



Significant Impact Assessment

Ramsar sites

Western Port Ramsar wetland

The project is not considered likely to have a significant impact on the ecological character of the Western Port Ramsar site for the following reasons:

Horizontal directional drilling (HDD) will be employed from approximately KP3.9 to KP4.4 and KP18.6 to KP19.5 so that surface disturbance of the Western Port Ramsar site is entirely avoided. As such there is no plausible risk that the project will cause areas of the wetland to be destroyed or substantially modified.

No substantial and measurable change to the hydrological regime of the Western Port Ramsar site is expected to occur as a result of the project. The movement of water through the Western Port Ramsar site is dominated by semi-diurnal tides, and neither evaporation nor freshwater inputs are sufficient to affect flushing or to generate strong or persistent estuarine circulation patterns (Lee 2011). There is no plausible risk that the project will cause a substantial or measurable change to tidal patterns which dominate the hydrological regime of the Western Port Ramsar site.

The project is considered unlikely to seriously affect the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the Western Port Ramsar site. The ecological character description addendum for the Western Port Ramsar site (Hale 2016) identifies six species of waterbirds for which the wetland regularly supports greater than 1% of the global population. These species, which are listed below, are comprised of three non-breeding spring-summer visiting shorebirds, an oystercatcher, a tern and a gull.

- Australian fairy tern *Sternula nereis*
- Australian pied oystercatcher *Haematopus longirostris*
- Curlew sandpiper *Calidris ferruginea*
- Eastern curlew *Numenius madagascariensis*
- Pacific gull *Larus pacificus*
- Red-necked stint *Calidris ruficollis*

Important habitat for migratory and resident shorebirds in Western Port comprises 27,000 ha of intertidal mudflat, used for foraging, and adjacent higher areas used for roosting (Dann 2011). The Australian pied oystercatcher forages in similar intertidal habitats to shorebirds, as well as beaches, and breeds on beaches on French Island and the north shore of Phillip Island (Dann 2011). The Fairy Tern is piscivorous and forages in the marine water column, and breeds regularly at Rams Island on the southern coast of French Island, and occasionally has been reported breeding at Tortoise Head (French Island) and Observation Point (Phillip Island) (Dann 2011). The Pacific Gull is a common resident of the Ramsar site, but breeds on islands off Wilsons Promontory or in Bass Strait not within the Ramsar site (Kellogg Brown & Root, 2010).

The alignment avoids all intertidal mudflat and shorebird roosting areas, and does not result in surface disturbance to the Ramsar wetland. Breeding sites for the Australian pied oystercatcher and Fairy Tern are on islands, and are at least 6km from the alignment. As such, there is no plausible risk that the project will seriously affect the foraging, roosting or breeding habitat of the birds listed above.

Other habitats within the Western Port Ramsar site, notably seagrass beds, act as important nursery habitat for a range of fish and crustacean species (Hale 2016). Western Port is a key breeding area for some species such as elephant fish (*Callorhynchus milii*), school shark



(*Galeorhinus australis*) and Australian anchovy (*Engraulis australis*), and a nursery area for other species such as King George whiting (*Sillaginodes punctatus*), yellow-eye mullet (*Aldrichetta forsteri*) and Australian salmon (*Arripis spp.*) (Jenkins 2011).

The Western Port Ramsar site also supports a number of fish species that migrate between fresh, estuarine and marine waters as part of their life cycles, including the Australian grayling, black bream (*Acanthopagrus butcheri*) and the short-finned eel (*Anguilla australis*).

Australian Grayling rely upon the Western Port Wetland for migration between fresh, estuarine and marine waters as part of their life cycles (DELWP 2017). Cardinia Creek is known as a key watercourse for movements between fresh and estuarine waters for this species. Impacts to Cardinia Creek will be avoided through using HDD between KP40-40.3.

As the alignment does not result in surface disturbance to the Western Port Ramsar site there is no plausible risk that the project will seriously affect the habitat or lifecycle of any fish or crustacean species dependent upon the wetland.

The water quality of Western Port Ramsar site is primarily controlled by extensive tidal flushing, residence time of water, resuspension of sediments by tidal movement and importation of nutrients and pollutants in river discharge during periods of above average rainfall (Lee 2011). There is no plausible risk that the project will cause changes to these process.

The alignment crosses five major creeks within 1 km of the Ramsar boundary: Warringine Creek, Olivers Creek, Kings Creek, Watson Creek and Langwarrin Creek. Of these Warringine Creek, Kings Creek and Watson Creek will be crossed by HDD to avoid disturbance of the watercourse bed and banks, with elimination of the potential for mobilized sediment to enter the Western Port Ramsar site.

To mitigate the potential for localised runoff from the construction footprint entering the Western Port Ramsar site, standard erosion sediment controls for pipeline construction, in accordance with the Code of Practice and Appendix P - Land-based pipeline construction, and as described in Section 4 of the referral, will be incorporated in the project Construction Environmental Management Plan. Following construction, the construction footprint will be rehabilitated to a stable, vegetated landform.

As such, no substantial or measurable changes to the water quality of the Western Port Ramsar site are considered likely to occur due to the project.

Standard biosecurity control measures for overland pipelines, as described in Section 4 of the referral, will be incorporated in Construction Environmental Management Plan. With these measures in place there is no real chance or possibility that the project will cause an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the Western Port Ramsar site.



Threatened species, threatened ecological communities or their habitat

The ecological assessment undertaken for the project (Monarc, 2018) determined that a number of threatened species and one ecological community occur, or have a high or moderate likelihood of occurring, within or adjacent to the construction footprint. An assessment of the impact of the project to these threatened species and ecological community is provided below.

Subtropical and Temperate Coastal Saltmarsh

Direct impacts to the Subtropical and Temperate Coastal Saltmarsh vulnerable ecological community at KP19 - 19.5, are entirely avoided by HDD beneath Watson Creek.

Southern Brown Bandicoot – endangered

The Southern Brown Bandicoot was recorded at eight of 35 locations where camera surveys were undertaken for the project. In addition, presence of the species has been assumed at a further 8 locations based on recent records. These 16 locations extend from the South Gippsland Highway (KP30.3) to McDonalds Drain Road (KP48.4), which generally aligns with the extent of the former Dalmore and Koo Wee Rup swamps where traversed by the alignment.

The 8 locations where the Southern Brown Bandicoot was recorded are listed below:

- KP 34.6 – Adjacent to Manks Road
- KP 35.4 – Adjacent to Tooradin Station Road
- KP 37.1 – Tooradin Inlet Drain
- KP 40.0 - Cardinia Creek
- KP 40.4 to 41.3 – Lower Scrub Gum Creek drain complex
- KP 41.6 – Deep Creek
- KP 43.0 - Paddock drain south of Soldiers Road (east of Hobson Road)
- KP 46.3 – East of Koo Wee Rup Road (#1)

There were a further 8 locations where the construction footprint intersects or is adjacent to habitat where the Southern Brown Bandicoot is presumed present are as follows:

- KP 33.4 - Muddy Gates Drain
- KP 33.4 - Muddy Gates Lane
- KP 33.5 - South Gippsland Rail Line
- KP 37.5 - Adjacent to Ridgeways Drain
- KP 46.25 - Hagelthornes Drain
- KP 46.5 - East of Koo Wee Rup Rd (#2). This site is adjacent to Koo Wee Rup Road, and 160m south of the alignment. A project access track is proposed in the vicinity of this area but an existing track will be used to cross the road reserve and no clearing of vegetation in the road reserve is required.
- KP 48.4 - Pakenham Creek
- KP 48.4 - McDonalds Drain Road reserve

The structural habitat component that is present at all of these locations is a dense understorey. Dense understorey vegetation was present at these locations as a range of condition states with varying floristic composition including shrubby weeds (*Blackberry Rubus fruticosus* agg.), dense stands of exotic grasses typically *Phalaris* spp., Common Reed *Phragmites australis*, plantings of native shrubs, weedy patches of remnant native vegetation and dense planted shadelines of exotic trees. Figure 1 below shows dense groundcover of Blackberry where the Southern Brown Bandicoot was recorded at Tooradin Inlet Drain in the vicinity of KP 37.1.



Figure 1- Dense groundcover of Blackberry at Tooradin Inlet Drain where the Southern Brown Bandicoot was recorded in the vicinity of KP 37.1.

These findings are consistent with other studies in the area (Ecology Australia 2009, Maclagan 2016, Ecology Australia 2017) which have found that the Southern Brown Bandicoot has low association with variables which typically indicate better habitat quality for native fauna such as areas of higher native vegetation cover, quality and connectivity. Similarly, Packer (2014) found the Southern Brown Bandicoot to be nearly three times as abundant at sites dominated by blackberry than at sites with intact native vegetation without blackberry in the Mount Lofty Ranges of South Australia. Furthermore, a trapping study of seven sites proximal to the alignment (Maclagan et al. 2018) demonstrated that bandicoot abundance was higher within weedy linear vegetation patches associated with roadsides and railways than large (>100ha) areas of remnant vegetation, with the highest abundance at the roadside with the most urbanised surroundings. The majority of bandicoots at roadside and railway sites were resident (present at a site over two breeding seasons), and breeding activity, recruitment of first-year adults, and survival of mature adults was observed at all such sites. Female body condition was also similar between roadside/railway and remnant sites, suggesting that despite the higher abundance of bandicoots at roadside/railway sites, there were apparently enough resources (e.g. food and/or shelter) to support equivalent body condition to in remnant habitat.

As such, the ability to exploit degraded linear habitats appears to facilitate the ongoing viability, and even localized abundance, of the Southern Brown Bandicoot population in the peri-urban and agricultural landscape traversed by the alignment. Available evidence suggests that the narrow strips of native and exotic vegetation following the network of drainage channels, roadsides and railway lines in the former Dalmore and Koo Wee Rup swamps forms core habitat for the species in this landscape matrix.

Whilst tracking studies in the local area indicate that site fidelity of the Southern Brown Bandicoot is high and activity is concentrated in the linear vegetated strips, it is acknowledged that habitat use may extend beyond these areas into adjacent cleared paddocks and gardens, as shown in Figure 2 (Maclagan 2016). Such agricultural and peri-urban habitat is extensive in the area traversed by the alignment and availability of this habitat cannot be materially reduced by the narrow construction footprint, and temporary disturbance, associated with the project.



Figure 2 - Example of habitat use by the Southern Brown Bandicoot beyond linear vegetated strips. Nesting site of a male bandicoot under *Agapanthus* in a suburban garden opposite a roadside vegetation strip. From Maclagan 2016.

The primary mitigation measure employed by the project to reduce impacts on the Southern Brown Bandicoot is to minimise vegetation clearing in areas of known or assumed presence. The most important design measure which has been implemented to achieve this minimisation, as far as practicable for a long linear footprint, is positioning of the construction footprint to avoid areas of remnant vegetation or exotic vegetation with a dense understorey. In addition trenchless crossing methods have been extensively used to minimise impacts where such areas of known or assumed presence are intersected, such as along roads, watercourses and drains.

These design measures are summarised in Table 1. The outcome of these measures is that the estimated area of direct impact on areas of known and assumed presence is less than 0.5ha, patchily distributed over approximately 13km of the alignment. As such direct impacts to known or assumed habitat will be minor, localized and temporary.

Measures will also be employed during construction to reduce the potential for other direct or indirect impacts to the Southern Brown Bandicoot. These measures, which will be incorporated into the CEMP for the Project, are described in Section 4 of the referral and include exclusion fencing adjacent to areas of known or assumed habitat and inspections of open trenches each morning. Additionally, rapid re-establishment of dense ground cover in the less than 0.5ha of known or assumed habitat impacted by the construction footprint will be achieved by plantings of semi mature native shrubs at an appropriate density during rehabilitation.

With mitigation measures in place, given the linear and temporary nature of disturbance associated with the project and contemporary research that demonstrates that the species is capable of sustaining populations in the fragmented landscape traversed by the alignment, it is not considered likely that the project will:

- Lead to a long-term decrease in the size of a population
- Reduce the area of occupancy of the species
- Fragment an existing population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a population
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the



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extent that the species is likely to decline

- Interfere with the recovery of the species

Biosecurity protocols to be employed by the project will be as described in Section 4 of the referral. These measures will be incorporated into the project CEMP and OEMP as relevant. In addition, it is noted that the key feral predators of the Southern Brown Bandicoot are cats and foxes (Threatened Species Scientific Committee (2016).). These species are abundant across the landscape traversed by the project, as noted by extensive camera trapping undertaken from 2011 to 2017 by Ecology Australia (2017) as well as the results of Monarc (2018) for this project. The activities of the project can have no meaningful impact on the current distribution and abundance of these predators. Given these measures the project is not considered likely to:

- Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- Introduce disease that may cause the species to decline.



Table 1 - Design measures for areas of known and assumed presence of the Southern Brown Bandicoot

KP	Location	Brief Description based on Monarc studies	Control measures	Approximate area impacted (ha)
33.4	Muddy Gates Drain	SBB assumed present in a mixture of exotic and native grasses	Avoidance: HDD/bore and no access to drain. Mitigation: Not required (due to avoidance).	0
33.4	Muddy Gates Lane (adjacent to CPT086)	SBB assumed present in thick Cypress Hedge	Avoidance: HDD/bore and no access to Muddy Gates Lane. Mitigation: Not required (due to avoidance).	0
33.5	South Gippsland Railway Line (inactive)	SBB assumed present in a mixture of exotic and native grasses	Avoidance: HDD/bore and no access to South Gippsland Railway Line corridor. Mitigation: Not required (due to avoidance).	0
34.6	Adjacent to Manks Road	SBB recorded in planted vegetation along fenceline on southern side of Manks Road adjacent to the alignment crossing location.	Avoidance: Bore of Manks Road. Mitigation: Access requirements to private property will result in disturbance to SBB habitat. Construction footprint will be reduced (to 20m) south of Manks Road (KP33.6-34.0). Constraint of working around landowner wetlands and safe working width for pipeline construction means the area cannot be further reduced. Disturbance to SBB habitat associated with access to Manks Road is to be limited to 10m wide access track. Further reductions not possible due to the safe ingress and egress of larger vehicles, such as pipe trucks.	0.3
35.4	Adjacent to Tooradin Station Road	SBB recorded near fallen pine tree in a heavily grassed roadside plantation	Avoidance: Bore of Tooradin Station Road. Mitigation: Access requirements to private property will result in disturbance to SBB habitat. Works limited to an access track of 10m in width. Further reduction is not possible due to the safe ingress and egress of larger vehicles, such as pipe trucks. No feasible alternative access points at this location.	0.02
37.1	Tooradin Inlet Drain	SBB recorded in blackberries and Phalaris on top of drain bank	Avoidance: Not feasible due to significant construction constraints (access required to facilitate construction) and SBB habitat creates a long linear barrier perpendicular to the pipeline route. Mitigation: Construction footprint will be reduced (to 20m) in area of SBB habitat.	0.05
37.5	Adjacent to Ridgeways Drain	SBB assumed present in hawthorn hedge with blackberries	Avoidance: Not feasible due to significant construction constraints (access required to facilitate construction) and additional impact to land use by avoiding long linear habitat. Direct impacts to the hedge near the southern boundary of the construction footprint from Ridgeways Drain to KP38.0 will be avoided. Mitigation: Construction footprint will be reduced (to 20m) in area of SBB habitat.	0.01



KP	Location	Brief Description based on Monarc studies	Control measures	Approximate area impacted (ha)
40.0	Cardinia Creek	SBB recorded in heavily planted creek embankment	Avoidance: HDD and no access to Cardinia Creek or associated riparian vegetation within reserve. Mitigation: Not required (due to avoidance).	0
40.4 40.7 41.4	Lower Gum Scrub Creek Moodys Inlet	SBB recorded in heavily planted creek embankment	Avoidance: Construction footprint avoids impact to SBB habitat along creek embankment. No access to SBB habitat required. Mitigation: Not required (due to avoidance).	0
41.6	Toomuc Creek and Deep Creek	SBB recorded in heavily planted creek embankment	Avoidance: HDD of drainage reserve (for Toomuc and Deep Creek). No access to SBB habitat, vegetation or embankment within drainage reserve. Mitigation: Not required (due to avoidance).	0
43.0	Paddock drain to the west of Hobson Road, south of Soldier's Road	A narrow strip of dense vegetation along a paddock drain.	Avoidance: Not feasible due to significant construction constraints (access required to facilitate construction) and SBB habitat creates a long linear barrier perpendicular to the pipeline route. Mitigation: Construction footprint will be reduced (to 20m) in area of SBB habitat.	0.03
46.25	Hagelthornes Drain	SBB assumed present in dense phalaris beside drain with Phragmites and blackberries	Avoidance: No access to banks of Hagelthornes Drain to avoid banks and SBB habitat in dense weedy vegetation in drain reserve. Mitigation: Not required (due to avoidance).	0.0
46.3	East of Koo Wee Rup Rd (#1)	SBB recorded adjacent to Swamp Scrub in the road reserve	Avoidance: HDD/bore and no access to SBB habitat in Koo wee Rup Road reserve.	0.0
46.5	East of Koo Wee Rup Rd (#2)	SBB assumed present in dense phalaris and Phragmites.	Mitigation: Not required (due to avoidance).	0.0
48.4	Deep Creek/Pakenham Creek	SBB assumed present at Deep Creek/Pakenham Creek, on levee bank of creek amongst gorse and swamp scrub	Avoidance: HDD/bore and no access to Deep Creek/Pakenham Creek drainage/levee bank reserve. Access from McDonalds Drain to be from existing access locations or without impact to blackberry and understory growth within road reserve.	0.0
48.4	McDonalds Drain Road, north from Deep Creek (also referred to as Pakenham Creek)	SBB assumed present in road reserve of McDonalds Drain Road south-east of Deep/Pakenham Creek amongst blackberries.	Mitigation: Not required (due to avoidance).	0.0



Growling Grass Frog – Vulnerable

The Growling Grass Frog tends to be associated with permanent still or slow flowing waterbodies such as streams, farm dams and billabongs. They can also use temporarily inundated waterbodies for breeding purposes, provided that they contain water over the breeding season. Typically, the species prefers well vegetated water bodies that support extensive areas of emergent, submerged and floating vegetation as these provide both basking sites and protection from predators as well as areas for egg deposition (DEWHA 2009). Typical vegetation includes *Typha* sp. (Cumbungi), *Phragmites australis* (Common Reed) and *Eleocharis* sp. (Spike-rush) in or at the edge of water bodies. The species breeds between November and March.

Surveys for the species were undertaken at 12 locations along the alignment, with locations selected based on review of database records and assessment of aerial photography. The Growling Grass Frog was recorded at one location surveyed for the project, at Cardinia Creek (KP 40-40.3). In addition, the species was not recorded but may be present at the following locations which provide suitable habitat for the species:

- KP 20.32 - A farm dam and roadside drainage line within private property north of South Boundary Road East
- KP 23.05 - A wetland complex within private property east of Vowell Drive
- KP 31.1 - The Western Outfall Drain
- KP 41.5 - Deep Creek and Toomuc Creek
- KP 48.55 - Pakenham Creek

As with the Southern Brown Bandicoot, the primary mitigation measure employed by the project to reduce impacts on the Growling Grass Frog is to minimize disturbance in and adjacent to areas of known or potential habitat. Of the locations of known presence or suitable habitat, direct impacts to Cardinia Creek, the wetland complex at KP23.05 Deep Creek/Toomuc Creek and Pakenham Creek are entirely avoided by use of trenchless crossing methods. Additionally, the farm dam at KP20.32 is avoided by the positioning of the construction footprint.

An open cut crossing is proposed for the Western Outfall Drain, however the width of the construction footprint will be reduced to 20m. The roadside drain at KP20.32 is also proposed for an open cut crossing.

The outcome of these measures is that the estimated area of direct impact on areas of suitable habitat for the Growling Grass Frog within the Western Outfall Drain is approximately 0.07ha. The drainage line was not considered to provide suitable habitat for the Growling Grass Frog at the time of survey, but if this drain is conservatively assumed to potentially provide habitat then the area of direct impact to potential habitat of the Growling Grass Frog will be approximately 0.12ha.

Measures that will be implemented to mitigate the potential for other direct or indirect impacts to the Growling Grass Frog are described in Section 4 of the referral. With these measures in place it is not considered likely that the project will:

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations



- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of an important population
- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- interfere substantially with the recovery of the species

It is recognized that the chytrid fungus presents a threat to populations of the Growling Grass Frog (DEWHA 2009). The chytrid fungus is a virulent pathogen of amphibians and is capable causing sporadic deaths in some populations, and 100 per cent mortality in other populations. As such the biosecurity protocols listed in Section 4 of the referral will be implemented to mitigate the risk of introduction of the diseases. These measures will be incorporated into the project CEMP and OEMP as relevant. Given these measures the project is not considered likely to:

- Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- Introduce disease that may cause the species to decline.

Dwarf Galaxias and Australian Grayling

The Australian Grayling (*Prototroctes maraena*) is a small fish that migrates between fresh and marine waters. Most of its life is spent in freshwater, but at least part of the larval and/or juvenile stages are spent in coastal seas. Spawning occurs in fresh water, from late summer to winter, the timing varying with location and between years. The species occurs in south-eastern Australia, in coastal rivers and streams. In Victoria it occurs widely across the State, from the Genoa River system in the east to the Hopkins River system in the west (Backhouse 2008). The Australian Grayling was assessed to have a 'High' to 'Moderate' likelihood of occurring in Cardinia Creek, based on nearby records (Monarc 2018). Cardinia Creek is also listed as an important river for the Australian Grayling under the national recovery plan for the species (Backhouse 2008).

Direct impacts on Australian Grayling habitat will be avoided as Cardinia Creek will be crossed by HDD. As such, the project is not considered likely to cause a significant impact to the Australian Grayling.

The Dwarf Galaxias (*Galaxiella pusilla*) is a small native fish species (maximum size of 50 mm) which has an exclusive freshwater lifecycle. The Dwarf Galaxias is a short lived species, with only a few individuals surviving through to a second year. The spawning period is mainly between winter and spring, but can extend throughout summer when conditions are favorable. The Dwarf Galaxias occurs in waters which have an array of native aquatic vegetation, typically preferring swampy floodplain environments, but can also be found in creeks and rivers.

Surveys for the Dwarf Galaxias were conducted by Monarc (2018) at 16 watercourses intersected by the alignment, with watercourses selected for survey based on review of database records. No Dwarf Galaxias were recorded during targeted surveys and predatory fish were recorded in most surveyed locations. However, the Dwarf Galaxias was assessed to have a "High" to "Moderate" likelihood of occurrence, due to either being a known resident, having recent records (<5 years) or there being suitable habitat in the 10 watercourses listed below.



- Warringine Creek – avoided by HDD
- Pearcedale South
- Langwarrin Creek
- CPT 60 (dam and Lachies Marsh)
- Craigs Lane Drain
- Western Outfall Drain
- Cardinia Creek – avoided by HDD
- Toomuc Creek – avoided by HDD
- Deep Creek – avoided by HDD
- Pakenham Creek – avoided by HDD

The Action Statement for the species under the Flora and Fauna Guarantee Act 1988 (DELWP 2015) suggests that important populations of this species may occur within Cardinia Creek, Watson Creek and Deep Creek. All of these watercourses will be crossed by HDD so direct impacts to habitat of these important populations will be entirely avoided. The likelihood of occurrence of the species in Watson Creek is considered to be low as the latest record was in 2010 and some 7.7km away from the alignment.

As such the Project is not expected to

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Disrupt the breeding cycle of an important population

Those waterways listed above which are not crossed by HDD will experience short-term localised impacts to suitable habitat for the Dwarf Galaxias as a result of the project. However important populations of the species are not likely to occur in these watercourses. Measures to mitigate direct impacts to watercourse bed and banks, and indirect impacts associated with temporary barriers to movement through watercourses, release of sediment, or introduction of biosecurity risks are as described below in Section 4 of the referral. With these measures in place the project is not expected to

- Adversely affect habitat critical to the survival of a species
- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Interfere substantially with the recovery of the species



Strzelecki Gum, River Swamp Wallaby Grass, Dense Leek-orchid, Swamp Fireweed, Swamp Everlasting - Vulnerable

The **Strzelecki gum** (*Eucalyptus strzeleckii*) a medium to tall forest tree which is a member of the swamp gum group. The species is endemic to the Strzelecki Ranges, in Gippsland, Victoria. It extends north to Neerim South, south to Foster, east to Woodside – Yarram area, and west to Western Port Bay – Bass River area. Habitat where the species occurs is variable, including ridges, slopes and along the banks of streams, but particularly foothills and flats. Preferred soils are grey, deep, fertile loams which are seasonally waterlogged (Carter 2006).

Field surveys undertaken for the project located a single adult Strzelecki gum within the construction footprint at KP21 near Langwarrin Creek. Options to avoid this individual were assessed but a feasible solution for avoidance was not available due to the proximity of houses and a road, and significant constraints that would be imposed on a HDD proposed to avoid a wetland at KP21.2. As such the individual Strzelecki gum is proposed for removal.

This individual Strzelecki gum is not considered to be an important population as no other adults or juveniles were present in the immediate area. The closest stand is near the mouth of the Bass River into Westernport (DSE 2008). Additionally, no significant populations identified in the national recovery plan for the species (Carter 2006) or important populations identified in the Action Statement for the species under the Flora and Fauna Guarantee Act 1988 (DSE 2008a) are proximal to the alignment. Given the absence of an important population the project will not:

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Disrupt the breeding cycle of an important population

Additionally, removal of a single, isolated Strzelecki gum is not considered likely to:

- Adversely affect habitat critical to the survival of a species
- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Interfere substantially with the recovery of the species

The **River Swamp Wallaby-grass** (*Amphibromus fluitans*) is an aquatic perennial with 1 m long aerial stems growing horizontally. River Swamp Wallaby-grass grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. In southern Victoria, it is known from several localities in south Gippsland and has also been reported at Cranbourne (Department of the Environment, 2018).

This species was not recorded in the construction footprint during extensive field surveys undertaken by Monarc (2018). There is, however, a known population on an existing pipeline easement adjacent (200m away) to the construction footprint between KP14.5 and KP15. This area will not be impacted by the construction



footprint. Other suitable habitat within the construction footprint near this point will be traversed by HDD to avoid impacts. As there are no direct impacts to populations or potential habitat of River Swamp Wallaby-grass there is no plausible risk of a significant impact to this species.

The **Dense Leek-orchid** (*Prasophyllum spicatum*) is a deciduous, perennial, terrestrial orchid emerging annually from an underground tuber. A single leaf emerges in late autumn, following the seasonal rainfall. Flowering commences in early October and is usually completed by early November. About four weeks after flowering finishes, the leaf has shriveled and the species survives the dry summer and early autumn as a dormant tuber that is replaced annually (Duncan 2010).

The species generally occurs on sandy soils, with some sites seasonally waterlogged. 80 individuals are known from around eight populations ranging from south Gippsland (Wonthaggi) to the far south-east of South Australia (Duncan 2010). Duncan (2010) details two of these occur in Crib Point and one in nearby Stony Point Rail Reserve.

The construction footprint follows existing oil and gas pipeline infrastructure corridors in the Crib Point and Stony Point area but also traverses an area of Damp Heathy Woodland at KP1.5, which provides suitable habitat for this species. The presence of the Dense Leek-orchid at this location is presently undetermined as surveys have not been yet conducted during the flowering period. If Dense Leek-orchid did occur at this location it would be considered part of an important population given the low numbers of the species across its' distribution and proximity to the Stony Point and Crib Point sites which contribute 27% of the total population .

A targeted survey is planned at this location during spring 2018 to determine if the species is present. If the species is found to be present impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If the species is present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring.

Given this approach, the project is not considered likely to significantly impact the Dense Leek-orchid as the project will not:

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

The **Swamp Fireweed** is an erect, native, rhizomatous perennial herb. This species typically occurs on high-quality herb-rich wetlands on plains. Swamp Fireweed is



known from approximately 14 sites with the recorded population in the Westernport being one of the most easterly recorded (DEWHA 2008).

The **Swamp Everlasting** (*Xerochrysum palustre*) is a perennial, erect herb to 100 cm tall. Flowering occurs from November to March. Swamp Everlasting occurs in Victoria, Tasmania and New South Wales within lowland swamps and wetlands, usually on black cracking clay soils. Swamp Everlasting is known from about 35 populations with an estimated abundance of over 10,000 plants (Carter and Walsh 2011). The Action Statement for the species under the Flora and Fauna Guarantee Act 1988 (DSE 2008b) indicates that an important population of this species occurs within the 'South Gippsland Clyde Manks Road Rail Reserve'.

Both the Swamp Fireweed and Swamp Everlasting are considered to have a high likelihood of occurrence in suitable habitat at KP 33.5 as known populations exist nearby at Muddy Gates Lane and Manks Road, and the South Gippsland Railway line. In response to this high likelihood of occurrence, a single HDD will be used to cross from the west of the Muddy Gates Lane road reserve to the east of the South Gippsland Railway reserve. As such, there will be no direct impacts to these areas of potential habitat traversed by the HDD. The area impacted to the east of the South Gippsland Railway reserve is a paddock that aerial imagery indicates is subject to ongoing hay production, and so provides lower quality habitat.

The presence of the Swamp Fireweed and Swamp Everlasting at this location is presently undetermined as surveys have not been yet conducted during the flowering and fruiting period, which are necessary to distinguish these species from other similar species. A targeted survey is planned at this location during spring and early summer 2018 to determine if either species is present. If either species are found to be present, impacts will be avoided by using trenchless technology, or by minor realignment of the construction footprint. If either species are present and direct impacts cannot be entirely avoided, options for offsetting or translocation will be agreed with the federal regulator prior to impacts occurring.

Given this approach, the project is not considered likely to significantly impact the Swamp Everlasting or Swamp Fireweed as the project will not:

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



Migratory species

Latham's Snipe and White-throated Needletail

The ecological assessment undertaken for the project (Monarc 2018) determined that the White-throated Needletail and Latham's Snipe have a moderate likelihood of occurrence in the project area.

Latham's Snipe occur in a single, widely dispersed non-breeding population in South-eastern Australia. The species differ to other shorebirds in preferring open freshwater or brackish wetlands with cover nearby, particularly areas of wet tussock grassland and other dense ground vegetation (Department of the Environment 2016).

Important habitat for Latham's snipe is defined under the EPBC Act Policy Statement 3.21 as areas that have previously been identified as internationally important for the species, or areas that support at least 18 individuals of the species.

The only site of international significance identified within Australia is Cedar Hill and Hexham Swamp in NSW (Bamford *et al.* 2008). This site is at least 800 km from the nearest point of the alignment.

The species is considered to be an irregular visitor to the Western Port Ramsar site with a frequency of occurrence of 3% in annual surveys (Hale 2016). The most recent records of the species near the project area was ~420m from the alignment at the corner of Graydens Rd and Marine Parade, Hastings in 2013 (Atlas of Living Australia). Whilst the construction footprint will require removal of degraded pasture, which provides moderate quality habitat for the species, it is considered implausible that the construction footprint could support 18 individuals.

The White-throated Needletail is widespread in eastern and south-eastern Australia, where the species is a non-breeding summer (October-April) visitor. The species is almost exclusively aerial in Australia, and has been recorded above most types of terrestrial habitat including woodlands, farmland, heathland and mudflats.

The range of the White-throated Needletail in Australia extends from Cape York to Tasmania along the eastern seaboard, and inland to central NSW and western Victoria. The most recent records of the species near the project area were at Woolleys Beach and Warringine Park, Bittern in 2006 and 2007, respectively (Monarc 2018).

Although the construction footprint contains degraded pasture and some wooded vegetation, which could provide moderate quality potential foraging/roosting habitat for the species, this is not considered to be important habitat, as the species is predominantly or exclusively aerial whilst in Australia.

As important habitat for the White-throated Needletail and Latham's Snipe is not present within the construction footprint the project will not:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for the White-throated Needletail and Latham's Snipe
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the White-



throated Needletail and Latham's Snipe

Additionally, it is not considered likely that the project will seriously disrupt the lifecycle (breeding, feeding, migration or resting behavior) of an ecologically significant proportion of the population of the White-throated Needletail and Latham's Snipe. No impacts to an ecologically significant proportion of the White-throated Needletail population are expected as the species is almost exclusively aerial within Australia. Impacts on the degraded habitat for White-throated Needletail and Latham's Snipe within the construction footprint will be localised and temporary, and mitigated through rehabilitation of the construction footprint as described in Section 4 of the referral.



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