occur in Cranbourne area.	This orchid could potentially be present within the Cranbourne area, although this is not considered very likely. Searches for this species will take place as part of Precinct Structure Planning investigations. Suitably qualified botanists will need to search for the species at the appropriate time of year. If found a protocol will be developed.	Targeted survey required in Spring. Focus on areas of likely habitat. Ensure conservation of all sites and implement appropriate management as suggested in recovery plan.
Large-fruit Groundsel <i>Senecio macrocarpus</i>	Vulnerable	Found in grasslands and grassy woodlands west of Melbourne (Department of Sustainability and Environment 1996). Recent records from within the study area.	Within the Melbourne West Investigation area it has been found within the Melbourne-Bendigo Railway Reserve and on one private land site on the north side of the railway at Tockbank, where it is scattered through rocky native grassland. This site will not be excluded from development and further investigation will be required at the Precinct Structure planning stage...it is quite possible that a significant impact may occur on this species if removal of a substantial proportion of this population is unavoidable. Additional populations of this species are not likely to be located on private land within the study area.	Recorded on one property in investigation area. No targeted survey was undertaken, insufficient information on its distribution (Biosis, 2009). Protection of all high priority grassland sites identified in this submission is required as a minimum. Targeted survey required in known and likely habitat. Protect all known locations with appropriate buffers. Develop and implement a management plan for Large-fruit Groundsel to strategically guide the Precinct Planning process.

Plants	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Maroon Leek-orchid <i>Prasophyllum frenchii</i>	Endangered	Known from Clyde near Cranbourne. Cranbourne area must be surveyed in October.	One site is known, on the railway reserve near Clyde in the South-east Investigation area. A conservation management plan will be prepared before adjacent Precinct Structure Plans are finalised. As the site containing the Maroon Leek-orchid will be excluded from development it is not likely that the Program will result in significant impacts to this species. However, this assumes the ongoing implementation of management in line with the conservation management plan....	Targeted survey required in spring. Focus on the old South Gippsland Railway line and other areas of likely habitat. Ensure conservation of the entire length of rail reserve as a habitat link for flora and the Southern Brown Bandicoot. Implement appropriate management as suggested in recovery plan.
Matted Flax-lily <i>Dianella amoena</i>	Endangered	Many records from within the Greater Melbourne area, including the Melbourne South-East Investigation Area (see map).	Current knowledge of Matted Flax-lily and application of the Commonwealth's Significant Impact Guidelines indicate that actions under the Program are likely to result in significant impact at some sites in the north. It is assumed that such impacts would be on very small populations in degraded habitat. Further detailed information would be collected to determine the extent of the impact. A prescription has been developed for applying within the Precinct Structure Planning Process.	Protection of all high priority grassland sites identified in this submission is required as a minimum. Targeted survey required in known and likely habitat. Protect all known locations with appropriate buffers. Develop and implement a management plan for Matted Flax-lily to strategically guide the Precinct Planning process.
Metallic Sun-orchid <i>Thelymitra epipactoides</i>	Endangered	Known with certainty from eight main populations in Victoria in the southwest and in Gippsland (Coates et al. 2003). There are no recent records from the study area (see map), but it may potentially occur in Cranbourne area, based on habitat requirements.	This orchid could potentially be present within the Cranbourne area, although this is not considered very likely. Searches for this species will take place as part of Precinct Structure Planning investigations. Suitably qualified botanists will need to search for the species at the appropriate time of year. If found a protocol will be developed.	Targeted survey required in spring. Focus on areas of likely habitat. Ensure conservation of all sites and implement appropriate management as suggested in recovery plan.

Plants	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
River Swamp Wallaby-grass <i>Amphibromus fluitans</i>	Vulnerable	Recent records in Greater Melbourne area, including the study area. Importance of particular sites will need to be determined.	This species has only been recorded in one location within the Melbourne West Investigation Area, but may be present elsewhere. It is most likely within the proposed western grassland reserve, but could appear within the Melbourne West Investigation Area and potentially in the South-east and North Investigation areas in farm dams or permanent swamps. Based on current information, actions under the Program are not likely to result in a significant impact on this species unless additional populations are located during detailed surveys for Precinct Structure Planning.	A single population was found outside the investigation areas. No targeted survey was undertaken, insufficient information on its distribution. Further survey recommended. Most likely to occur in the wetlands south of Ballan Rd (Biosis, 2009). Targeted survey required in known and likely habitat (eg. south of Ballan Road). Protect all known locations with appropriate buffers (suggest buffers prescribed for migratory wetland-dependent birds). Develop and implement a management plan for River Swamp Wallaby-grass to strategically guide the Precinct Planning process.
Small Golden Moths <i>Diuris basaltica</i>	Endangered	Recent records from the Greater Melbourne area, including the study area.	Known in only two populations, both in Melbourne (Laverton Airbase and Clarkes Road Grasslands). Clarkes Road Grasslands is located within the Investigation Area. It will be excluded from urban development, permanently protected and managed to maintain this critically important population. If these arrangements are put in place, actions under the Program are not likely to result in a significant impact on this species.	Other populations are known along the railway line easement west of Werribee and also along the railway line between Donnybrook and Craigieburn. This location has not been acknowledged in the Strategic Impact Assessment report. Targeted survey required in known and likely habitat (e.g. along the railway easement west of Werribee). Protect all known locations with appropriate buffers. Develop and implement a management plan for Small Golden Moths to strategically guide the Precinct Planning process.
Spiny Rice-Flower <i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Critically endangered	Recent records from study area (see Map). Relatively easily detected during general/standard field assessments.	The actions associated with the program are likely to result in a significant impact at some sites in the west, although further information is needed to determine the extent of the impact. As populations close to Melbourne are at the south-eastern extent of the species' range, any loss would be considered a significant impact. Mitigation objectives: 1. Retain largest (best) habitat areas in grassland reserves, plus a proportion of smaller sites scattered across the range; 2. Manage retained areas of native grassland to improve quality and connectivity of existing habitat by removing barriers and actively managing open-tussock grassland structure. Connect suitable unoccupied habitat with occupied habitat; 3. Monitor and manage adaptively; 4. Undertake broader targeted surveys for the species across its historic range to provide context for land use decisions. A mitigation strategy is proposed. A prescription has been developed.	Protection of all high priority grassland sites identified in this submission is required as a minimum. Recorded in scattered populations throughout Investigation Area, particularly in areas of high-quality grassland. This study highlighted that the current known extent of this species is not well documented. Higher density locations were south of Ballan Rd and directly south of Melton Desktop investigation area (Biosis, 2009). Avoid any fragmentation of a population. Avoid any loss of >5 individuals. Retain all individuals from any population which occurs on the edge of the Spiny Rice-flower's current known distribution.

Plants	EPBC status	DSE comments	DSE Assessment of Program and Mitigation Measures	VNPA Recommendation
Swamp Everlasting <i>Xerochrysum palustre</i>	Vulnerable	A few recent records from Greater Melbourne area, including in the study area near Cranbourne.	One site is known to be located within the rail reserve in the South-east Investigation area, but the species may potentially be present in shallow wetlands elsewhere, including within the other Investigation Areas. Current information indicates that actions under the Program are unlikely to result in a significant impact on this species unless additional populations are located during surveys for Precinct Structure Planning. A conservation management plan will be prepared for the population in the South-east before adjacent Precinct Structure Plans are finalised.	Targeted survey required in spring. Focus on areas of likely habitat, including known site in the Upper Merri Catchment. Protect all known locations with appropriate buffers (suggest buffers prescribed for migratory wetland dependent birds). Develop and implement a management plan for Swamp Everlasting to strategically guide the Precinct Planning process.
Swamp Fireweed <i>Senecio psilocarpus</i>	Vulnerable	Scattered populations across western Victoria including one to the north of Melbourne.	This species has only been recorded at one location (Hearne Swamp) within the Northern Investigation Area,. However, it may well be present elsewhere. It is most probably within areas of grassy wetland to the north and west of Melbourne. The OMR/E6 corridor passes through one of the sites within the swamp where this species has been recorded. It is likely that some of the population at Hearne Swamp will be affected. The likely extent of unavoidable impact is not yet known and further investigation will be required prior to commencement of construction. No prescription has been developed.	Apply buffers to wetlands in Growth Areas as prescribed for migratory species. Develop and implement a management plan for Swamp Fireweed ready for implementation at any sites where it is found through future survey. Conduct any survey in accordance with best times for Swamp Fireweed identification.

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