

REFERRAL OF A PROJECT FOR A DECISION ON THE NEED FOR ASSESSMENT UNDER THE *ENVIRONMENT EFFECTS ACT 1978*

REFERRAL FORM

The *Environment Effects Act 1978* provides that where proposed works may have a significant effect on the environment, either a proponent or a decision-maker may refer these works (or project) to the Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required.

This Referral Form is designed to assist in the provision of relevant information in accordance with the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Seventh Edition, 2006). Where a decision-maker is referring a project, they should complete a Referral Form to the best of their ability, recognising that further information may need to be obtained from the proponent.

It will generally be useful for a proponent to discuss the preparation of a Referral with the Impact Assessment Unit (IAU) at the Department of Environment, Land, Water and Planning (DELWP) before submitting the Referral.

If a proponent believes that effective measures to address environmental risks are available, sufficient information could be provided in the Referral to substantiate this view. In contrast, if a proponent considers that further detailed environmental studies will be needed as part of project investigations, a more general description of potential effects and possible mitigation measures in the Referral may suffice.

In completing a Referral Form, the following should occur:

- Mark relevant boxes by changing the font colour of the 'cross' to black and provide additional information and explanation where requested.
- As a minimum, a brief response should be provided for each item in the Referral Form, with a more detailed response provided where the item is of particular relevance. Cross-references to sections or pages in supporting documents should also be provided. Information need only be provided once in the Referral Form, although relevant cross-referencing should be included.
- Responses should honestly reflect the potential for adverse environmental effects. A Referral will only be accepted for processing once IAU is satisfied that it has been completed appropriately.
- Potentially significant effects should be described in sufficient detail for a reasonable conclusion to be drawn on whether the project could pose a significant risk to environmental assets. Responses should include:
 - a brief description of potential changes or risks to environmental assets resulting from the project;
 - available information on the likelihood and significance of such changes;
 - the sources and accuracy of this information, and associated uncertainties.
- Any attachments, maps and supporting reports should be provided in a secure folder with the Referral Form.
- A CD or DVD copy of all documents will be needed, especially if the size of electronic documents may cause email difficulties. **Individual documents should not exceed 2MB as they will be published on the Department's website.**

- A completed form would normally be between 15 and 30 pages in length. Responses should not be constrained by the size of the text boxes provided. Text boxes should be extended to allow for an appropriate level of detail.
- The form should be completed in MS Word and not handwritten.

The party referring a project should submit a covering letter to the Minister for Planning together with a completed Referral Form, attaching supporting reports and other information that may be relevant. This should be sent to:

Postal address

**Minister for Planning
GPO Box 2392
MELBOURNE VIC 3001**

Couriers

**Minister for Planning
Level 20, 1 Spring Street
MELBOURNE VIC 3001**

In addition to the submission of the hardcopy to the Minister, separate submission of an electronic copy of the Referral via email to ees.referrals@delwp.vic.gov.au is required. This will assist the timely processing of a referral.

PART 1 PROPONENT DETAILS, PROJECT DESCRIPTION & LOCATION

1. Information on proponent and person making Referral

Name of Proponent:	VicRoads
Authorised person for proponent:	Charlie Broadhurst
Position:	Project Director South Eastern Projects
Postal address:	40 Belgrave Hallam Road, Hallam
Email address:	charlie.broadhurst@roads.vic.gov.au
Phone number:	9703 5904
Facsimile number:	N/A
Person who prepared Referral:	Philippa Forge
Position:	Principal Environmental Scientist
Organisation:	WSP Australia Pty Limited
Postal address:	WSP Australia Pty Limited Level 15, 28 Freshwater Place Southbank VIC 3006
Email address:	philippa.forge@wsp.com
Phone number:	(03) 9861 1243
Facsimile number:	N/A
Available industry & environmental expertise: (areas of 'in-house' expertise & consultancy firms engaged for project)	<p>WSP Australia Pty Limited is utilising in-house expertise in the following areas for the project and to prepare this referral:</p> <ul style="list-style-type: none"> → Road design → Geotechnical investigations → Contaminated land assessment → Surface water hydrology and hydraulics → Groundwater → Flora and fauna → Planning → Noise → Air quality → Social. <p>Other firms engaged for this project and to provide input to this referral included:</p> <ul style="list-style-type: none"> → Archaeology at Tardis – Historic and cultural heritage → Tract – Landscape values

2. Project – brief outline

Project title: Mordialloc Bypass			
Project location: (describe location with AMG coordinates and attach A4/A3 map(s) showing project site or investigation area, as well as its regional and local context)			
<p>The proposed Mordialloc Bypass (the project) is in Melbourne's south-eastern suburbs. The Bypass is to extend north-west from the Mornington Peninsula Freeway's existing terminus at Springvale Road in Aspendale Gardens and link to the Dingley Bypass.</p> <p>For the purposes of this referral, the term 'project' refers to the construction and operational phases of the proposed Mordialloc Bypass and 'project area' refers to the area within which the project will be designed and physically constructed. The approximate project area is shown in Attachment 1. Most new infrastructure and upgrades to existing infrastructure will occur within the project area shown in Attachment 1, but some will occur outside this area (e.g. to tie in to existing roads, bikeways and walkways).</p> <p>The approximate AMG coordinates for key locations of the project are listed below (Table 1) and correspond to points labelled on Attachment 1.</p>			
Table 1: Project location coordinates			
Site Location	ID	Easting	Northing
Dingley Bypass (top left project boundary)	1	334305	5797095
Dingley Bypass (top right project boundary)	2	335130	5796919
Centre Dandenong Road	3	334491	5795532
Lower Dandenong Road	4	334727	5793903
Governor Road	5	335173	5791472
Springvale Road	6	336174	5789724
Mornington Peninsula Freeway	7	336696	5788468
Short project description (few sentences):			
<p>The Mordialloc Bypass is a proposed new arterial road within Melbourne's south-eastern suburbs, located within an existing road reservation. The Bypass provides a link between the termination of the Mornington Peninsula Freeway at Springvale Road in Aspendale Gardens and the Dingley Bypass in Dingley. The road will also provide connections via new junctions to three intersecting arterial roads; Governor Road, Lower Dandenong Road and Centre Dandenong Road.</p> <p>The project corridor is approximately 9 km in length, comprising 7.5 km of dedicated greenfield road corridor and a 1.5 km upgrade to the Mornington Peninsula Freeway. Road engineering design work is continuing, with the ultimate road design expected to be influenced by traffic modelling and a range of economic, community, environmental and social considerations.</p>			

3. Project description

Aim/objectives of the project (what is its purpose / intended to achieve?):

The Mordialloc Bypass is a proposed new arterial road within Melbourne's south-eastern suburbs, located within an existing road reservation. The reservation was conceived in the 1950's and formalised in the 1970's to accommodate a six lane road to cater for future urban growth.

The proposed Bypass will comprise a four lane road with two lanes in each direction and divided median. This can be upgraded to a six lane arterial road in the future by adding two lanes in the centre median.

The objectives of the project are to provide a response to the following needs and issues:

- Improved transport efficiency: improve east-west and north-south connectivity and capacity, hence reducing delays at existing intersections and providing a high level of service for all vehicles using the road network.
- Improved amenity and attractiveness of the area as places to live and work: more efficient links along the southern movement corridor will reduce the reliance on local and arterial roads as key movement routes. This will boost amenity of the middle south-eastern suburbs by reducing the number of vehicles moving through residential areas.
- Increased economic development: improving east-west and north-south connectivity and addressing the capacity constraints in the corridor will improve accessibility between existing and establishing employment clusters, industrial areas and residential areas in the south-east.

Background/rationale of project (describe the context / basis for the proposal, e.g. for siting):

An arterial road bypass of bayside suburbs on the Nepean Highway between Mordialloc and Frankston was first proposed in 1954 in the *Melbourne and Metropolitan Board of Works (MMBW) Planning Scheme Report*. The report recognised the detrimental impacts of heavy traffic on amenity and development of bayside suburban settlements and proposed an arterial road, designated Route 26, connecting Brighton to Frankston.

Further work on the projected long term growth and strategic connectivity needs of the south-eastern region resulted in a 7.5 km road reservation being established for a northern extension of the previously proposed Mornington Peninsula Freeway to the (then) proposed Dingley Bypass. The reservation for the Mordialloc Bypass between Springvale Road and the Dingley Bypass has been detailed in the Kingston Planning Scheme since 1979. The reservation was created to be able to accommodate a six lane road with three lanes in each direction and a divided median.

In 2010, a strategic transport assessment and subsequent feasibility study were commissioned by VicRoads to investigate and determine the associated benefits, impacts and feasibility of constructing a bypass within the Mordialloc Bypass reservation. The study concluded that demand was not sufficient to warrant investment in a freeway facility at that time; however, there was sufficient future demand to support a business case for the construction of an arterial road within the reservation.

From 2016, VicRoads has been re-evaluating options in response to revised projections of growth-driven travel demand in Melbourne's southern region. The evaluation considered indicators of worsening congestion and connectivity issues in the south-eastern suburbs. Modelling showed that traffic volumes in the outer suburbs will increase by nearly 17 percent between 2021 and 2031.

High population growth and the strengthening of significant economic centres are already generating increasing travel demand in this region. Established metropolitan areas such as Greater Dandenong and Kingston, as well as in the Casey-Cardinia growth corridor, are experiencing strong growth in both population and employment, with substantially more growth expected over the next 20 years. According to Victoria's strategic planning document, *Plan Melbourne* (Department of Environment, Land Water and Planning 2017), the city's southern sub-region will accommodate 480,000 new residents and support an additional 150,000 jobs by 2031.

In response to the increased travel demand, the state government committed funds to the upgrade of 44 km of the Monash Freeway and construction of the Dingley Bypass. *Plan Melbourne* also sets out a policy to improve arterial road connections across Melbourne.

Main components of the project (nature, siting & approx. dimensions; attach A4/A3 plan(s) of site layout if available):

The project corridor is approximately 9 km in length, comprising 7.5 km of greenfield dedicated road corridor and 1.5 km of upgrade to the Mornington Peninsula Freeway. A four lane arterial road will be constructed, with divided median and a path for walking and cycling. The Bypass can be upgraded to a six lane arterial road in the future by adding two lanes in the centre median. Due to large intersecting traffic volumes, a grade-separated intersection will be provided at Springvale Road.

The road will also provide connections to four arterial roads: Governor Road, Lower Dandenong Road, Centre Dandenong Road and Dingley Bypass, via signalised intersections. Mordialloc Creek and the associated Waterways wetlands will be spanned by twin 400m long bridges, with the remainder of the route anticipated to be at or near grade (i.e. existing ground level), subject to flood modelling and other design considerations.

Typically, each carriageway will provide two 3.5m wide lanes (widening to three 3.5m lanes at the signalised intersections), with a 3.0m wide outside shoulder and 1.0m wide inside shoulder. The design is still at concept stage and will be further refined, particularly where passing through environmentally sensitive areas, to minimise the road footprint.

Ancillary components of the project (e.g. upgraded access roads, new high-pressure gas pipeline; off-site resource processing):

No ancillary components of the project that would introduce additional environmental impacts have been identified.

Key construction activities:

Proposed construction activities are likely to be standard road construction activities for a road construction project within a greenfield corridor, including:

- Preliminary stage investigations including geotechnical investigation and baseline monitoring, remediation of contaminated land, removal of hazardous material, implementation of a mandatory Cultural Heritage Management Plan (CHMP) measures, service relocations and environmental studies;
- Vegetation removal;
- Clearing and grubbing, temporary sediment and erosion control works;
- Bulk earthworks and haulage;
- Structures and drainage works;
- Pavement works;
- Bikeway and walkway construction and connections;
- Traffic management systems and landscaping; and
- Commissioning.

Key operational activities

The commissioned road corridor will be subject to normal road corridor maintenance, comprising road, bridge, cycle path, walking path and roadside maintenance.

Key decommissioning activities (if applicable):

Not applicable.

Is the project an element or stage in a larger project?

No Yes If yes, please describe: the overall project strategy for delivery of all stages and components; the concept design for the overall project; and the intended scheduling of the design and development of project stages).

Is the project related to any other past, current or mooted proposals in the region?

No Yes If yes, please identify related proposals.

Note that a road reservation has been in place at this location since 1979.

4. Project alternatives

Brief description of key alternatives considered to date (e.g. locational, scale or design alternatives. If relevant, attach A4/A3 plans):

The key alternatives to the arterial road proposal considered by VicRoads to date can be summarised as:

- Localised improvements to the broader road network
- 6 lane arterial
- Freeway option.

The ultimate design is expected to be influenced by traffic modelling and a range of economic, community, environmental, and social considerations.

Brief description of key alternatives to be further investigated (if known):

Items to be further investigated include the number of lanes, intersection treatments and bridge structures.

5. Proposed exclusions

Statement of reasons for the proposed exclusion of any ancillary activities or further project stages from the scope of the project for assessment:

A freeway option as listed above has been excluded from further consideration based on preliminary traffic modelling and economic analysis.

6. Project implementation

Implementing organisation (ultimately responsible for project, ie. not contractor):

VicRoads (Roads Corporation)

Implementation timeframe:

Subject to environmental assessment and statutory approval requirements, construction is expected to commence by mid-2019, following the completion of detailed design and investigation activities.

Proposed staging (if applicable):

VicRoads proposes to develop the bypass in two stages:

- Stage 1 encompasses the section between Lower Dandenong Road and the Dingley Bypass
- Stage 2 encompasses the section between the Mornington Peninsula Freeway and Lower Dandenong Road

The anticipated period between the commencement of each stage is 6-9 months, subject to planning approvals.

7. Description of proposed site or area of investigation

Has a preferred site for the project been selected?

- No Yes If no, please describe area for investigation.
If yes, please describe the preferred site in the next items (if practicable).

Refer to the attached map of the project area (Attachment 1).

General description of preferred site, (including aspects such as topography/landform, soil types/degradation, drainage/ waterways, native/exotic vegetation cover, physical features, built structures, road frontages; attach ground-level photographs of site, as well as A4/A3 aerial/satellite image(s) and/or map(s) of site & surrounds, showing project footprint):

The following description of the project area applies to the area shown in Attachment 2 (Project area in relation to surrounding land uses).

The project area for Mordialloc Bypass traverses the suburbs of Clayton South, Dingley Village, Braeside, Waterways, Aspley Gardens, Chelsea Heights and Bangholme in the City of Kingston.

The project area is situated approximately 25 km south east of the Melbourne CBD and 5 km east of Mordialloc. The proposed road extends north-west from the Mornington Peninsula Freeway's existing terminus at Springvale Road in Aspendale Gardens and links to the Dingley Bypass and provides connections to Governor Road, Lower Dandenong Road and Centre Dandenong Road.

Topography, landform, geology and soils

The topography of the project area is relatively flat, with gentle rises in the landscape. The lowest lying section of project area is in the south around the Waterways Wetlands, at around 4 m above sea level. The topography increases gradually heading north, to around 30 m elevation at the top of the project boundary.

The present-day suburbs of Mordialloc through to Frankston once comprised a large wetland area known as Carrum Carrum Swamp, covering over 4,000 hectares. Modern development and drainage within the region has left only remnants of the swamp in place today, such as the Edithvale-Seaford wetlands. This swamp comprised of a thin sequence of black clay, silt and minor shell beds which reflect a swampy lagoonal environment with few layers of marine sediment.

The project area lies within geological deposits of:

- Quaternary inland dune deposits (Qd1), comprising sand, silt and clay: friable to consolidated; well sorted; includes both lunette deposits and deposits of longitudinal dunes.
- Pleistocene to Holocene swamp lake deposits (Qm1) comprising grey to black carbonaceous mud, silt, clay, minor peat: generally unconsolidated; rare dolomite.
- Holocene coastal lagoon deposits (Qg) comprising silt, clay: dark grey to black; variably consolidated.
- Holocene coastal dune deposits (Qd1) comprising sand, silt and clay: well sorted, poorly consolidated; coastal dune and beach deposits; some swamp deposits.

These recent Quaternary deposits overlie Tertiary sands, of the Brighton Group, and potentially Tertiary silts and clays, of the Newport Formation. These overlie Silurian bedded sandstones and siltstones of the Dargile Formation at depth. A variable thickness of anthropogenic fill material is expected to be found overlying the natural geological materials in numerous locations along the alignment due to historic sand quarrying, landfill creation, industrial and residential

development and other activities in the area (refer to the Preliminary Contaminated Land Management report; Attachment 3).

Waterways and drainage

The project will occur largely within the designated Braeside West and Mordialloc Creek Wetlands (also referred to as 'Waterways') catchment areas. Both these catchments contribute tributary runoff flow to the larger Mordialloc Creek drainage system (refer to the Preliminary Surface Water Assessment report; Attachment 4).

The Braeside West catchment is consistently flat and covers an area of approximately 21 km² within the municipalities of Kingston and Greater Dandenong. It consists of several different land use types including residential, industrial, special use and green wedge zones. The main drainage asset for this catchment is the Braeside West Drain which discharges into the Mordialloc Main Drain, approximately 1 km east of the Wells Road Bridge and ultimately connecting to Port Phillip Bay. The project area crosses the Braeside West Drain as well as several tributary drains.

The Mordialloc Creek Wetlands catchment is very flat and covers an area under 2 km² within the municipality of Kingston. It consists of medium to high density development surrounding a wetland and lake system. Drainage is through the network of wetlands and eventual discharge into the Mordialloc Creek Main drain less than approximately 2 km east of the Wells Road Bridge.

Flora and fauna

Most of the project area has been highly modified due to past disturbances including the draining of Carrum Carrum Swamp, clearing of vegetation, modification of the landscape for urban development, alterations to local hydrology through the extensive modification of waterways and the introduction of exotic flora and fauna species. However, the corridor passes close to significant native vegetation remnants in Braeside Park and restored habitat areas such as the Waterways estate and Woodlands Industrial Estate Wetlands. These also provide habitats for numerous woodland and wetland birds (refer to the Preliminary flora and fauna assessment for Mordialloc Bypass; Attachment 5).

Cultural heritage

Previous investigations found no Aboriginal cultural heritage located within the project area. The project is located on land formerly occupied by the Carrum Carrum Swamp, an area of high cultural significance to the Traditional Owner Groups. Based on the distribution and frequency of archaeological and heritage sites in the surrounding project area, it is possible that cultural heritage sites exist in areas that have not yet been investigated or defined as sensitive by the Traditional Owner Groups, Aboriginal Victoria (AV) and historic heritage registers.

Built structures

There is a commercial nursery located within the proposed alignment on Grange Road, Clayton South (Lot 1 TP675948). The land occupied by the nursery is owned by VicRoads and leased to the proprietor. The nursery is comprised of polyweave greenhouse sheds and a maintenance shed. The site is approximately 21,000 m² and is located and captured in the Public Acquisition Overlay.

A materials recycling/composting facility is also located within the proposed alignment (Lot 1 PS409861). The land occupied by the facility is owned by VicRoads and leased to the business proprietor. The site contains fixed plant and equipment and is captured in the Public Acquisition Overlay.

A Parks Victoria office on Cypress Drive, Braeside is located within the proposed alignment (Lot 1 PS420865) and is also captured in the Public Acquisition Overlay.

The impact on these structures will be determined by the final design and construction methodology. Decommissioning of the commercial nursery, materials recycling facility and Parks Victoria office is likely.

Site area (if known): Approximately 137 ha (hectares)

Route length (for linear infrastructure) 9.0 km **and width** 40-100m (approx.)

Although the project envelope is 137 ha, the construction footprint for the project is estimated to be 108 ha.

Also, the width of the alignment varies along the route, with wider sections at the arterial intersections. An approximate average of the road alignment width between intersections is 40m, excluding bikeways and walkways.

Current land use and development:

The current land use within the project area is road reservation which is predominantly vacant land. Wetlands occur in the Waterways area and several modified waterways and drains intersect with the project area. A commercial nursery and materials recycling facility is located within the road reservation on land leased from VicRoads. The Parks Victoria office for Braeside Park also occupies the proposed alignment. Privately owned lots south of Mordialloc Creek include paddocks used for cattle grazing.

Description of local setting (e.g. adjoining land uses, road access, infrastructure, proximity to residences & urban centres):

The project area is in the City of Kingston. The City of Kingston is located within Melbourne's south-eastern band of middle suburbs, approximately 17 km from Melbourne's CBD. It is framed by the Port Phillip coastline to the west and major arterial road corridors to the north and east. Kingston's regional neighbours include the cities of Bayside, Glen Eira, Monash, Greater Dandenong and Frankston.

The following describes the land uses adjacent to the project area, as illustrated in Attachment 2.

Residential land uses

Detached housing is the predominant form of housing adjacent to the project area and is characterised by single detached dwellings on conventional lots. Residential land uses are located to the east of the project area in Dingley Village, between Centre Dandenong Road and Lower Dandenong Road. The project area abuts the western periphery of the Waterways residential development. The project area is adjacent to the eastern periphery of Aspendale Gardens and a retirement village development in Chelsea Heights, alongside the Mornington Peninsula Freeway. Land adjacent to the southern periphery of the project, in Bangholme, is comprised of rural residential land.

Industrial land uses

Large contiguous industrial land uses are located adjacent to the west of the project area in Dingley Village and Braeside. This consists of factory units that range in size and scale. Pockets of industrial land use are in Chelsea Heights adjacent to the Mornington Peninsula Freeway. The City of Kingston is one of the largest and most concentrated manufacturing bases in metropolitan Melbourne.

Commercial land uses

Commercial nurseries and a materials recycling/composting facility are adjacent to the project area towards the northern section of the project in Dingley Village. Commercial activities are also located adjacent to Moorabbin Airport, west of the project area (e.g. DFO, The Good Guys, Costco).

Recreation reserves and waterways

There are several recreational reserves and golf courses adjacent, or within close proximity, to the project area. Recreation reserves adjacent to the project area include Braeside Park, Woodlands Industrial Estate, Waterways Estate, Chadwick Reserve and Bardoe Park. The largest of these recreation reserves is Braeside Park, Braeside. It is a 295 ha park which offers a variety of educational and recreational opportunities. The park contains grassy woodlands, heathland and wetlands. There are a number of private golf courses in close vicinity to the project area, including Capital Golf Course, Peninsula Kingswood Golf Course, Southern Golf Course and Keysborough Golf Course.

Land subject to inundation

The City of Kingston Planning Scheme identifies land subject to inundation (LSI). The project area in the vicinity of the north-western corner of Braeside Park is affected by the LSI Overlay. Similarly, a large continuous LSI area affects the project area. This LSI area begins in the south-western corner of Braeside Park and terminates at Springvale Road (refer Attachment 6).

Moorabbin airport

Moorabbin airport is located to the west of the project area. It supports flight training and general aviation services. It has unconstrained capacity for 686,000 fixed wing and rotary wing aircraft. It is not expected to reach this capacity within the next 20 years. Moorabbin Airport is consistently the third busiest airport in Australia averaging 250,000 movements per year. The airport is capable of landing corporate jets, turbo props, twin engine aircraft and helicopters. The *Moorabbin Airport 2015 Master Plan* (Moorabbin Airport Corporation) remains in force until a new master plan is approved. The plan envisages:

- On-airport jobs growing from 3,300 to 8,500 over the next 20 years.
- Economic value increasing from \$340 million to \$825 million annually.
- \$10 billion of economic activity over the 20 year period.
- Investment of \$570 million in high quality facilities and infrastructure.

Planning context (e.g. strategic planning, zoning & overlays, management plans):

State policy context

Plan Melbourne 2017-2050 - Metropolitan Planning Strategy, Victorian Government, March 2017.

A key outcome of *Plan Melbourne* is that 'Melbourne has an integrated transport system that connects people to jobs and services and goods to market'. Two of the key directions relating to this outcome is to 'transform Melbourne's transport system to support a productive system', and to 'improve transport in Melbourne's outer suburbs'. According to the plan, the proposed Mordialloc bypass will provide a key north-south connection and will transform the road network in south-eastern Melbourne, leading to greater efficiencies, improved productivity, and greater access to jobs, services and markets.

Local policy context

Kingston Planning Scheme and Greater Dandenong Planning Scheme

The project is located primarily within the City of Kingston, with a small area of proposed works within Greater Dandenong. The State Planning Policy Framework is included in both the Kingston and Greater Dandenong Planning Scheme. A key strategy in Clause 11.06 is to 'enable improved arterial road connections across Melbourne' and to 'improve the road network in growth areas and outer suburbs to ensure access to jobs and services'. The proposed Mordialloc Bypass will add to the arterial road network and improve the transport connections in the south-east growth area of Melbourne.

Kingston's Municipal Strategic Statement identifies capacity deficiencies in the north-south arterial routes as a key land use challenge. The proposed Mordialloc Bypass will alleviate the pressure on existing roadways and improve the transport network for the municipality. Further, the Dingley Freeway and extension of the Mornington Peninsula Freeway are identified as a key priority area for Kingston in Clause 21.12-3 of the Local Planning Scheme.

Greater Dandenong's Municipal Strategic Statement sets out a vision of 'state of the art inter-modal transport interchange for south-eastern Victoria'. The proposed Mordialloc Bypass will contribute to this vision for the region.

The land use surrounding the project area is a mixture of low rise residential and industrial, with some waterway areas. The primary land use classifications within the project area are Industrial 1 Zone, Road Zone, and Green Wedge Zone. The majority of the project footprint is covered by a Public Acquisition Overlay for acquisition for the purpose of a road. A PAO is required on two private lots (approx 700m²). In addition, several areas that are prone to flooding are identified with a Land Subject to Inundation Overlay (LSIO) and a Special Building Overlay (SBO).

The zones and overlays that are intercepted by the project alignment are identified and described in Table 2.

Table 2: Zones and overlays intercepting the project alignment

Zone/Overlay	Description
Zone	
General Residential Zone – Schedule 3	Identifies land for housing and other non-residential uses that serve a local community.
Industrial 1 Zone	Identifies land for manufacturing industry, the storage and distribution of goods and associated uses.
Green Wedge Zone Schedule 1 and 2	Identifies land to be protected for its agricultural, environmental, historic, landscape, recreational and tourism values.
Public Use Zone - Schedule 1 and 7	Identifies land to be used for public utility, community services and facilities. Schedule 1 relates to 'Service and Utility', whilst Schedule 7 relates to 'other public uses'.
Public Park and Recreation Zone	Identifies areas for public recreation and open space.
Road Zone Category 1	Identifies significant existing roads and land which has been acquired for a significant proposed road.
Urban Floodway Zone	Identifies areas which have the greatest risk and frequency of being affected by flooding.
Overlay	
Design and Development Overlay No 4 and 6.	Identifies areas that are affected by specific requirements relating to the design and built form.
Incorporate Plan Overlay – Schedule 2 (IPO2)	The IPO2 applies to the Kingston Lodge Concept Plan 2006.
Heritage Overlay (HO3)	This applies to the Christ Church located at 387-405 Old Dandenong Road (Cnr Centre Dandenong Road) Dingley
Land Subject to Inundation Overlay (LSIO)	Identifies land subject to 1:100 year flood events and other significant flood prone areas.
Special Building Overlay (SBO)	Identifies land in urban areas that are liable to inundation.
Public Acquisition Overlay – Schedule 1 (PAO1)	Identifies land for public purposes (to be acquired by the Roads Corporation)

It is proposed that the project area be changed to Road Zone Category 1 (where the land is not already in that zone). The Public Acquisition Overlay, where it applies, will need to be removed as it would no longer be required when land is acquired.

Other relevant planning provisions are Clause 52.29 (altering access to a Road Zone Category 1 where the road joins existing roads) and Clause 52.17 in relation to vegetation removal.

Refer to Attachment 6 and 7 for maps displaying the planning overlays and planning zones interacting with the project area.

Local government area(s):

The project area is predominantly located within the City of Kingston, with a small part of the project within the City of Greater Dandenong, as shown in Attachment 2.

8. Existing environment

Overview of key environmental assets/sensitivities in project area and vicinity

(cf. general description of project site/study area under section 7):

The project area has the following key environmental assets and sensitivities within its vicinity.

Land use

The land use is predominantly road reservation. There are two commercial enterprises within the northern section of the project area, a commercial nursery and a materials recycling/composting facility. A Parks Victoria office is also situated within the project area, abutting Braeside Park.

The northern section of the project area intersects the South East Green Wedge Zone. The South East Green Wedge Zone is directly adjacent to the southern section of the project area.

Land uses in the vicinity of the project area are predominantly composed of residential, industrial, recreation and non-urban land. Non-urban residential land uses exist in Keysborough, Bangholme and Lyndhurst. These land uses are located within the South East Green Wedge Zone and outside of the Urban Growth Boundary. They contain a mix of agriculture and low density activities. Refer to Attachments 6 and 7 which display the relevant zones and overlays throughout the project area.

There are numerous recreation reserves and golf courses within 2 km of the project area. Golf courses within the vicinity of the project are located within the Melbourne sandbelt, a region which has over 20 public, private and major championship golf courses.

Water

The project will occur largely within the designated Braeside West and Mordialloc Creek Wetlands (also referred to as 'Waterways') catchment areas. Both these catchments contribute tributary runoff flow to the larger Mordialloc Creek drainage system. Refer to Appendix A within the preliminary surface water impact assessment (Attachment 4 of this referral) for overview maps of surface water within the project area.

The Braeside West catchment is consistently flat and covers an area of approximately 21 km² within the municipalities of Kingston and Greater Dandenong. It consists of several different land use types including residential, industrial, special use and green wedge zones. The main drainage asset for this catchment is the Braeside West Drain which discharges to the Mordialloc Main Drain approximately 1 km east of the Wells Road Bridge. The Project crosses the Braeside West drain as well as several tributary drains.

The Mordialloc Creek Wetlands catchment is very flat and covers an area under two square kilometres within the municipality of Kingston. It consists of medium to high density development surrounding a wetland and lake system. Drainage is through the network of wetlands and eventual discharge into the Mordialloc Creek Main drain less than approximately two kilometres east of the Wells Road Bridge.

The Mordialloc Bypass project crosses the following drainage lines (South to North):

- Smythes Drain open channel, east of Bowen Parkway – covered by LSIO;
- Mordialloc Creek Wetlands, between Mordialloc main drain and Governor Road – covered by LSIO;
- Dingley Drain open channel – covered by LSIO;
- Lower Dandenong Road
 - Gartsides South Drainage Scheme open channel – covered by SBO;
 - Gartsides Drainage Scheme underground drainage – covered by SBO;
 - Braeside West Drainage Scheme open channel – covered by LSIO
- Centre Dandenong Road
 - Old Dandenong Road Drain waterway – covered by SBO;
 - Gartsides North Drainage Scheme underground drainage – covered by SBO; and
- Old Dandenong Road Drain waterway.

A total of five groundwater resource units were identified below the project area in the preliminary desktop assessment (the estimated depth below surface is indicated in brackets), these being:

- Quaternary Aquifer (0–3 m)
- Upper Tertiary Aquifer (3–16 m)
- Upper-Mid Tertiary Aquitard (16–47 m)
- Lower Tertiary Aquifer (47–53 m)
- Mesozoic and Palaeozoic Bedrock (53–253 m).

For details on these groundwater resource units, refer to Section 4.1 within the Preliminary Groundwater Impact Assessment (Attachment 9 of this referral).

Within 500 m of the project there are 18 groundwater bores with beneficial uses (irrigation, stock and domestic purposes)

Within 2 km there are nine types of ecosystems that rely on the subsurface presence of groundwater with a moderate to high potential for groundwater interaction. The following groundwater dependent ecosystems have been identified from the Bureau of Meteorology's National Groundwater Dependent Ecosystems Atlas:

- Coast Banksia Woodland
- Coastal Dune Scrub
- Creekline Grassy Woodland
- Damp Sand Herb-rich Woodland
- Grassy Woodland
- Heathy Woodland
- Plains Grassy Wetland
- Plains Grassy Woodland
- Swamp Scrub (mosaic).

Within 2 km there are five ecosystems that rely on the surface expression of groundwater. These ecosystems are:

- Carrum Carrum Swamp
- Clayton South Drain
- Edithvale Wetlands
- Mordialloc Creek
- Mordialloc Settlement Drain.

Refer to Figures 4.2 and 4.3 within the preliminary groundwater impact assessment (Attachment 9 of this referral) which display groundwater users and dependant ecosystems within 2km of the project area.

The Edithvale component of the Edithvale-Seaford Wetlands is listed under the Ramsar Convention. Although the project area does not intersect this wetland (it is 700 m away), it may be hydro-geologically.

Native Vegetation

The project will occur largely within the designated Braeside West Wetlands and Mordialloc Creek Wetlands (also referred to as 'Waterways') catchment areas. Both these catchments contribute tributary runoff flow to the larger Mordialloc Creek drainage system and the road is proposed to bridge over Mordialloc Creek. The Waterways is a 48 hectare planned and revegetated area. Work on the wetlands commenced in 2000.

Braeside Park is contiguous with the study area and a very good example of remnant Plains Grassy Woodland and Heathy Woodland, with much of the larger woody species persisting in abundance, although the understory is somewhat modified in areas.

The Edithvale-Seaford Wetlands is the largest natural wetland of its type in the Port Phillip and Westernport basins. It is one of the few remaining remnants of the former Carrum Carrum Swamp, which once covered more than 4,000 hectares from Mordialloc in the north to Frankston

in the south. These wetlands are renowned for being important habitat for birds. It regularly supports 1% of the East Asian-Australasian Flyway population of Sharp-tailed Sandpipers. Edithvale Wetlands, the northern remnant of the swamp, is located approximately 700m east of the main proposed works area.

The revegetated Waterways and wetlands to the south of the Woodlands industrial estate is also a good example of what local swampy ecosystems in the area may have been like prior to European occupation. Both provide valuable habitat for many flora and fauna species both common and of conservation significance, particularly for wetland and migratory bird species. These species are described in Section 12 of this referral.

Remnant vegetation, where it persists in the local landscape, is likely to be comprised of vegetation types associated with the swampy grey clays of the Gippsland plains. This includes Plains Grassy Woodland and Swamp Scrub. Vegetation types associated with paleo dunes such as Damp-sands Heathy Woodland also persist in the area.

Remnant vegetation local to the project area is likely to be most attributable to, or commonly associated with, one of the ecological vegetation classes listed in the Table 3.

Table 3: Ecological vegetation classes in the project area

EVC	Name	Conservation Significance
55	Plains Grassy Woodland	Endangered
881	Damp Sands Herb-rich Woodland/Heathy Woodland Mosaic	Vulnerable
125	Plains Grassy Wetland	Endangered
68	Creekline Grassy Woodland	Endangered
719	Grassy Woodland /Damp Sands Herb-rich Woodland Mosaic	Endangered
48	Heathy Woodland	Least Concern
53	Swamp Scrub	Endangered

Down catchment from the wetlands associated with the proposed Mordialloc Bypass is the Mordialloc Creek which enters the Port Phillip Bay via a channelised estuarine system through Mordialloc.

The local region, is a patchwork of urbanisation, industrial areas along with open grassy and treed areas similar to those supported by the project area, and providing similar habitat resources associated with open modified woodland and grassland, in the form of a semi-rural tract of land to the south-east, numerous golf courses along the sandbelt and the Moorabbin Airport. Refer to Appendix G within the preliminary flora and fauna impact assessment (Attachment 5 of this referral) for a series of maps displaying ecological considerations for the project area.

Cultural Heritage

Previous investigations found no Aboriginal cultural heritage located within the project area. The project is located on land formerly occupied by the Carrum Carrum Swamp, an area of high cultural significance to the Traditional Owner Groups. Based on the distribution and frequency of archaeological and heritage sites in the surrounding study area, it is possible that cultural heritage sites exist in areas that have not yet been investigated or defined as sensitive by the Traditional Owner Groups, Aboriginal Victoria (AV) and historic heritage registers.

European Heritage

A search of the Victorian Heritage Register (VHR) and Victorian Heritage Inventory (VHI) was undertaken, identified that no European Heritage places are located within the project area.

9. Land availability and control

Is the proposal on, or partly on, Crown land?

No Yes If yes, please provide details.

The proposal passes through one property identified as Crown Land Allotment: 2012, Standard Parcel Identifier: 2012\PP3025, Parish of Lyndhurst.

Current land tenure (provide plan, if practicable):

The proposed alignment would be located within land predominantly owned by VicRoads. However, properties that are privately and publicly owned will also be impacted.

The properties listed below are only partially intersected (by varying degrees)

Table 4: Non-VicRoads properties in project area

Lot #	Owner
Lot 1, TP675948	Private Property
Lot 1, TP95013	Private Property
Lot A, LP204907	Private Property
Lot 2, PS404186	DELWP Tenanted
Lot A, PS605114	Private Property
Lot 3, TP749429	Private Property
Lot 1, TP592493	Private Property
Lot B, PS443745	Private Property
Lot 1, PS804736	Private Property
Lot 1, PS431563	Melbourne Water
Lot 1, TP171639	Melbourne Water
Lot 1, TP558168	Melbourne Water
Lot 1, TP574271	Melbourne Water
Lot 2, PS431563	Melbourne Water
RES1, PS327478	Melbourne Water
RES2, PS432019	Melbourne Water
RES28, PS435322	Melbourne Water
RES29, PS435322	Melbourne Water
RES3, PS432874	Melbourne Water

Work is underway to determine the level of land acquisition that may be required for the project.

Access and temporary construction activities are also likely to be potential impacts for the section of the project located adjacent to the Waterways Estate and Mordialloc Creek.

Intended land tenure (tenure over or access to project land):

VicRoads intends to have tenure over the project land prior to construction and during operation of the road. Access to private and public land is likely to be required for the entirety of the project area, to allow for construction activities.

Other interests in affected land (e.g. easements, native title claims):

VicRoads leases land within the PAO to two businesses north of Old Dandenong Road; Enviromix and Multiskills Training.

10. Required approvals

State and Commonwealth approvals required for project components (if known):

A preliminary list of potential approvals required for the project has been compiled as follows:

Commonwealth

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The project may require approval of the Australian Minister for Environment and Energy under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to the presence of a number of Matters of National Environmental Significance (MNES) within or close to the project area which have been assessed as having a moderate to high likelihood of impact, without any mitigation measures. These matters include:

- Ramsar-listed Edithvale-Seaford Wetlands
- Eight migratory bird species including Sharp-tailed Sandpiper, Curlew Sandpiper[^], Pectoral Sandpiper, Red-necked Stint, Latham's Snipe, Eastern Curlew[^], Glossy Ibis and Wood Sandpiper ([^] also listed as threatened)
- Three threatened flora species River Swamp Wallaby-grass, Swamp Everlasting and Matted Flax-lily (all planted throughout The Waterways)
- Three threatened fauna species Australasian Bittern, Curlew Sandpiper and Eastern Curlew
- Two ecological communities:
 - Seasonal Herbaceous Wetlands of the Temperate Lowland Plains – approximately 2.12 ha (construction footprint loss)
 - Natural Damp Grasslands of the Victorian Coastal Plains – approximately 0.03 ha (construction footprint loss)

Preliminary mitigation measures have been proposed in the attachment *Preliminary flora and fauna assessment for Mordialloc Bypass* (Attachment 5). Provided that measures to avoid and minimise impacts are explored and that detailed mitigation measures are planned and implemented, no significant impacts on listed MNES above is anticipated. The need for a referral to the Commonwealth's Department of Environment and Energy is currently being assessed.

State

Planning and Environment Act 1987 (P&E Act)

The project will require approval under the Kingston Planning Scheme for use and/or development works within the Public Use Zone, Land Subject to Inundation Overlay and the Special Building Overlay of the Kingston Planning Scheme. Approvals for vegetation removal (works) will be required under both the Kingston and Greater Dandenong Planning Schemes.

The planning pathway for this project is dependent upon whether this EES Referral confirms the requirement for an EES, an Environment Report, or for an EES for portions of the overall project area. A request to the Minister for Planning would be made to determine the most appropriate planning mechanism for the project.

If an EES is required, the Panel appointed as part of this process would be able to consider submissions in response to a proposed amendment to the Greater Dandenong and Kingston Planning Schemes.

Should an EES not be required, or not be required for part of the project area, a request would be made to the Minister for Planning to facilitate the project.

If the Minister believes that public notification is not warranted or that the project is of significance to the State or part of the State, he may exempt the project under Section 20(4) of the Planning and Environment Act from this notification.

Permitted clearing of native vegetation – biodiversity assessment guidelines (DEPI 2013)

The location risk is determined from the *Native vegetation location risk map* (found in the DEPI guidelines). All locations in Victoria fall into one of three location risk categories: A, B, C. Most of the alignment is mapped as Location A risk category, except for the Waterways wetlands, which is mapped as mix of Location B and Location C.

A preliminary calculation of biodiversity impacts and Offset requirements has been completed for the current construction footprint. This has resulted in:

- 0.076 general units (General Offsets) for the Port Phillip and Westernport Catchment Management Authority (CMA) or Kingston City Council.
- The following Specific Offsets:
- 1.261 specific units of habitat for Orange-bellied Parrot
- 2.794 specific units of habitat for Marsh Saltbush
- 1.684 specific units of habitat for Creeping Rush
- 2.745 specific units of habitat for Salt Lawrencia
- 2.725 specific units of habitat for Purple Blown-grass
- 0.060 specific units of habitat for Lacey River Buttercup

Aboriginal Heritage Act 2006

A mandatory Cultural Heritage Management Plan (CHMP) is required as the project area intersects an area of cultural heritage sensitivity.

Other

Other approvals or consents likely to be required for the project include:

- a Melbourne Water Permit to Work under the *Water Act 1989* for works within flood overlay areas (e.g. LSIO, SBO) and works on or in the vicinity of Melbourne Water assets.
- a permit to remove protected flora, threatened species and threatened communities under the *Flora and Fauna Guarantee Act 1988* (FFG Act) and an authorisation under the *Wildlife Act 1975* are also likely to be required.

Have any applications for approval been lodged?

No Yes If yes, please provide details.

Approval agency consultation (agencies with whom the proposal has been discussed):

The Department of Environment, Land, Water and Planning (DELWP), Melbourne Water, the City of Kingston, Parks Victoria and the City of Greater Dandenong have been consulted.

Other agencies consulted:

Aboriginal Victoria.

Consultation is ongoing, as indicated in the Engagement Action Plan (refer to Attachment 11).

PART 2 POTENTIAL ENVIRONMENTAL EFFECTS

11. Potentially significant environmental effects

Overview of potentially significant environmental effects (identify key potential effects and comment on their significance and likelihood, as well as key uncertainties):

The Mordialloc Bypass is located in a long-established reserved road corridor. The following potential impacts, as presented in this referral, are based on the information available at the time of referral lodgement. A comprehensive risk assessment for the project based on this information is being developed.

Removal of native vegetation

The area of native vegetation that may need to be removed, depending on the final design, is estimated to be 6.17 hectares. Median widths and the use of retained earth systems are the design variables with the largest influence on the impacted area. The majority of native vegetation in the project area has an endangered EVC status.

Potential impacts to threatened species

Seven significant flora species have a moderate to high likelihood of occurrence within the project area, all of which have been planted within the Waterways wetlands. 46 significant fauna species have a moderate to high likelihood of occurrence within the project area of which 26 are anticipated to have at least a moderate likelihood of impact, prior to mitigation. Preliminary mitigation measures have been proposed in the attachment *Preliminary flora and fauna assessment for Mordialloc Bypass* (Attachment 5). Provided measures to avoid and minimise impacts are explored and that detailed mitigation measures are planned and implemented, no significant impacts on significant flora or fauna species is anticipated.

Potential impacts on significant Aboriginal cultural heritage places

The project is located on land formerly occupied by the Carrum Carrum Swamp, an area of high cultural significance to Traditional Owner Groups of the region. Although the project area has been highly disturbed since European settlement, the construction phase of the project still has the potential to uncover and damage cultural artefacts.

A compulsory Cultural Heritage Management Plan (CHMP) is currently being prepared, as required by the Aboriginal Heritage Regulations 2007. Early stage investigations have shown that part of the project is covered by an area of legislated cultural heritage sensitivity (Regulation 31: Koo Wee Rup Plain; see Attachment 8), and there have been three cultural heritage surveys and five CHMPs completed which have included at least part of the project area. No Aboriginal cultural heritage was located within the current project area during these investigations.

Potential social impacts

A preliminary review has shown that the project area comprises diverse residential communities. Population density is generally low throughout the project area, and communities in the north and south of the project area have quite distinct population characteristics. This reflects the existing access and movement networks, and the influence of the existing mix of commercial, industrial, residential and open space land uses.

The community profile considers a range of indicators of vulnerability to identify communities that are likely to be less resilient or more vulnerable to change. In the context of this assessment, vulnerable communities are assumed to be those with higher rates or multiple indicators of socio-economic disadvantage, reduced mobility (low car ownership, reduced access to public transport) or greater reliance on local facilities and services.

Vulnerable communities were identified in Chelsea Heights, Dingley Village and Waterways.

In general, communities within the project area experience comparatively high levels of local amenity and access. It is reasonable to assume that communities have the expectation that existing levels will be maintained. Some communities, such as Waterways, rely on neighbouring areas and centres to access services and facilities.

The project area also includes significant open space resources including Braeside Park and the Waterways wetlands, which are likely to be accessed by communities across the project area and from further afield.

A preliminary review of social factors identified potential effects resulting from altered local access networks during construction to communities vulnerable to change, potential temporary reduction of access to open space resources and potential reduction in existing levels of local amenity.

In addition, opportunities to enhance connectivity and support achievement of state and municipal policy objectives were identified. These include enhanced cycle networks and new or improved infrastructure to improve local accessibility and connectivity.

Further detailed assessment including targeted consultation will focus on the needs and expectations of communities identified as vulnerable and identify appropriate management and mitigation measures to address these impacts.

Potential visual impact

A preliminary landscape and visual impact assessment (Attachment 10) indicates that the landscape through which the road will be built has been significantly altered. Clearing for development and farming has led to significant changes to surface drainage, resulting in a highly modified landscape that is generally of relatively low quality, but with pockets of higher quality landscape associated with Braeside Park and the new wetlands.

Changes resulting from the road construction may affect landscape values in both a negative and positive sense. Negative in terms of direct impacts (tree and wetland clearances) and potential changes to drainage patterns that may support nearby ecological systems (off site impacts). Positive in terms of visual screening of existing land uses by roadside planting, potential new wetlands, linked park systems and new trail connections, and new ways of seeing the altered landscape.

Potential noise impacts

There is potential for dust and noise emissions, as well as vibration during the construction of the project. It is anticipated that construction activities may increase noise levels within and surrounding the construction corridor and this may affect residences close to the corridor.

There is potential in residential areas to experience higher than existing noise levels. Noise mitigation measures may be considered to comply with the VicRoads Traffic Noise Reduction Policy 2005.

Potential air quality impacts

During construction, there may be potential temporary and localised dust impacts to air quality typically associated with construction and the removal, storage and transport of excavated material. These impacts are unlikely, and furthermore low-risk, as construction is a short-lived and temporary phase of the project. As such, this will cause limited impacts to nearby sensitive receptors.

The operation phase is unlikely to result in nuisance dust and odour issues. Preliminary air quality screening assessments predicted PM₁₀ (particulate matter) concentrations will not exceed the Intervention Levels specified in the State Environment Protection Policy (SEPP) – Air Quality Management, (AQM).

Potential contaminated land impacts

The project is unlikely to produce a waste that will contaminate land. However, potential impacts may arise from planned earthworks which may disturb and mobilise existing contaminated soils. Mobilisation of contaminants could potentially occur via several transport media including the ingestion and dermal contact with contaminated soils, air inhalation of dust and/or vapours, lateral migration of dissolved contaminants in groundwater, surface water run-off and entry into stormwater drains in the event of spills; and/or odour emissions.

Landfilled areas exist beneath the proposed road alignment footprint located at the property known as Lot 2 Grange Road, Dingley Village. This will require appropriate investigation, design

and environmental management to minimise potential human health and environmental risks. In addition, there are several other former landfills or suspected landfills in the area, including the former Din San Landfill located at 370-418 Centre Dandenong Road, Dingley Village. Geotechnical and associated contaminated land investigations are currently being progressed in order to collect baseline data to evaluate and to better understand the potential risks.

Potential impacts to surface water and groundwater

The project has the potential to impact on the surface water regime and water quality during both construction and operation. The potential impacts include:

- changes to flooding conditions such as frequency and duration of flooding, increases to flood levels or flow velocities;
- reduction of floodplain storage or other changes to flow regimes leading to increases to peak flows or floodwater volumes; and
- discharge of polluted/turbid water.
- Potential impacts resulting from fuel/chemical spills

Detailed hydrologic and hydraulic modelling is currently being completed to define existing conditions and develop mitigation options.

The construction and operation of the project also has the potential to result in groundwater related impacts, including:

- a reduction in groundwater levels and/or change of aquifer flow characteristics, reducing water availability for existing groundwater users, groundwater dependent ecosystems and surface water
- the inflow of contaminated groundwater to working areas presenting Occupational Health and Safety concerns
- discharge of dewatered inflows to the environment (for saline, nutrient rich, and/or contaminated groundwater); and
- contamination because of accidental fuel and chemical spills through the operation and maintenance of vehicles and equipment.

The project will not involve deep excavations and groundwater impacts will be minimal and confined to the immediate vicinity of the construction site. The magnitude of groundwater drawdown will depend on the depth of the excavation compared to the water table and the lateral distance that the drawdown will extend. This will depend on the hydraulic properties of the soil and rock formation and the duration over which the dewatering occurs.

12. Native vegetation, flora and fauna

Native vegetation

Is any native vegetation likely to be cleared or otherwise affected by the project?

NYD No Yes If yes, answer the following questions and attach details.

What investigation of native vegetation in the project area has been done? (briefly describe)

Several reports have been prepared which investigate native vegetation either within or adjacent to the project. This referral draws primarily from the most recent reports including WSP (2017a; Attachment 5) and Biosis (2015). These reports include detailed field assessments and vegetation mapping. They specifically address the Mordialloc Bypass corridor and were utilised in support of this referral.

Refer to Attachment 5 (WSP. 2017a) for all relevant material pertaining to the characterisation of the project area and assessment of impacts. This report synthesises information from all other sources referred to below.

- WSP. 2017a. Preliminary flora and fauna impact assessment for Mordialloc Bypass. Prepared by WSP Australia Pty Ltd for VicRoads.

- WSP. 2017b. Outer Suburbs Arterial Roads Project (OSAR) – Qualitative Environmental Effects Statement (EES) Self-Assessment – Project Site 26 – Mordialloc Bypass.
- Brett Lane & Associates Pty. Ltd. 2016. Outer Suburban Arterial Road Program – Preliminary Biodiversity Assessment.
- Biosis. 2015. Mordialloc Bypass: Flora and Fauna Investigation Including Habitat Hectare Assessment.
- Biosis. 2013. Flora and Fauna Investigation: Northern Extension of the Mornington Peninsula Freeway.
- Biosis Research Pty. Ltd. 2008. Preliminary Ecological Assessment for 12 kilometres of proposed roadway between the South Gippsland Freeway and Warrigal Road.

The following investigation was also used to support the WSP investigation for the project:

- Australian Ecosystems. 2017. Establishment of Indigenous Flora and Fauna in Revegetated Areas at 'The Waterways'.

What is the maximum area of native vegetation that may need to be cleared?

NYD No Yes Estimated area6.17 ha(hectares)

It is anticipated that the construction footprint may result in a loss of approximately 6.17 ha of native vegetation. Of this, approximately 2.65 ha is in the Stage 1 area (north) and 3.51 ha in the Stage 2 area (south). This preliminary estimate of potential native vegetation impact is conservative and represents the probable maximum extent of native vegetation clearance.

The majority of native vegetation impacted in the Stage 1 area is comprised of scattered trees (1.55 ha of 2.65 ha) and the remaining 1.1 ha is comprised of small patches of lower condition vegetation. The Stage 2 area is dominated by higher quality wetland vegetation and threatened bird habitats.

How much of this clearing would be authorised under a Forest Management Plan or Fire Protection Plan?

N/A

No clearing would be authorised under these plans.

Which Ecological Vegetation Classes may be affected? (if not authorised as above)

NYD Preliminary/detailed assessment completed. If assessed, please list.

Biosis conducted detailed flora and fauna investigations and habitat hectare assessments for the project in 2015. Several properties were not able to be accessed at the time of that study and the project area has also changed, therefore WSP has conducted additional surveys of the project area in 2016 and 2017. The WSP study included habitat hectare assessments and applying wetland EVCs (as defined under the Index of Wetland Condition) to the vegetation in the project area.

Based on the latest vegetation assessments from March to May 2017, the project area supports 11.99 ha of native vegetation, including several scattered trees. This comprises 11 EVCs, most of which are considered 'endangered' within the Gippsland Plain Bioregion. The breakdown of areas (in hectares) of EVCs within the project area is provided in the table below.

Table 5: Breakdown of EVCs within the project area

Stage 1 – North of Governor Road				
EVC No.	EVC	EVC conservation status	Complete project area (ha)	Construction footprint (ha)
EVC 653	Aquatic Herbland	Endangered	0.40	0.10
EVC 308	Aquatic Sedgeland	Vulnerable	0.12	0.00
EVC 68	Creekline Grassy Woodland	Endangered	0.42	0.27
EVC 125	Plains Grassy Wetland	Endangered	0.63	0.41
EVC 55	Plains Grassy Woodland	Endangered	1.11	0.23
EVC 53	Swamp Scrub	Endangered	0.02	0.00
EVC 821	Tall Marsh	Endangered	0.34	0.10
Scattered tree – converted to area of 15m radius tree = 0.07ha per tree (DELWP 2015)				
EVC 68	Scattered Tree - Creekline Grassy Woodland	Endangered	0.07	0.07
EVC 3	Scattered Tree - Damp Sands Herb-rich Woodland	Vulnerable	0.49	0.49
EVC 55	Scattered Tree - Plains Grassy Woodland	Endangered	1.84	0.99
Total (ha)			5.45	2.65
Total (ha) subtract Vulnerable EVCs for EES Act criteria			4.83	2.16
Stage 2 – South of Governor Road				
EVC No.	EVC	EVC conservation status	Complete project area (ha)	Construction footprint (ha)
EVC 653	Aquatic herbland	Endangered	0.12	0.06
EVC 308	Aquatic Sedgeland	Vulnerable	0.19	0.08
EVC 125	Plains Grassy Wetland	Endangered	3.85	2.02
EVC 647	Plains Sedgy Wetland	Endangered	0.47	0.30
EVC 651	Plains Swampy Woodland	Endangered	0.04	0.03
EVC 132_62	South Gippsland Plains Grassland	Endangered	0.09	0.04
EVC 918	Submerged Aquatic Herbland	Endangered	0.53	0.25
EVC 53	Swamp Scrub	Endangered	0.85	0.51
EVC 821	Tall Marsh	Endangered	0.40	0.21
Total (ha)			6.54	3.51
Total (ha) subtract Vulnerable EVCs for EES Act criteria			6.35	3.43
Grand total			11.99	6.17
Grand total (ha) subtract Vulnerable EVCs for EES Act criteria †			11.18	5.59

† total figures calculated based on six decimal places, rounded to two decimal places

The preliminary flora and fauna impact assessment for Mordialloc Bypass (Attachment 5) also considers indirect effects on native vegetation such as changes to surface and groundwater, weed invasion, habitat fragmentation, shading and other impacts.

Have potential vegetation offsets been identified as yet?

NYD Yes If yes, please briefly describe.

VicRoads have commenced work on a native vegetation offset strategy and are working through the process to identify and secure offset sites.

In addition to managing the native vegetation offset process, VicRoads has also commenced a feasibility study into opportunities to create wetlands in proximity to the Mordialloc Bypass with the aim of:

- offsetting flooding areas lost to the proposed road
- integrating Water Sensitive Road Design
- offsetting native vegetation under the State's Permitted Clearing Guidelines 2013; and
- provision of open space and wetland amenity affected throughout Waterways.

Other information/comments? (e.g. accuracy of information)

Prior to undertaking additional ecological studies, WSP performed a gap analysis and assessment of technical reliability of reports undertaken by others. The WSP report and continuing studies of threatened species and ecological communities have focussed on filling information gaps and checking the robustness of previous work.

NYD = not yet determined

Flora and fauna

What investigations of flora and fauna in the project area have been done?

(provide overview here and attach details of method and results of any surveys for the project & describe their accuracy)

A number of reports have been prepared which investigate flora and fauna either within or adjacent to the project. The following assessments were completed specifically for the project.

Refer to Attachment 5 (WSP. 2017a) for all relevant material pertaining to the characterisation of the project area and assessment of impacts. This report synthesises information from all other sources referred to below.

- WSP. 2017a. Preliminary flora and fauna impact assessment for Mordialloc Bypass. Prepared by WSP Australia Pty Ltd for VicRoads.
- WSP. 2017b. Outer Suburbs Arterial Roads Project (OSAR) – Qualitative Environmental Effects Statement (EES) Self-Assessment – Project Site 26 – Mordialloc Bypass
- Brett Lane & Associates Pty. Ltd. 2016. Outer Suburban Arterial Road Program – Preliminary Biodiversity Assessment.
- Biosis. 2015. Mordialloc Bypass: Flora and Fauna Investigation Including Habitat Hectare Assessment.
- Biosis. 2013. Flora and Fauna Investigation: Northern Extension of the Mornington Peninsula Freeway.
- Biosis Research Pty. Ltd. 2008. Preliminary Ecological Assessment for 12 kilometres of proposed roadway between the South Gippsland Freeway and Warrigal Road.

Previous investigations commissioned by other organisations are listed below, and were used to support the WSP investigation for the project:

- Australian Ecosystems. 2016 Establishment of Indigenous Flora and Fauna in Revegetated Areas at 'The Waterways'.
- Birdlife Australia. 2016a. Melbourne Water – Regional Bird Monitoring Project.
- BirdLife International 2017. Important Bird Areas factsheet: Carrum Wetlands. Downloaded from <http://datazone.birdlife.org/site/factsheet/carrum-wetlands-iba-australia> on 16/05/2017)
- AECOM-GHD JV 2016. Edithvale & Bonbeach Groundwater Preliminary Impacts - Ecological Assessment. Report prepared by AECOM-GHD Joint Venture for the Level Crossing Removal Authority, Melbourne.
- AECOM-GHD JV 2017. Flora and Fauna Assessment – Rail Under Road. Edithvale & Bonbeach. Report prepared by AECOM-GHD Joint Venture for the Level Crossing Removal Authority, Melbourne.
- Ecology Australia. 2016. Edithvale-Seaford Wetlands Ramsar Site Management Plan
- Birdlife Australia. 2016b. Edithvale and Seaford Wetlands Bird Survey Project 2014-15.

Have any threatened or migratory species or listed communities been recorded from the local area?

NYD No Yes If yes, please:

List species/communities recorded in recent surveys and/or past observations.

Indicate which of these have been recorded from the project site or nearby.

A suite of threatened wetland birds and a range of other threatened fauna species have been recorded in the project area and nearby. A range of threatened flora species have also been re-established within the Waterways Wetlands. 3.69 ha of threatened wetland bird habitat occurs within the Stage 2 area with an additional 1.97 ha occurring within the Stage 1 area.

Two FFG Act threatened communities and two EPBC Act communities have been recorded within the project area. All vegetation that meets the definition of an FFG or EPBC community within the project area occurs only within the Stage 2 area (south of Governor Road).

Eight significant flora species have a moderate to high likelihood of occurrence within the project area, all of which have been planted within the Waterways wetlands. 46 significant fauna species have a moderate to high likelihood of occurrence within the project area, of which 26 are anticipated to have at least a moderate likelihood of impact, prior to mitigation (Tables 5 & 6).

Table 6: Flora species with a moderate or higher likelihood of impact

Common Name	Conservation Status			Count of Sightings, 5km buffer (VBA)	Likelihood of occurrence	Potential for Impact (prior to mitigation)
	EPBC Act	FFG Act	Victorian Advisory List			
Leafy Twig-sedge			Rare		High – Recorded, planted	Moderate
Pale Swamp Everlasting			Vulnerable	2	High – Recorded, planted	Moderate
Swamp Everlasting	Vulnerable	Listed	Vulnerable	1	High – Recorded, planted	Moderate
River Swamp Wallaby-grass	Vulnerable			2	Moderate - Planted	Moderate
Matted Flax-lily	Endangered	Listed	Endangered		Moderate - Planted	Moderate
Large River Buttercup			Poorly known	9	Moderate - Planted	Moderate
Lacey River Buttercup			Rare	1	Moderate - Planted	Moderate
Swamp Fireweed	Vulnerable		Vulnerable	0	Moderate - Planted	Moderate

Table 7: Fauna species with a moderate or higher likelihood of impact

Common Name	Conservation Status			Count of Sightings, 5km buffer (VBA)	Likelihood of Impact (prior to mitigation)
	EPBC Act	FFG	Victorian Advisory List		
Migratory, waterfowl and waterbirds					
Australasian Shoveler			Vulnerable	431	Moderate
Magpie Goose		Listed	Near threatened	144	Moderate
Eastern Great Egret		Listed	Vulnerable	215	Moderate
Hardhead			Vulnerable	367	Moderate
Musk Duck			Vulnerable	267	Moderate
Australasian Bittern	Endangered	Listed	Endangered	167	High
Sharp-tailed Sandpiper	Migratory				Moderate-High
Curlew Sandpiper	Critically endangered, Migratory	Listed	Endangered	73	Moderate
Pectoral Sandpiper	Migratory		Near threatened	41	Moderate
Red-necked Stint	Migratory				Moderate
Whiskered Tern			Near threatened	174	Moderate
White-winged Black Tern			Near threatened	22	Low – Moderate
Little Egret		Listed	Endangered	16	Low - Moderate
Latham's Snipe	Migratory		Near threatened	261	Moderate
Caspian Tern		Listed	Near threatened	47	Moderate
Little Bittern		Listed	Endangered	28	Moderate
Eastern Curlew	Critically Endangered, Migratory	Listed	Vulnerable	5	Low-moderate
Nankeen Night Heron			Near threatened	43	Moderate
Blue-billed Duck		Listed	Endangered	390	Moderate
Pied Cormorant			Near threatened	112	Moderate
Royal Spoonbill			Near threatened	240	Moderate
Glossy Ibis	Migratory		Near threatened	55	Moderate
Baillon's Crake		Listed	Vulnerable	88	Moderate
Freckled Duck		Listed	Endangered	22	Moderate
Wood Sandpiper	Migratory		Vulnerable	55	Low-moderate
Reptiles					
Eastern Snake-necked Turtle			Data deficient	10	Moderate
Glossy Grass Skink			Vulnerable	0	Moderate

Several EPBC Act and FFG Act listed vegetation communities were identified within the project area. These include:

- FFG Act threatened communities of:
 - Herb-rich Plains Grassy Wetland (West Gippsland) Community
 - Plains Grassland (South Gippsland) Community.
- EPBC Act communities of:
 - Natural Damp Grassland of the Victorian Coastal Plains
 - Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains.

If known, what threatening processes affecting these species or communities may be exacerbated by the project? (e.g. loss or fragmentation of habitats) Please describe briefly.

Waterways Wetlands provides high quality habitat for a range of waterbirds and is further enhanced by the close proximity of Edithvale-Seaford Wetlands and the Eastern Treatment Plant. Nineteen threatened or migratory Waterbirds have been assigned a high likelihood of occurrence within the project area, the majority of which have been recorded within the broader Waterways Wetlands complex.

The potential impacts to threatened species, including wetland birds, includes:

- the loss of vegetation and habitat, including the potential loss of habitat connectivity
- direct impacts during the construction phase
- road noise
- light pollution from artificial lighting and shading beneath bridge structures
- mortality and injury from motor vehicles.

Further details regarding potential impacts can be found in Attachment 5.

Are any threatened or migratory species, other species of conservation significance or listed communities potentially affected by the project?

NYD No Yes If yes, please:

List these species/communities:

Indicate which species or communities could be subject to a major or extensive impact (including the loss of a genetically important population of a species listed or nominated for listing). Comment on likelihood of effects and associated uncertainties, if practicable.

Up to several hectares of FFG Act threatened community; Herb-rich Plains Grassy Wetland (West Gippsland) Community and EPBC Act community Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains are likely to be removed (precise figures will be provided as design is refined).

A range of significant flora and fauna species have been assigned a moderate likelihood of impact prior to mitigation. Preliminary mitigation measures have been proposed in the attachment *Preliminary flora and fauna assessment for Mordialloc Bypass* (Attachment 5). Provided that a range of known mitigation measures to avoid and minimise impacts are explored and that detailed mitigation measures are planned and implemented, no significant impacts on significant flora or fauna species are anticipated.

Summary of significant impact assessments under the EPBC Act and FFG Act are provided in the two tables below, without and with mitigation.

Table 8: Summary of significant impact assessments under the EPBC Act without and with mitigation

MNES	Likelihood of a Significant impact (with no mitigation measures implemented)	Likelihood of a Significant impact (with mitigation measures implemented)	Conclusion on the likelihood of significant impacts
Ramsar Wetland – Edithvale-Seaford Wetlands	Low to moderate	Likely low, pending groundwater hydrological investigations	Significant impact unlikely provided appropriate avoidance, minimisation and mitigation is undertaken.
Migratory species – Sharp-tailed Sandpiper, Curlew Sandpiper, Pectoral Sandpiper, Red-necked Stint, Latham's Snipe, Eastern Curlew, Glossy Ibis and Wood Sandpiper	Moderate	Low	Unlikely significant impacts provided appropriate avoidance and mitigation undertaken
Australasian Bittern	Moderate-high	Low	Unlikely significant impacts provided appropriate avoidance and mitigation undertaken
Swamp Everlasting	Moderate	Low	Unlikely significant impacts provided appropriate avoidance and mitigation undertaken
River Swamp Wallaby-grass	Moderate	Low	Unlikely significant impacts provided appropriate avoidance and mitigation undertaken
Matted Flax-lily	Moderate	Low	Unlikely significant impacts provided appropriate avoidance and mitigation undertaken
Natural Damp Grassland of the Victorian Coastal Plains	Moderate	Low	Unlikely significant impacts provided appropriate avoidance and mitigation undertaken
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Moderate	Low	Unlikely significant impacts provided appropriate avoidance and mitigation undertaken

Table 9: Summary of impact assessment under the FFG Act and DELWP Advisory List species without and with mitigation

COMMON NAME	CONSERVATION STATUS			LIKELIHOOD OF HABITAT LOSS WITHOUT MITIGATION	LIKELIHOOD OF HABITAT LOSS WITH APPROPRIATE MITIGATION	RESIDUAL RISK IMPLICATIONS AND PERMIT REQUIREMENTS
	EPBC ACT	FFG	VICTORIAN ADVISORY LIST			
Migratory birds, waterfowl and other waterbirds						
Australasian Shoveler			Vulnerable	Moderate	Low	Approximately 0.75 ha habitat proposed for removal. Low impact expected. No permit required.
Magpie Goose		Listed	Near threatened	Moderate	Low	Approximately 0.09 ha habitat proposed for removal. Low impact expected. Permit required.
Eastern Great Egret		Listed	Vulnerable	Moderate	Low	Approximately 0.09 ha habitat proposed for removal. Low impact expected. Permit required.

Hardhead			Vulnerable	Moderate	Low	Approximately 0.75 ha habitat proposed for removal. Low impact expected. No permit required.
Musk Duck			Vulnerable	Moderate	Low	Approximately 0.75 ha habitat proposed for removal. Low impact expected. No permit required.
Australasian Bittern	Endangered	Listed	Endangered	High	Moderate	Approximately 4.90 ha habitat proposed for removal. Some impact expected. Permit required.
Curlew Sandpiper	Critically endangered, Migratory	Listed	Endangered	Moderate	Low	No primary habitat proposed to be removed. Negligible impact expected. No permit required
Pectoral Sandpiper	Migratory		Near threatened	Moderate	Low	No primary habitat proposed to be removed. Negligible impact expected. No permit required
Whiskered Tern			Near threatened	Moderate	Low	No primary habitat proposed to be removed. Negligible impact expected. No permit required
White-winged Black Tern			Near threatened	Low – Moderate	Low	No primary habitat proposed to be removed. Negligible impact expected. No permit required
Little Egret		Listed	Endangered	Low - Moderate	Low	Approximately 0.09 ha habitat proposed for removal. Low impact expected. Permit required.
Latham's Snipe	Migratory		Near threatened	Moderate	Low	Approximately 4.90 ha habitat proposed for removal. Some impact expected. Permit required.
Caspian Tern		Listed	Near threatened	Moderate	Low	No primary habitat proposed to be removed. Negligible impact expected. No permit required
Little Bittern		Listed	Endangered	Moderate-High	Moderate	Approximately 4.90 ha habitat proposed for removal. Some impact expected. Permit required.
Lewin's Rail		Listed	Vulnerable	Moderate-High	Moderate	Approximately 4.90 ha habitat proposed for removal. Some impact expected. Permit required.
Eastern Curlew	Critically Endangered, Migratory	Listed	Vulnerable	Low-moderate	Low	No habitat directly proposed for removal. Low impact expected. No permit required

Nankeen Night Heron			Near threatened	Moderate	Low	Some habitat may be lost however this is expected to be low. Habitat not mapped. No permit required
Blue-billed Duck		Listed	Endangered	Moderate	Low	Approximately 0.09 ha habitat proposed for removal. Low impact expected. Permit required.
Pied Cormorant			Near threatened	Moderate	Low	Negligible impact expected No permit required
Royal Spoonbill			Near threatened	Moderate	Low	Negligible impact expected No permit required
Glossy Ibis	Migratory		Near threatened	Moderate	Low	Negligible impact expected No permit required
Baillon's Crake		Listed	Vulnerable	Moderate	Low	Approximately 4.90 ha habitat proposed for removal. Some impact expected. Permit required.
Freckled Duck		Listed	Endangered	Moderate	Low	Approximately 0.09 ha habitat proposed for removal. Low impact expected. Permit required.
Wood Sandpiper	Migratory		Vulnerable	Low-moderate	Low	No primary habitat proposed to be removed. Negligible impact expected. No permit required
Reptiles						
Eastern Snake-necked Turtle			Data deficient	High	Moderate	Some residual impact may occur from road mortality however species likely to persist in the area. No permit required
Glossy Grass Skink			Vulnerable	Moderate	Moderate	Some residual impact may occur from habitat loss however species likely to persist in the area. No permit required
Flora						
Leafy Twig-sedge			Rare	High	Moderate	Planted in Waterways and recorded during survey. Some plants may be lost. No permit required
Pale Swamp Everlasting			Vulnerable	Moderate	Low	Planted in Waterways and recorded during survey outside of construction footprint. No permit required

Matted Flax-lily	Endangered	Listed	Endangered	Moderate	Low	Species was planted within Waterways however was not recorded in project area. No impact or habitat loss expected. Pre-clearing survey and relocation to mitigate any impacts. No permit required.
Lacey River Buttercup			Rare	Moderate	Low	Species was planted within Waterways however was not recorded in project area. No permit required.
Large River Buttercup			Poorly known	Moderate	Low	Species was planted within Waterways however was not recorded in project area. No permit required.
Swamp Everlasting	Vulnerable	Listed	Vulnerable	Moderate	Low	Recorded within project area (outside of construction footprint). Unlikely to be impacted by the Project. No impact or habitat loss expected. Pre-clearing survey and relocation to mitigate any impacts. No permit required.
Threatened Ecological Communities						
Herb-rich Plains Grassy Wetland (West Gippsland) Community		Listed		High	High	Some residual impact (2.22 ha) will occur. This is a small extent and considered low risk to the Project, provided the measures in Section 5 (in Attachment 5) are implemented. Permit required
Plains Grassland (South Gippsland) Community		Listed		High	High	Only 0.03 ha will be impacted. This is a small extent and considered low risk to the Project, provided the measures in Section 5 (in Attachment 5) are implemented. Permit required
<p>Is mitigation of potential effects on indigenous flora and fauna proposed? <input checked="" type="checkbox"/> NYD <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Yes If yes, please briefly describe.</p> <p>A number of mitigation measures have been proposed in the attachment <i>Preliminary flora and fauna assessment for Mordialloc Bypass</i> (Attachment 5) including:</p> <p>→ Preliminary measures to avoid and minimise impacts through design</p>						

- Minimising impacts to vegetation and habitat during construction
- Opportunities to offset wetland impacts in the surrounding area
- Minimise disruption to existing hydraulic and hydrogeology regimes
- Measures to avoid or reduce the negative impacts on wildlife movement and connectivity
- Specific measures to minimise damage to trees during construction
- Measures to minimise vehicle-wildlife collisions after road completion
- Measures to minimise noise, vibration and light from the operation of the road
- Measures to minimise visual impacts and disturbances.

Other information/comments? (e.g. accuracy of information)

13. Water environments

Will the project require significant volumes of fresh water (e.g. > 1 GI/yr)?

NYD No Yes If yes, indicate approximate volume and likely source.

Construction and operation of the project would not require significant volumes of fresh water.

Will the project discharge waste water or runoff to water environments?

NYD No Yes If yes, specify types of discharges and which environments.

The project will occur largely within the designated Braeside West and Mordialloc Creek Wetlands (also referred to as 'Waterways') catchment areas. Both these catchments contribute tributary runoff flow to the larger Mordialloc Creek drainage system.

During the construction phase, erosion from the project has the potential to contribute sediment loads to downstream areas. During operational phase, increases to impervious areas will increase the stormwater volumes and pollutant loads from the project area.

Clause 46 of the SEPP (Waters of Victoria) requires urban stormwater, which includes road runoff, provides for the protection of beneficial users and the demonstration of best practice. The best practice approach requires proposed road projects meet the best practice performance objectives and process outlined in *Urban Stormwater: Best Practice Environmental Management Guidelines*, Victorian Stormwater Committee (1999). To achieve this, increases to pollutant loads will be assessed and mitigated using Water Sensitive Road Design (WSRD) elements, such as swales, bio-retention systems, basins and wetlands, as part of the design phase.

The Acid Sulfate Soils Distribution Map (refer to Victorian Resources Online) has indicated the southern portion of the project site (south of Lower Dandenong Road) is within the Coastal Acid Sulfate Soils Area. The presence of acid sulphate soils (ASS) and the potential for associated contamination of water environments is unknown at this stage. Near-surface testing in low-lying areas has not identified any ASS, although further testing is required.

Are any waterways, wetlands, estuaries or marine environments likely to be affected?

NYD No Yes If yes, specify which water environments, answer the following questions and attach any relevant details.

The project area will support linear road infrastructure and is approximately 9 km in length. The project area crosses the following waterways and wetlands that may be affected by the project:

- Smythes Drain
- Mordialloc Creek Wetlands
- Dingley Drain
- Gartsides South Drainage Scheme open channel
- Braeside West Drainage Scheme open channel
- Old Dandenong Road Drain.

The majority of the project area south of Springvale Road (representing a small section of the alignment) drains to the Edithvale-Seaford Wetlands, which are located approximately 700 metres south-east of the project area.

The impacts will result in erosion and sediment discharge from the site during construction. These impacts will be short term for the construction period and will be managed in accordance with EPA Best Practice Guidelines for Construction to minimise the impacts.

Impacts from road operation will be managed via the implementation of Water Sensitive Road Design (WSRD).

A preliminary surface water impact assessment has been undertaken (refer Attachment 4). Detailed hydrologic and hydraulic modelling is currently being completed to define existing flood and drainage conditions, quantify the magnitude of impacts and develop mitigation options.

Are any of these water environments likely to support threatened or migratory species?

NYD No Yes If yes, specify which water environments.

The following water environments are likely to support threatened or migratory species:

- Smythes Drain
- Mordialloc Creek Wetlands
- Dingley Drain
- Gartsides South Drainage Scheme open channel
- Braeside West Drainage Scheme open channel
- Old Dandenong Road Drain.

Are any potentially affected wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'?

NYD No Yes If yes, please specify.

No listed Ramsar or Important Wetlands are located within the project area, as defined in Section 2 of this referral (Project location). The closest Ramsar Convention listed wetlands are the Edithvale-Seaford Wetlands, located approximately 700 m south-west of the project area on Springvale Road. These wetlands are the remnant of the Carrum Carrum Swamp, much of which has since been drained and altered. However, remaining areas of the former swamp, including the Edithvale-Seaford Wetlands, provides an important habitat for a variety of native flora and fauna, including migratory bird species.

Embankment structures placed on the existing land surface that are sufficient to load and compress shallow unconsolidated aquifer/s can induce changes in aquifer hydraulic conductivity..

The surface water impacts to the Edithvale-Seaford Wetlands are yet to be determined.

Could the project affect streamflows?

NYD No Yes If yes, briefly describe implications for streamflows.

The project crosses a number of drainage lines that could potentially be affected, including;

- Smythes Drain open channel – covered by LSIO
- Mordialloc Creek Wetlands – covered by LSIO
- Dingley Drain open channel – covered by LSIO
- Gartsides South Drainage Scheme open channel – covered by SBO
- Gartsides Drainage Scheme underground drainage – covered by SBO
- Braeside West Drainage Scheme open channel – covered by LSIO
- Old Dandenong Road Drain waterway – covered by SBO
- Gartsides North Drainage Scheme underground drainage – covered by SBO
- Gartsides North Drainage Scheme underground drainage– covered by SBO; and
- Old Dandenong Road Drain waterway.

Detailed hydrologic and hydraulic modelling is currently being completed to define existing flood and drainage conditions, quantify the magnitude of impacts and develop mitigation options. The water quality impact assessment will also include a normal flow regime impact assessment to assess impacts for non-flood flows.

Could regional groundwater resources be affected by the project?

NYD No Yes If yes, describe in what way.

A desktop hydrogeological assessment on the project has been undertaken (refer to Attachment 9). From this assessment, it is unlikely that regional groundwater resources will be affected by the project. Hydrological and hydrogeological assessments are currently being undertaken to determine pre-construction groundwater levels and groundwater quality. These assessments will help determine potential impacts of the Project on surrounding water environments.

Could environmental values (beneficial uses) of water environments be affected?

NYD No Yes If yes, identify waterways/water bodies and beneficial uses (as recognised by State Environment Protection Policies; SEPPs)

Environmental values (beneficial uses) of water environments have not been assessed in detail. Detailed hydrological and hydrogeological impact assessments will be undertaken to determine the potential impacts on beneficial uses.

Based on a high level identification of beneficial uses of surface water, as recognised by State Environment Protection Policy (Waters of Victoria), the Project is unlikely to impact beneficial uses assuming the implementation of Water Sensitive Road Design (WSRD) and flood mitigation measures.

Based on a high level identification of beneficial uses, as recognised by State Environment Protection Policy (Groundwaters of Victoria), the Project has the potential to impact the maintenance of ecosystems in the unlikely event that regional groundwater levels are affected.

Could aquatic, estuarine or marine ecosystems be affected by the project?

NYD No Yes If yes, describe in what way.

The Mordialloc Creek Wetlands aquatic ecosystem falls within the alignment of the project area.

Clearance of native aquatic vegetation will be required for the project, particularly through The Waterways, which surrounds Mordialloc Creek. There are also seasonal shallow wetlands through open pasture and mown areas from The Waterways to Governor Road, and to a lesser extent between Governor Road and Lower Dandenong Road.

Some of the native wetland vegetation proposed for removal includes the restored wetlands through The Waterways. This area generally has a high species-richness and low coverage of weeds. The vegetation condition is generally high. Impacts on wetland Threatened Vegetation Communities listed under the EPBC Act has been assessed using the significant impact criteria, and significant impacts are considered unlikely provided appropriate avoidance and mitigation is undertaken (see Section 12 above - *Summary of significant impact assessments under the EPBC Act without and with mitigation tables*).

Losses of aquatic vegetation and associated habitat may affect wetland and migratory bird species of Commonwealth and State conservation significance such as Lewin's Rail, Baillon's Crake, Wood Sandpiper, Common Sandpiper, Common Greenshank, Marsh Sandpiper, Curlew Sandpiper, Latham's Snipe, Australasian Bittern, and Australasian Shoveler. See Section 12 above for details on impacts on these species - *Summary of significant impact assessments under the EPBC Act without and with mitigation tables*).

Following targeted assessments by Biosis Research Pty Ltd (Biosis 2015) and Streamline Research Pty Ltd (McGuckin 2017), and confirmed by WSP 2017, impacts to aquatic species of conservation significance are not anticipated to be significant.

Hydrological and hydrogeological assessments are currently being undertaken to determine pre-construction groundwater levels and groundwater quality in order to assess potential impacts of the project on surrounding water environments.

Detailed design, construction methods and environmental management during construction, in accordance with the previously mentioned guidelines and a project specific CEMP, would avoid or minimise the likelihood of adverse impacts to waterways and flood/retention areas.

Is there a potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long-term?

NYD No Yes If yes, please describe. Comment on likelihood of effects and associated uncertainties, if practicable.

No estuarine or marine ecosystems intersect with the project area, however other aquatic ecosystems do fall within the alignment.

Long term effects to aquatic biodiversity are not anticipated. Minor impacts may be associated with noise pollution, light pollution, small areas of altered environment due to shade, loss of area due to supporting structures. Pollution from runoff is anticipated to be mitigated via WSRD.

A study (Biosis 2015) and assessment McGuckin (2017) have been undertaken pertaining to impacts to significant aquatic species.

Biosis Research (2015) undertook a targeted fish survey for dwarf galaxias and Yarra pygmy perch at six locations in the vicinity of the Mordialloc Bypass. The study encompassed waterbodies within Waterways, Mordialloc Creek and unnamed wetlands to the west of Braeside Park. Neither Dwarf Galaxias nor Yarra Pygmy Perch were found to occur along the alignment. In addition to this study, Streamline Research has undertaken extensive sampling for Melbourne Water throughout the length of the Mordialloc Bypass over the past decade. In none of the numerous investigations were the Dwarf Galaxias or Yarra Pygmy Perch captured (McGuckin 2017).

There is the potential for embankment structures to induce long-term changes in aquifer hydraulic conductivity and, as a result, groundwater flow may be restricted or diverted from terrestrial aquatic ecosystems.

Is mitigation of potential effects on water environments proposed?

NYD No Yes If yes, please briefly describe.

Groundwater

Groundwater observation bores are being installed at the project area to monitor groundwater levels and determine if embankment structures proposed are sufficient to load and compress shallow unconsolidated aquifers and impact on water environments.

In the case that major long-term effects on groundwater environments are observed (however unlikely), the magnitude of impacts would be estimated using analytical methods and 'make-good' provisions applied by providing alternative water supplies to artificially recharge affected areas.

Surface water

Mitigation of potential effects on water environments will be required for surface water (flood and water quality impacts). These mitigation measures will be input into the design-phase considerations.

Section 12 details offsets and construction of new wetlands associated with mitigation of potential effects on indigenous flora and fauna. VicRoads has commenced a feasibility study to create wetlands in proximity to the Mordialloc Bypass associated with offsetting flooding areas.

Erosion and the minimisation of sediment loads and discharge from the project will comply with Clause 56 of the State Environment Protection Policy (SEPP) (Waters of Victoria) requires construction works be managed to minimise land disturbance, soil erosion and the discharge of sediment and other pollutants to surface waters. To achieve this, construction works should be consistent with guidance in the EPA's publications *Construction Techniques for Sediment Pollution Control* (1991) and *Environmental Guidelines for Major Construction Sites* (1996) and EPA publication 960, *Doing it right on subdivisions* (2004).

Stormwater pollutant loads will be addressed in accordance with Clause 46 of the SEPP (Waters of Victoria) for the management of urban stormwater, which includes road runoff, for the protection of beneficial users and the demonstration of best practice. The best practice approach requires proposed road projects meet the best practice performance objectives and process

outlined in *Urban Stormwater: Best Practice Environmental Management Guidelines, Victorian Stormwater Committee* (1999). To achieve this, increases to pollutant loads will be assessed and mitigated using Water Sensitive Road Design (WSRD) elements, such as swales, bio-retention systems, basins and wetlands, as part of the design phase.

Aquatic ecology

Mitigation, corrective action and contingency measures to protect waterway habitat may include:

- Use of controls to manage erosion and sedimentation in line with the Victoria EPA Principles of Best Practice Guidelines (including Environmental Guidelines for Major Construction Sites (1996) and Construction Techniques for Sediment Pollution Control (1991)) and EPA publication 960, *Doing it right on subdivisions* (2004).
- Formulation of a contingency plan to manage any spills, including the containment, treatment and disposal.
- Appropriate fuel management, including refuelling of vehicles and other machinery at least 10 m from waterway drainage areas, and storage of fuel in accordance with EPA bunding Guideline (Publication 347) at least 10 m away from drainage and waterways.
- Communication of importance of ecological values, mitigation measures and how to report accidents concerning watercourses to construction personnel. If an incident occurs, the effect to the aquatic ecosystem will be determined through monitoring by an aquatic biologist. This will consist of an aquatic survey (if necessary) and sampling.

Other information/comments? (e.g. accuracy of information)

14. Landscape and soils

Landscape

Has a preliminary landscape assessment been prepared?

No Yes If yes, please attach.

The review of the reference design and alignment indicates that existing vegetation and wetlands will be cleared as a result of the construction, but that landforms will only be minimally affected (refer to Attachment 10).

The existing views will be impacted in Stage 2 (predominately); in the proximity of the elevated structures over the Waterways Estate and Springvale Road.

Braeside Park is an iconic landscape feature that may be adversely affected in terms of direct landscape effects (vegetation removal) and by changes to views and visual quality for park users.

Is the project to be located either within or near an area that is:

- **Subject to a Landscape Significance Overlay or Environmental Significance Overlay?**
 NYD No Yes If yes, provide plan showing footprint relative to overlay.
- **Identified as of regional or State significance in a reputable study of landscape values?**
 NYD No Yes If yes, please specify.
- **Within or adjoining land reserved under the *National Parks Act 1975* ?**
 NYD No Yes If yes, please specify.
- **Within or adjoining other public land used for conservation or recreational purposes?**
 NYD No Yes If yes, please specify.

A section of the proposed Mordialloc Bypass alignment is adjacent to Braeside Park, a 295 hectare recreational reserve managed by Parks Victoria. A small area of Braeside Park will need to be excised to allow for the project. The alignment of the Mordialloc Bypass will have a minimal impact on the landscape quality of Braeside Park as the works will be located alongside the western edge and allow for landscape mitigation works to maintain the quality of the park and recreational experience into the future.

The proposed Mordialloc Bypass will also pass through the Waterways Wetlands, currently used by the community for recreational purposes. The roadway in this area is proposed to bridge over the wetlands and Mordialloc Creek. The alignment of the Mordialloc Bypass will impact the wetland areas as the elevated roadway will create shaded zones (the extent will need to be determined) requiring direct landscape mitigation to the wetlands and creek but will maintain the vehicle, pedestrian and recreational access for the community as well as providing further connectivity to the trails and shared paths of Braeside Park.

Is any clearing vegetation or alteration of landforms likely to affect landscape values?

NYD No Yes If yes, please briefly describe.

Vegetation will be cleared as a result of the construction. Landforms are likely to be only minimally affected.

Is there a potential for effects on landscape values of regional or State importance?

NYD No Yes Please briefly explain response.

Existing landscape features are of local significance only. There are no Significant Landscape Overlays or similar designated significance areas.

Is mitigation of potential landscape effects proposed?

NYD No Yes If yes, please briefly describe.

A landscape concept plan will be prepared. The mitigation strategy could include direct mitigation of the effects of the alignment where they occur (planting and additional wetland areas), as well as landscape and environmental rehabilitation works that offset effects by upgrading other places that benefit the open space network as a whole.

The areas within the northern section of the corridor are likely to be substantially mitigated through planting.

The areas within the middle (Braeside Park) section of the corridor are likely to be substantially mitigated with planting and implementation of SUP connections and grade separated pedestrian and cycling bridge to further enhance the recreational opportunities for the community.

The areas to the south (Waterways Wetlands) where the carriageway is elevated over the wetlands may require a combination of screen planting close to the view source and offset wetland planting for the areas affected. The elevated roadway structure allows for the development of additional connectivity with the trails and recreational opportunities to Braeside Park and Dingley village to the north.

Other information/comments? (e.g. accuracy of information)

Soils

Is there a potential for effects on land stability, acid sulphate soils or highly erodible soils?

NYD No Yes If yes, please briefly describe.

The Acid Sulfate Soils Distribution Map (see Victorian Resources Online) has indicated the southern portion of the project site (south of Lower Dandenong Road) is within the Coastal Acid Sulfate Soils Area. Also, the land elevation south of Lower Dandenong Road ranges from approximately 1m to 9m AHD (Australian Height Datum). Section 5.2.2 of Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulfate Soils ('the CASS Guidelines') states "land or soil at elevations less than 10m AHD" is a geomorphic indicator for CASS.

Near-surface testing in low-lying areas has so far not identified any Acid Sulfate Soils. Additional investigations are required to determine the existence of, and if present, the extent of Acid Sulfate Soils (in accordance with the CASS Guidelines).

Possible land stability issues exist through the wetland area with their soft soils. There are also land stability concerns in the northern section of the alignment, through a historic landfill south of

the Dingley Bypass. Potential for soil erosion also exists in areas where stability issues are identified. Geotechnical fieldwork is underway, with the results aiming to inform the engineering design and environmental risks.

Are there geotechnical hazards that may either affect the project or be affected by it?

NYD No Yes If yes, please briefly describe.

Geotechnical fieldwork is underway for the project to provide information on underlying geology and potential landfill material.

Other information/comments? (e.g. accuracy of information)

A preliminary desktop investigation was undertaken to determine historic land uses and the existence (or potential for) contaminated land within the project area (refer Attachment 3). From the investigation it appears the project area was predominantly used for farming until the 1960s and 1970s. The project area and the surrounding land were then progressively developed into commercial and industrial uses within the northern section. The central and southern sections were developed for waterway and drainage systems. Most commercial activities undertaken in the northern section of the project area comprised of quarrying and landfilling. From the 1970s to the present day, the surrounding land was further developed and currently comprises a mixture of commercial and industrial facilities, residential properties, agricultural activities (including commercial nurseries), open space and recreational uses; and roads.

Potentially nearby (historical and current) contaminating land activities were identified during the desktop study (refer to Attachment 3). This included:

- former landfill(s) and filled in sand quarries located within the northern portion of the project area, refer Appendix B in Attachment 3
- waste recycling facilities located within 150 m of the site, within the northern portion of the project area. Service stations located within 150 m of the project area
- chemical handling and/or manufacturing companies located within 150 m of the project area
- agricultural land uses, including cropping, grazing and nurseries
- fill material that may have been imported during the backfilling of former landfills and sand quarries located within the footprint of the proposed road design
- fill material used for any raising of land that occurred in the general area, due to extensive historical sand quarrying activities.

From the identified potentially contaminating activities, it is considered that the key contaminants of concern derived from current and/or historical uses located along the proposed Mordialloc Bypass (project area) or in the vicinity of the project area are:

- landfill gases (including methane, carbon dioxide, nitrogen and hydrogen sulfide) and leachate (including, volatile organic compounds (VOC)s, cyanide, nitrates, ammonia, sulphates/sulphides, metals, organic acids, E-coli and other bacteria)
- petroleum hydrocarbons (total petroleum hydrocarbons (TPHs), monocyclic aromatic hydrocarbons (MAHs), benzene, toluene, ethylbenzene, xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs))
- pesticides and herbicides (organochlorine pesticides (OCPs)/organophosphate pesticides (OPP)s)
- metals and metalloids
- Asbestos Cement Material (ACM).

15. Social environments

Is the project likely to generate significant volumes of road traffic, during construction or operation?

NYD No Yes If yes, provide estimate of traffic volume(s) if practicable.

Road traffic conditions are likely to be impacted during construction of the project, due to changes in local movements and access for construction.

At the operational stage, the outcomes of this project are expected to result in positive changes to traffic flow, congestion issues and road traffic conditions.

On opening the bypass is expected to carry in the order of 45,000 to 50,000 vehicles per day at its busiest southern end, with use of the bypass expected to increase further into the future with population growth and land use changes.

Is there a potential for significant effects on the amenity of residents, due to emissions of dust or odours or changes in visual, noise or traffic conditions?

NYD No Yes If yes, briefly describe the nature of the changes in amenity conditions and the possible areas affected.

There is potential for dust and noise emissions, as well as vibration during the construction of the project. It is anticipated that construction activities may increase noise levels within and surrounding the construction corridor and this may affect residences close to the corridor.

During construction, there may be potential temporary and localised dust impacts to air quality typically associated with construction and the removal, storage and transport of excavated material. These impacts are unlikely and furthermore low-risk, as construction is a short-lived and temporary phase of the project. As such, this will cause limited impacts to nearby sensitive receptors.

The operation phase is unlikely to result in nuisance dust and odour issues. Preliminary air quality screening assessments predicted PM₁₀ (particulate matter) concentrations will not exceed the Intervention Levels specified in the State Environment Protection Policy (SEPP) – Air Quality Management, (AQM).

The landscape through which the road alignment travels is likely to have a relatively high Visual Absorption Capability (VAC factors including but not limited to land composition, land use (residential, industrial etc.), topography, vegetation cover and tree canopy) and therefore the effects of the road development are likely to be low to moderate. The exception to this is in Stage 2, where the elevated carriageway and wetland landscape type will expose the road corridor to expansive views from relatively sensitive view locations (residential). In this setting, the effects of the visual change are likely to be moderate to high.

Impacts on wetlands where elevated structures are used are likely to result in a more significant impact on landscape and scenic quality values than areas affected by tree clearance. Changes may affect landscape values in terms of tree clearances, exposure of previously screened views, changes to wetland areas and changes to drainage patterns that may support nearby ecological systems (off site impacts).

Is there a potential for exposure of a human community to health or safety hazards, due to emissions to air or water or noise or chemical hazards or associated transport?

NYD No Yes If yes, briefly describe the hazards and possible implications.

It is understood that the property located at Lot 2, Grange Road, Dingley Village, Victoria (currently occupied by Enviromix Pty Ltd) was formerly a sand quarry that was progressively landfilled during the early 1960s with both liquid and solid industrial waste. Geotechnical investigations conducted within the project area on 11th May 2017 identified landfill gases including methane and carbon dioxide, during the drilling of a geotechnical bore. The bore was subsequently grouted to seal any potential leaks and/or venting of landfill gases to the atmosphere. Further intrusive investigations will be undertaken within the former landfilled area (northern section of project area) to evaluate potential human health risks and/or safety hazards.

There is a potential of amenity impacts from the operation of the road as well as the construction of the project. The VicRoads Traffic Noise Reduction Policy 2005 (VicRoads TNRP) would be considered in relation to operational noise impacts along the bypass alignment. A range of noise mitigation measures may be utilised to comply with relevant noise criteria outlined in the policy.

It is unlikely the operation of the project would result in significant air quality issues. Air quality screening assessments indicate predicted NO₂ and PM₁₀ concentrations will not exceed

Intervention Levels specified in the State Environment Protection Policy – Air Quality Management, (SEPP (AQM)).

Is there a potential for displacement of residences or severance of residential access to community resources due to the proposed development?

NYD No Yes If yes, briefly describe potential effects.

A preliminary review of social factors has been carried out for this project. No displacement of residences has been identified.

Land within the project area is predominantly owned by VicRoads, Melbourne Water and the Department of Environment, Land, Water and Planning (DELWP). A small number of parcels are under private ownership.

There are two non-residential dwellings impacted by the proposed alignment, one is a derelict dwelling associated with a business that is not currently trading. The other is on VicRoads land managed by Parks Victoria and is used as an office for Braeside Park staff.

The project may temporarily alter local movement, access and connectivity to, and between, residential communities within the project area during construction. However, these impacts are expected to be localised to where the proposed alignment intersects with the existing road network. Further investigation as part of a detailed social impact assessment will consider the potential for severance of residential access to community resources with reference to a more detailed project design and construction program. There are opportunities to mitigate potential severance impacts to existing roads through construction methodology.

Are non-residential land use activities likely to be displaced as a result of the project?

NYD No Yes If yes, briefly describe the likely effects.

The proposed alignment predominantly passes through land owned by VicRoads, Melbourne Water and the Department of Environment, Land, Water and Planning (DELWP). VicRoads land is variably tenanted for a mixture of uses including a commercial nursery and materials recycling facility. There are also areas of VicRoads land which is currently vacant.

There are a small number of privately owned lots with non-residential uses within the project area which include paddocks used for cattle grazing, commercial and industrial uses. A public acquisition overlay currently applies to these properties. The extent of impact to these private lots has not yet been determined.

Do any expected changes in non-residential land use activities have a potential to cause adverse effects on local residents/communities, social groups or industries?

NYD No Yes If yes, briefly describe the potential effects.

A preliminary review of social factors identified potential effects resulting from altered local access networks during construction to communities vulnerable to change, potential temporary reduction of access to open space resources and potential reduction in existing levels of local amenity.

In addition, opportunities to enhance connectivity and support achievement of state and municipal policy objectives where identified. These include enhanced cycle networks and new or improved infrastructure to improve local accessibility and connectivity.

The project area includes significant open space resources that are of value to local and regional communities, including Braeside Park which adjoins the bypass reserve. At present, it is not anticipated that the construction or operational phases of the project will occupy or significantly impact the use of these areas.

It must be noted that this preliminary review considers potential for change but is unable to determine extent of impact at this stage. A detailed social impact assessment, considering a detailed construction program, will include an assessment of extent of potential impacts and mitigation measures relating to public open space and community facilities.

Is mitigation of potential social effects proposed?

NYD No Yes If yes, please briefly describe.

Dust and noise impacts would be managed in accordance with relevant EPA guidelines:

- EPA publication 480 (*Environmental Guidelines for Major Construction Sites*), and
- EPA publication 1254 (*Noise Control Guidelines*).

The VicRoads Traffic Noise Reduction Policy 2005 (VicRoads TNRP) would also be considered in relation to operational noise impacts along the alignment. A range of noise mitigation measures may be utilised (for example, noise barriers, earth berms, low noise surface treatments) to comply with relevant noise criteria outlined in the policy.

Dust mitigation measures will be implemented to avoid, minimise dust impacts during construction. Air quality monitoring will be undertaken to ensure the effectiveness of site management.

Landscape and visual mitigation measures being investigated include possible additional wetland creation, screening of industrial buildings and linking of existing fragmented landscape systems. Landscaping treatments will be developed in consultation with the surrounding community and other relevant stakeholders.

A stakeholder engagement plan is currently being implemented by VicRoads. The plan contains an action plan with engagement activities with a range of stakeholders planned out to early 2018 (refer to Attachment 11). The plan is a live document and will be continually reviewed and updated as the project progresses.

Options for maximising social benefits and minimising potential social risks have been considered. Further identification of mitigation measures for potential social impacts will be considered as part of a detailed social impact assessment.

Other information/comments? (e.g. accuracy of information)

The preliminary review of social factors draws on publicly available Australian Bureau of Statistics datasets from the 2011 Census of Population and Housing. The release of 2016 census data is anticipated in late 2017.

Cultural heritage**Have relevant Indigenous organisations been consulted on the occurrence of Aboriginal cultural heritage within the project area?**

No If no, list any organisations that it is proposed to consult.
 Yes If yes, list the organisations so far consulted.

Consultations have occurred with Aboriginal Victoria, Bunurong, Boon Wurrung and Wurundjeri Traditional Owner Groups.

What investigations of cultural heritage in the project area have been done?

(attach details of method and results of any surveys for the project & describe their accuracy)

A Notice of Intent to prepare a CHMP has recently been lodged and desktop study has commenced. Field surveys have not yet commenced; therefore, no further information can be provided at this stage.

There have been three cultural heritage surveys and five CHMPs completed which have crossed the project area. No Aboriginal cultural heritage was located within the current project area during these investigations.

Is any Aboriginal cultural heritage known from the project area?

NYD No Yes If yes, briefly describe:

- Any sites listed on the AAV Site Register
- Sites or areas of sensitivity recorded in recent surveys from the project site or nearby

- Sites or areas of sensitivity identified by representatives of Indigenous organisations

There are no previously Registered Aboriginal cultural heritage places located within the project area. CHMPs nearby have identified sandy rises and sand dunes as areas of sensitivity (see Attachment 8) therefore, there is potential for Aboriginal cultural heritage places to be present within the project area at sandy rises and sand dunes.

Are there any cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within the project area?

NYD No Yes If yes, please list.

No Victorian Heritage Inventory or Victorian Heritage Register places are located within the project area.

Is mitigation of potential cultural heritage effects proposed?

NYD No Yes If yes, please briefly describe.

Review of detailed plans will be completed to investigate the impact of the works on any potential historic places.

Other information/comments? (e.g. accuracy of information)

16. Energy, wastes & greenhouse gas emissions

What are the main sources of energy that the project facility would consume/generate?

- Electricity network. If possible, estimate power requirement/outputsee below.....
 - Natural gas network. If possible, estimate gas requirement/output
 - Generated on-site. If possible, estimate power capacity/output
 - Other. Please describe. Diesel fuel – see below
- Please add any relevant additional information.

Construction phase

Based on a similar scale project utilising construction equipment operating 6 days per week over a 30 month construction phase program the use of diesel fuel in construction equipment has been estimated by considering key elements of the construction project), and utilising default quantity factors sourced from the Greenhouse Gas Assessment Workbook for Road Projects (TAGG 2011).

For vegetation clearance, it has been assumed that, on average 80% of the vegetation cleared will be grassland, and 20% will be high shrubs and medium dense trees as defined in TAGG (2011).

Since actual data is not available on the type, number and fuel efficiency of the vehicles to be used to transport materials and people around the construction sites, a default quantity factor has been used, as provided by TAGG (2011), as a basis for extrapolation.

Grid connect construction equipment electricity consumption is based on a maximum demand requirements for major equipment (gantry crane, water treatment, precast, pumps, compressors, site and construction office) with a diversity of 30% applied.

- Electricity Consumption (construction phase) – ~900,000kWh –
- Diesel fuel – construction equipment, spoil transportation and site transportation - ~110,000kL.

Operational Phase

Operational phase electricity is considered for lighting of bypass only. Lighting energy has been modelled as LED type operating 12 hours per day per annum

Electricity Consumption (operation phase) – ~150,000kWh

What are the main forms of waste that would be generated by the project facility?

- Wastewater. Describe briefly.
- Solid chemical wastes. Describe briefly.
- Excavated material. Describe briefly.
- Other. Describe briefly.

Please provide relevant further information, including proposed management of wastes.

Wastewater from rainwater runoff or dewatering activities may be generated during construction. Wastewater would be managed in accordance with the *Environment Protection Act 1970* (EP Act) to ensure that the site is managed to minimise discharge of turbid water in the first instance and to ensure that ponded water is only discharged to drainage or a watercourse if it complies with the EP Act and the associated subordinate documents requirements, i.e. SEPP (WOV) and EPA guidelines.

Waste in the form of excavated material may be generated by the project, however the final volume cannot be determined until project investigations and designs are completed. Excavated material will generally be used on site where possible.

What level of greenhouse gas emissions is expected to result directly from operation of the project facility?

- Less than 50,000 tonnes of CO₂ equivalent per annum
- Between 50,000 and 100,000 tonnes of CO₂ equivalent per annum
- Between 100,000 and 200,000 tonnes of CO₂ equivalent per annum
- More than 200,000 tonnes of CO₂ equivalent per annum

Please add any relevant additional information, including any identified mitigation options.

Indicative GHG emissions for the road have been calculated at 18,350 tonnes CO₂ (2021 daily peak) and 19,800 tonnes CO₂ (2031 daily peak) per year, although these emissions are expected to be lower than if the vehicles utilised existing roads in the area.

Calculations are based on 2021 and 2031 modelled traffic data using the Victorian Integrated Transport Model (VITM) estimated traffic projections, traffic forecasts, average fuel economy of 1.3L per 10km trip (ABS 2014) and the National Greenhouse Accounts Factors (DoE 2015 p. 16) of approximately 35 GJ/kL (energy content factor for petrol) and approximately 70 kg CO₂/GJ (emission factor for CO₂).

17. Other environmental issues

Are there any other environmental issues arising from the proposed project?

- No Yes If yes, briefly describe.

18. Environmental management

What measures are currently proposed to avoid, minimise or manage the main potential adverse environmental effects? (if not already described above)

- Siting: Please describe briefly

The road will be constructed within the existing road reserve. The exact route will be determined via the design process described briefly below.

- Design: Please describe briefly

Detailed designs are yet to be developed, however a range of economic, community, environmental and social considerations will be part of the design processes to avoid and

minimise adverse effects. Design optimisation would be informed by the results of a range of site specific investigations. To minimise environmental effects, detailed design will consider the following:

- avoidance/minimisation of impacts on significant native vegetation and fauna habitat
- noise mitigation and attenuation measures
- landscape and urban design measures
- water sensitive road design.

Environmental management: Please describe briefly.

Environmental Management Overview

VicRoads has a well-established environmental management system for managing the potential environmental impacts of major road projects. VicRoads aims to achieve a high standard of environmental performance through a strong organisational commitment to the protection of the environment, supported by a systematic approach and a process of continual improvement.

The details of the systems and processes for management of environmental issues are described in VicRoads Environmental Risk Management Guidelines (2012). VicRoads approach to environmental management is modelled on the ISO 14001 Environmental Management System (EMS). The VicRoads EMS specifies environmental management processes for construction, operation and maintenance of the road network managed by VicRoads. Key components of the system for the delivery of a construction contract are:

- VicRoads Project Environment Protection Strategy (PEPS)
- VicRoads contract specification
- Contractor's Construction Environmental Management Plan (CEMP)
- Monitoring, surveillance and auditing of contractor activities.

Further details for each of these are provided below.

VicRoads Project Environment Protection Strategy

The Project Environment Protection Strategy (PEPS) is prepared prior to any construction works being undertaken for the project. The PEPS seeks to document all environmental requirements and its key objectives are to:

- guide the project team in the design and construction phases of the project
- protect the environment during construction and operation
- enhance, where possible, the environment in the immediate vicinity of the project.

The PEPS consolidates VicRoads procedures and responses to specific environmental issues into one document to identify:

- environmental performance objectives
- key roles and responsibilities
- environmental issues specific to the detailed design, construction and operation of the project
- potential impacts on the environment and proposed measures and objectives for minimising or avoiding these impacts through design, construction and operation
- processes for identifying further issues and protection actions throughout design and construction, involving for example, risk assessment reviews, auditing and surveillance
- conditions of planning and environmental approvals to be met during project implementation.

VicRoads Contract Specification

VicRoads standard environmental clauses provided in Contract Specifications have been developed from best industry practice, legislative requirements and VicRoads knowledge gained through the delivery of road projects. Clauses address the management requirements for all elements of the environment including water quality, air quality, biodiversity (flora and fauna), community (for the impacts of noise and vibration) and Cultural Heritage. The standard contractual requirements are further customised to ensure that all environmental commitments, risks and objectives specific to the project (as identified in the PEPS) are adequately addressed by the environmental clauses.

Contractor's Environmental Management Plan

The contractor is required to prepare, implement and maintain an Environmental Management Plan (EMP) that will meet the requirements of the Contract Specification and VicRoads PEPS. A review of the EMP will ensure that it contains adequate controls/processes to avoid and/or mitigate environmental impacts associated with construction activities and complies with the requirements of the Contract Specification. The EMP would include:

- an outline of the regulatory framework, including a list of required approvals
- identification of environmental conditions and issues, particularly where there are sensitive areas
- identification of the environmental risks to be managed and the management measures and methodologies to be taken to meet the project delivery standards
- contingency measures to be adopted if significant environmental risks are either identified through the risk assessment process or otherwise encountered during the project
- management measures to meet the performance objectives specified in the Contract Specification.

Monitoring, surveillance and auditing of contractor activities

Contractors are required to undertake monitoring and audits for construction activities, including works undertaken by subcontractors employed on their behalf to verify compliance with the contract Specification and their Environmental Management Plan. In addition to the contractor auditing and monitoring of the works, VicRoads also conducts its own surveillance and auditing to assess the contractor's compliance with the EMP and the requirements of the Contract Specifications through:

- observation of project activities on a day-to-day basis
- periodic risk based surveillance of the effectiveness of environmental controls and processes implemented on site
- audit of the implementation and effectiveness of the EMP and the effectiveness of the controls and processes implemented on site.

Other: Please describe briefly

VicRoads has an internal climate change adaptation strategy, lighting guidelines, emissions guidelines and other policies that address project sustainability.

19. Other activities

Are there any other activities in the vicinity of the proposed project that have a potential for cumulative effects?

NYD No Yes If yes, briefly describe.

20. Investigation program

Study program

Have any environmental studies not referred to above been conducted for the project?

No Yes If yes, please list here and attach if relevant.

Has a program for future environmental studies been developed?

No Yes If yes, briefly describe.

Specialists will be engaged to undertake the necessary investigations to inform design and obtain statutory approvals. Investigations continue to be developed to inform environmental obligations and approvals. It is currently anticipated that the following investigations may be required:

- Continuing flora and fauna studies

- Hydrological and hydraulic assessments
- Social impact assessment
- Visual impact assessment
- Contaminated land investigations and reporting
- Groundwater monitoring
- Noise and vibration monitoring
- Specialist wetland assessment.

Consultation program

Has a consultation program conducted to date for the project?

No Yes If yes, outline the consultation activities and the stakeholder groups or organisations consulted.

Consultation activities also occurred in 2012 during project feasibility and the current consultation program builds upon that work.

Since the public announcement of the project in May 2017, consultation has commenced with local councils, government departments and community groups. Consultation activities are continuing, as described below.

Has a program for future consultation been developed?

NYD No Yes If yes, briefly describe.

A stakeholder engagement plan is currently being implemented by VicRoads and its project advisors. The plan contains an action plan with engagement activities with a range of stakeholders planned out to early 2018 (see Attachment 11). VicRoads will use a mix of face-to-face communications, printed collateral, external media and digital media to engage with key stakeholders and the broader community. The plan is a live document and will be continually updated.

Attachments:

- Attachment 1 - Project area (with coordinate points)**
- Attachment 2 – Project area in relation to surrounding land uses**
- Attachment 3 - Phase 1 preliminary contaminated land assessment**
- Attachment 4 - Preliminary surface water impact assessment**
- Attachment 5 - Preliminary flora and fauna impact assessment**
- Attachment 6 – Planning Map - Overlays**
- Attachment 7 – Planning Map – Zones**
- Attachment 8 – Areas of cultural heritage sensitivity map**
- Attachment 9 - Preliminary groundwater impact assessment**
- Attachment 10 - Preliminary landscape and visual impact assessment**
- Attachment 11 – Engagement Action Plan**

Authorised person for proponent:

I, CHARLIE BROADHURST.....(full name),

VICROADS PROJECT DIRECTOR - SOUTHEAST.....(position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature _____

Date 21.07.2017

Person who prepared this referral:

I, Philippa Forge(full name),

Principal Environmental Scientist(position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature _____

21/07/2017 Date