

ATTACHMENT 5.2 - Assessment of Ramsar Selection Criteria

<p>CRITERION 1: Representative, rare, or unique example of a natural or near-natural wetland type.</p>	<ul style="list-style-type: none"> • The Western Port Ramsar site is an example of a natural wetland marine embayment with extensive intertidal flats, mangroves, saltmarsh, and seagrass beds within the South East Coastal Plain bioregion. Western Port is also an example of a saltmarsh-mangrove-seagrass wetland system. • The Project does not involve any construction works that will cause physical disturbance to the Western Port Ramsar site (for example, the Project does not require dredging). Project activities will occur on the FSRU, topside of the existing jetty and within the landside component (the landside component is outside the boundary of the Ramsar site). Operationally, any water discharge will descend to the seabed and is expected to be 0.3°C below the ambient seawater temperature upon reaching the seabed and will therefore have a negligible effect outside the mixing zone being a maximum spatial extent approximately 200 m north and south and 60 m east and west of the discharge point and will not impact on Ramsar values. • The Project will not involve any removal of mangroves, saltmarsh or seagrass beds or physical disturbance of intertidal flats. • Biological entrainment modelling indicates that mangrove seeds and other propagules (e.g. seagrass fragments) that drift or travel on the water surface or near the seabed should not be entrained due to the positioning of the FSRU intake at least 4 m above the seabed and at least 5 m below the water surface.
<p>CRITERION 2: Supports vulnerable, endangered, or critically endangered species or threatened ecological communities.</p>	<ul style="list-style-type: none"> • The Ramsar site supports the Australian Fairy Tern, which is a species of global conservation significance; and the Dense Leek-orchid which is listed as vulnerable under the EPBC Act. Saltmarsh vegetation within the Ramsar site provides important habitat for the Orange-bellied Parrot, listed as critically endangered under the EPBC Act. • The Project will not impact on any threatened communities listed under the EPBC Act or <i>Flora and Fauna Guarantee Act 1988</i> (FFG Act) and is not likely to have a significant impact on any listed threatened species as described elsewhere in this Referral. • The Project will not impact on areas of Coastal Dune Scrub along the foreshore, which may provide some low-moderate quality habitat for the Australian Fairy Tern. The Project Site is not considered to provide significant habitat for the Orange-bellied Parrot. • Suitable habitat for the Dense Leek-orchid may occur within moderate quality Heathy Woodland, an area of which (0.5 ha) is located within the Project Site. Although the species has not been encountered on this site during field survey, AGL has modified the land disturbance footprint of the Project site (to the footprint as shown in Figure 3) to avoid disturbance of this potentially sensitive area. Therefore, no vegetation will be impacted on this section of land. • The EPBC Protected Matters Search Tool (PMST) lists 23 EPBC-listed threatened marine birds and an additional 17 migratory marine birds as potentially occurring within a 5 km buffer of the Project Site. The Victorian Biodiversity

	<p>Atlas (VBA) lists a further 18 threatened marine birds. This provides for a total of 58 marine birds that may use the Project area. From an operational perspective, the impacts to these birds have been considered in the Flora and Fauna Assessment (Attachment 4). Given the existing port use, the scale of the proposed impacts associated with the Project and the known information regarding use of the area by marine birds suggests that there are unlikely to be significant impacts to threatened and migratory marine birds.</p> <ul style="list-style-type: none"> • The proposed water discharge from the FSRU has the potential for localised effects on the Western Port Ghost Shrimp (<i>Pseudocalliax tooradin</i>) and Small-gilled Ghost Shrimp (<i>Michelea microphylla</i>) (FFG Act listed species) if they are present, as well as other invertebrate species living in the seabed greater than 12 m depth in the near proximity of the discharge. Potential effects may be a result of the cold-water and residual chlorine characteristics of the proposed water discharge, however any potential effects to these species (if they are present) would be confined to a relatively small part of the seabed (approximately 200 m north and south and 60 m east and west of the discharge point) in a shipping berth area of the Ramsar site. The potential impact on any EPBC Act listed threatened or migratory marine species will be low to very low (see Impact Table – 2.4.1). • Both of the FFG Act listed ghost shrimps may have planktonic larvae with planktonic durations that could result in their susceptibility to entrainment. The adults of <i>Pseudocalliax tooradin</i> and <i>Michelea microphylla</i> are potentially distributed within the proximity of Crib Point. Preliminary modelling of biological entrainment for the Project shows a probability of up to 10 per cent of larvae released on the western edge of the channel (including the adjacent mudflats) within about 750 m of Crib Point may be entrained if operating at maximum capacity. Overall, the proportion of larvae entrained from populations of widespread biota in Western Port is less than 1% and the effect is likely to be undetectable. The FSRU will typically operate with a lower intake volume of 300 ML/day for the heat exchange requirements and will therefore reduce the potential impact by approximately one third. These levels may represent a significant proportion for these species, if these are present in the Project area. • <i>Pseudocalliax tooradin</i> have been recorded at 5 m depth in Western Port and 2 m depth in Swan Bay, which would indicate that this species may be restricted to depths shallower than the cold-water plume and therefore may not be affected by temperature or residual chlorine effects. However, its distribution is only known from two samples and it may occur sparsely over a greater depth range. • <i>Michelea microphylla</i> have been recorded approximately 2.4 km north of Crib Point Jetty, in gravelly seabed, at 19 m depth in the main North Arm channel. If the species is present in the Project area, given its presence close to the footprint of the cold-water plume (i.e. >12.5 m depth) and its occupancy of seabed burrows indicates that this species may be susceptible to the potential cold-water discharge and residual chlorine effects. • Mitigation measures incorporated into the design of the Project to minimise potential effects on the marine ecosystem include: <ul style="list-style-type: none"> ○ The marine assessments undertaken by CEE considered single, double and six-port discharge arrangements for the return of the water from the FSRU heat exchange system. The AGL preferred design
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	<p>for discharge is through a six-port discharge arrangement. This optimises dilution of the water discharge and results in water reaching 0.3°C below the ambient seawater temperature upon reaching the seabed, being similar to the daily variation of the receiving environment. Within approximately 20 seconds from the time of discharge, the residual chlorine will reduce in concentration to 0.005 mg/L, slightly above the ANZECC 2000 freshwater environment trigger value of 0.003 mg/L. Implementation of a six-port discharge from the FSRU (AGL preferred design) would avoid formation of a cold-water plume on the seabed, increase dilution of the discharge and reduce the extent of possible toxicity effects such that a significant impact on seabed biota, including the ghost shrimps, is unlikely to occur.</p> <ul style="list-style-type: none"> ○ The proposed seawater intake on the FSRU is designed to minimise the potential entrainment of large marine organisms, mammals and fish through the use of appropriate screens and the optimum positioning of the intake vertically within the water column layer, avoiding surface and seabed waters, where movements of biota are most likely to be concentrated.
<p>CRITERION 3: Supports populations of plant and/or animal species important for maintaining the biological diversity.</p>	<ul style="list-style-type: none"> · Western Port is an important area for migratory waders in south-east Australia with wader surveys indicating that the Ramsar site supports up to 39 species and includes 10,000 to 15,000 summer migrants (approximately 12 to 16 per cent of the Victorian population). It also supports seagrass and mangrove communities that are characteristic of the marine embayments of Southern Victoria. · Of the migratory bird species identified in the PMST report, 21 are marine species that are not impacted by the proposed works. Five are terrestrial, some of which may use the landside component for foraging, but this is expected to be very rare and the site is not considered significant habitat for these species. Twenty-eight (28) are wetland species. The assessment area (as defined in the Flora and Fauna Assessment) provides minimal habitat values for these species and it is not considered to be significant habitat. · The Project will not involve any direct removal of seagrass or mangroves communities and is not expected to indirectly impact on these communities as a result of FSRU water discharge, given that cooler seawater and any potential effects from the residual chlorine will only be present in the deeper channel of North Arm at water depths greater than 12.5 m and within an area of approximately 200 m north and south and 60 m east and west of the discharge point. On this basis, the proposed cold-water discharge is not predicted to have a measurable effect on benthic species on the seabed adjacent to the FSRU given that the temperature difference is well within the daily natural variation of the receiving environment and the residual chlorine being slightly above the ANZECC guideline for freshwater.
<p>CRITERION 4: Supports plant and/or animal species at a critical stage in their life cycles, or provides refuge</p>	<ul style="list-style-type: none"> · The Western Port Ramsar site is one of the three most important areas in southeast Australia for migratory waders in total numbers and density. The Ramsar site provides important overwintering habitat for the Orange-bellied Parrot. It also provides a number of important high tide roosts and breeding habitat. · The Project Site is not considered to provide significant habitat for the Orange-bellied Parrot.

<p>during adverse conditions.</p>	<ul style="list-style-type: none"> · All of the intertidal mudflats of Western Port are considered to be suitable foraging areas for waterbirds. The Project will not involve any direct physical disturbance of intertidal flats and is not expected to indirectly impact on these communities as a result of any potential noise or FSRU water discharge. · The Project Site does not contain any identified roosting sites or primary foraging areas for waterbirds. The nearest roosting sites are located more than 4 km from Crib Point at Long Island Point to the north, or across North Arm at Fairhaven on French Island and are not expected to be impacted by noise or light from the FSRU (any potential light spill from the FSRU will be minimised in accordance with applicable legislation and guidelines). The next closest roosting site is located at Sandy Point more than 6 km south of Crib Point. The nearest primary foraging areas extend over the intertidal mudflats to the north of Crib Point and south of Long Island Point. · The Project has the potential to affect some plankton and planktonic life stages of some marine invertebrate species through biological entrainment, exposure to cooler seawater and residual chlorine from the FSRU discharge. However, these effects would be limited to a confined part of the North Arm, within the Ramsar site and are unlikely to affect marine invertebrate populations or EPBC Act listed threatened species. · Biological entrainment modelling indicates that larvae that can maintain position in preferred nearshore habitats, such as mangroves, seagrasses and shallow nearshore waters, are unlikely to be entrained; and larvae, eggs and other propagules (e.g. mangrove seeds / propagules) that drift or travel on the water surface or near the seabed are unlikely to be entrained.
<p>CRITERION 5: Regularly supports 20,000 or more waterbirds.</p>	<ul style="list-style-type: none"> · The Western Port Ramsar site regularly supports about 10,000 to 15,000 migratory waders, and periodically supports 1,000 to 3,000 ducks and 5,000 to 10,000 Black Swans. · As per response in Criterion 2, there are 58 marine birds that may use the Project area, however the scale of the proposed impacts associated with the Project and the known information regarding use of the area by marine birds suggests that there are unlikely to be significant impacts to threatened and migratory marine birds. · All of the intertidal mudflats of Western Port are considered to be suitable foraging areas for waterbirds. · The Project will not involve any direct physical disturbance of intertidal flats and is not expected to indirectly impact on these communities as a result of any potential noise or FSRU water discharge, given that cooler seawater would only be present in the deeper channel of North Arm at water depths greater than 12.5 m. · The Project Site does not contain any identified roosting sites or primary foraging areas for waterbirds. The nearest roosting sites are located more than 4 km from Crib Point at Long Island Point to the north, or across North Arm at Fairhaven on French Island. The next closest roosting site is located at Sandy Point more than 6 km south of Crib Point. The nearest primary foraging areas extend over the intertidal mudflats to the north of Crib Point and south of Long Island Point. · Of the migratory bird species identified in the PMST report, 21 are marine species that are not impacted by the

	<p>proposed works. Five are terrestrial, some of which may utilise the landside component for foraging, but this is expected to be very rare and the site is not considered significant habitat for these species. Twenty-eight (28) are wetland species. The assessment area provides minimal habitat values for these species and it is not considered to be significant habitat.</p> <ul style="list-style-type: none"> · In summary, the Project is unlikely to directly affect waterbirds in North Arm and most unlikely to affect waterbirds elsewhere in Western Port.
<p>CRITERION 6: Regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.</p>	<ul style="list-style-type: none"> · The Western Port Ramsar site regularly supports more than one per cent of the estimated flyway population of five wader species. The site also regularly supports internationally significant numbers of several non-wader species. · Refer to response to Criterion 5.
<p>CRITERION 7: Supports a significant proportion of indigenous fish subspecies, species or families, lifehistory stages, species interactions and/or populations that are representative of wetland benefits and/or values and contributes to global biological diversity.</p>	<ul style="list-style-type: none"> · Not considered applicable to Western Port in KBR (2010) and DELWP (2017a) reviews.
<p>CRITERION 8: Important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.</p>	<ul style="list-style-type: none"> · Seagrass beds within the Western Port Ramsar site are known to provide important nursery habitat for a number of fish species, including commercially significant species. · The Project will not involve any removal of mangroves, saltmarsh or seagrass beds or physical disturbance of intertidal flats. · The discharge modelling demonstrates that the proposed cold-water discharge from the FSRU rapidly descends to the seabed (approximately 12.5 m), due to its higher density. The behaviour of the proposed water discharge means that key marine habitats in shallow waters adjacent to the FSRU (i.e. saltmarsh, mangroves, mudflats, seagrass beds and channel slope communities) are not predicted to be impacted. · As per response in Criterion 4, above, there may be possible effects on plankton and planktonic life stages of some marine invertebrate species.

	<ul style="list-style-type: none"> Species that occupy habitats in water depths greater than 12.5 m in the vicinity of the discharge may be exposed to a seawater temperature 0.3°C cooler than ambient seawater temperature. However, this temperature difference is well within the natural daily variation of the receiving environment. Biological entrainment modelling undertaken for the Project indicates that no significant impacts on local biota are likely to occur as a result of biological entrainment through the FSRU seawater intake (Attachment 7), as described in Section 2.6.2 of this Referral.
<p>CRITERION 9: Regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.</p>	<ul style="list-style-type: none"> Not considered applicable to Western Port in KBR (2010) and DELWP (2017a) reviews.
<p>SUMMARY</p>	<p>Based on the above assessment, the Project presents negligible risk to five of the seven applicable Ramsar criteria. There is negligible risk in relation to direct effects on waterbird populations. There is possible interaction of the Project (cold-water discharge, residual chlorine and entrainment pathways) in relation to four of the five Ramsar criteria due to potential localised effects on the planktonic life stages of some marine invertebrate species. However, this interaction will occur within a confined part of less than 1% of the North Arm within the larger Ramsar site.</p>