Expert Evidence

EASTERN ASH AMENDMENT C391GGEE: Stormwater Management & Biodiversity Assessment

Prepared for:
Maddocks Lawyers

Prepared by:
Lance N Lloyd, B.Sc., M.Sc.

15th November 2021

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1 EXPERT EVIDENCE INFORMATION

This report has been prepared in accordance with the Planning Panels Victoria "Guide to Planning Expert Evidence".

1.1 Expert's Name and Address

Lancelot Neil Lloyd

Director and Principal Ecologist

Lloyd Environmental Pty Ltd

PO Box 348, Somers, Victoria, 3927

1.2 Expert's Qualifications, Experience and Area of Expertise

Lancelot Neil Lloyd, BSc, MSc.

Master of Science, University of Adelaide, 1987

Bachelor of Science, University of Adelaide, 1981

Area of expertise: Aquatic Ecology; Environmental Flows; Ramsar Wetlands

Lloyd Environmental Pty Ltd

Lloyd Environmental Pty Ltd is a specialist consulting practice providing quality services to the water and environment industries in Australia. The company was established in 1998 and is led by myself, Lance Lloyd, BSc, MSc. I provide:

- a detailed knowledge of the ecology and habitat requirements of aquatic fauna;
- extensive experience in the assessment of the water management requirements of streams, wetlands and estuaries;
- extensive Ramsar wetland experience; and,
- high level strategic analytical skills.

I have had over 30 years' experience in environmental consulting, research and management. My key expertise developed over this time is in relating the ecology of aquatic systems to the needs of management issues. The majority of my work during my professional life, since 1979, has been in the ecology of aquatic and floodplain ecosystems and water regimes in flowing & lentic waters and their management. My postgraduate studies, major projects, and several published papers, have focused upon the central role of environmental water management to the ecology and biological requirements of fish, invertebrates and plants.

I have played a key role in developing environmental water concepts and has applied these concepts to over ~30 environmental flow assessments on rivers, wetlands and estuaries. I have published widely in fish ecology and aquatic fauna, water, wetland management, and environmental flows in scientific papers and management reports. I have been an innovator in the Ramsar process, having been appointed by the Department of the Environment (then SEWPaC) to a panel for 'The Development and Technical Review of Ramsar Wetland Documentation', working closely with the Department to update and refine the Guidelines for the preparation of Ecological Character Descriptions (ECD), preparation of ECDs and Ramsar Information Sheets (RIS), and reviewing multiple ECDs, RISs and Ramsar Management Plans (including those for the Edith Vale-Seaford Wetlands).

I am very familiar with the site where stormwater will discharge to Lake Connewarre, from previous work on the site and within the region. I was co-author of the work with Venant Solutions report in 2019 and other previous work for the CCMA (on Lake Connewarre and

the lower Barwon River and its wetlands) and Dept of Agriculture, Water and Environment, Australian Government (on the impacts from stormwater on Lake Connewarre) and the developers of the adjacent Mollers Lane development. I have undertaken ecological or environmental studies at most of Victoria's Ramsar sites over the last 24 years.

I have undertaken an extensive range of ecological and water quality consulting and research projects, including land and water management plans, as well as monitoring, evaluating, and reporting for the improvement of aquatic ecosystems. This work has included ecological studies, environmental impact assessments, risk assessments, water quality and biological monitoring, and data interpretation and reporting. I have undertaken projects in water resource management, including the delivery and management of water, and the assessment and treatment of risks to water resources. I have also undertaken multiple peer review of documents, reports or issues and also been involved with previous VCAT and planning proceedings.

The CV of my expertise is found in Attachment A.

1.3 Reference to any private or business relationship between the expert witness and the party for whom the report is prepared

Nil, other than current engagement.

1.4 Instructions defining Scope

Maddocks Lawyers (acting on Eastern Ash Pty Ltd) has retained my services and defined the scope my instructions.

These are presented in Section 2 and the list of documents provided to me are is found in Attachment B.

1.5 The facts, matters and all assumptions which form the basis of the report

Provided in Section 2 to Section 4 of this report.

1.6 Reference to documents and other materials used by the expert

I have used a variety of documents and other materials that I was instructed to consider or take into account in preparing my report. Further, I have also referenced other literature or material used in making the report. All documents and other materials used in the report are referenced within Section 3.

1.7 The identity and qualifications of the person who carried out any tests or experiments upon which the expert relied in making the report

Nil

1.8 Statement of the expert

Provided in Section 4 of this report.

1.9 A signed declaration by the expert

See Section 5.

2 INSTRUCTIONS

I have been instructed by Maddocks Lawyers (acting on Eastern Ash Pty Ltd) to undertake the following:

A. review the following documents:
   1. all exhibited Amendment documentation, with particular attention to the elements relevant to your expertise contained within:
      - DDO46; and
      - the draft Planning Permit.
   2. the Spiire Report (Spiire. 2020. Ash Road East Leopold Stormwater Management Plan Report);
   3. the Venant Solutions Report (Venant Solutions. 2019. Ash Road Development, Flows to Lake Connewarre Impact Assessment Report);
   4. Eastern Ash's submission on the Amendment and the revised concept plan attached; and
   5. all submissions lodged in respect of the Amendment, with particular attention to those raising issues in relation potential impacts of the development on the biodiversity of Lake Connewarre;

B. prepare a statement of evidence and appear as an expert witness at the Panel Hearing, listed to commence on 22 November 2021 (pre-set dates). Your expert witness report should:
   1. be prepared in accordance with the Guide to Expert Evidence;
   2. not refer to any submitter by name (please use submission numbers);
   3. express your opinion on the Amendment insofar as it relates to the impact of the Amendment on the biodiversity values of Lake Connewarre. In particular, we ask that you consider:
      (a) DDO46;
      (b) the draft Planning Permit.
      (c) the Spiire Report;
      (d) the Vernant Solutions Report;
      (e) Eastern Ash's submission on the Amendment and the revised concept plan attached; and
      (f) issues raised in submissions to the Amendment, including concerns or issues raised regarding biodiversity impacts on Lake Connewarre.

3 KEY DOCUMENTS

In undertaking this review, I have read all the relevant documents and technical documents necessary to assess impacts from the development on Lake Connewarre, its biodiversity and its Ramsar status.

In particular, I have focussed upon the following documents as provided by Maddocks:

03 - Schedule 46 to clause 43.02 (DDO) (Exhibited)

05 - DDO46 Map (Exhibited)

06 - Draft Permit (Exhibited)

14 - Biodiversity Assessment (Ecolink Consulting, July 2018)

15 - Growling Grass Frog Survey Report (Ecolink Consulting, December 2020)

16 - Stormwater Management Plan Report (Spiire, February 2020) (the Spiire Report);

17 – Ash Rd Development – Flows to Lake Connewarre Impact Assessment (Venant Solutions Report 2019)

18 - Landscape Masterplan (Tract, December 2020)

22.1 - Eastern Ash Pty Ltd - Exhibition Submission to Amendment C391

22.2 - Alternative subdivision concept plan attached to Eastern Ash submission

23 - Amendment C391 Combined Submissions_Redacted 16.07.2021

24 - CCMA submission to exhibited Amendment C391

25 - Letter from Spiire to Council July 2021

4 FINDINGS

4.1 Introduction

The Ash Road Development is a proposed urban sub-division located in Leopold to the south-east of Geelong in Victoria. It is currently farming land and is located within a catchment that drains to Lake Connewarre.

Lake Connewarre is part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site. The Lake Connewarre Complex includes Reedy Lake, Hospital Swamp, Salt Swamp Murtnaghurt Lagoon and the Barwon River estuary, each with their own unique values and assets (DELWP, 2018). Lake Connewarre operates under a complex hydrological regime with inflows from local catchment runoff, tidal flushing, inflow from the Barwon River during freshes, and possibly inflow from groundwater.

Ramsar sites are wetlands of international significance and are designated as Ramsar sites if they meet one (or more) of nine criteria, established by the Ramsar Secretariat, in Switzerland (see www.ramsar.org). Ramsar wetlands are protected in Australia and considered a matter of national environmental significance under the EPBC Act (1999). Any development likely to have a significant impact on a matter protected by the Act requires approval from the Australian Government Environment Minister.

Venant Solutions (2019) described the changes to catchment runoff volume into Lake Connewarre resulting from urbanisation of the Ash Road development and assessed any impact of the additional runoff on the ecological character of Lake Connewarre and receiving environments of the foreshore and littoral habitats at the lake's margins. Urbanisation of a catchment increases the percentage of impervious surfaces which invariably leads to an increase of flows off an area following rain events, higher peaks (flashier flows) in those flows and less base flow due to less infiltration of rain into the soil.

4.2 Impact Assessment Aproach

In assessing the impact from additional stormwater on the environmental values downstream of the development, it was decided that the highest values and most sensitive components were ecological character of the Ramsar site of the broader Lake Connewarre, it's foreshore and the littoral zone (at the lakes edge).

The other environmental values of the creek line in-between the Connewarre foreshore, and the development were not considered because many of the environmental values this system have been lost and the Ramsar site was likely to be a more sensitive receiving environment. Victorian Biodiversity Atlas (VBA) searches of the area under development and the creek line failed to identify any significant values that may be affected by water regime changes.

The approach for the environmental assessment following that of the Venant Solutions (2019) report but specifically included these steps for this evidence:

1. Describe the Ecosystem and Ramsar Values (including a new biodiversity database search; VBA 2021);
2. Analyse the change to monthly surface flow volumes to Lake Connewarre and the foreshore; and
3. Assess potential ecosystem changes to the broader Lake Connewarre and to the foreshore and littoral zone.

The approach and results are summarised in the following sub-sections.

4.3 Ramsar Site and Environmental Values

The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site is a multi-location wetland system which are along the western shoreline of Port Philip Bay from Point Cook (an outer suburb of Melbourne) to areas near Geelong, Victoria, Australia. The Ramsar Site comprises six distinct areas that include Point Cook/Cheetham, Werribee/Avalon, Point Wilson/Limeburners Bay, Swan Bay, Mud Islands, and the Lake Connewarre Complex including Lake Connewarre, Reedy Lake, Murtnaghurt Lagoon and the Barwon River estuary, each with their own unique values and assets (DELWP, 2018).

The part of Ramsar Site which could potentially be affected is the Lake Connewarre Complex. The tidal range within the Lake Connewarre Complex is dampened in amplitude compared to the Barwon River and the Bass Strait, adjacent to the mouth, due to the narrow opening of the Barwon Heads. The Ramsar Site supports a variety of wetland types ranging from shallow marine waters to seasonal freshwater swamps and extensive sewage ponds. Wetland areas include freshwater lakes, estuaries, mangrove, saltmarshes, intertidal mudflats and seagrass beds. This Ramsar Site is a major area in Australia for migratory waders and the most important in Victoria. Large numbers of bird species including Pied Oystercatchers, Banded Stilts, Red-necked Stint, Sharp-tailed Sandpiper, Fairy Tern, Australasian Shoveler, Red-necked Avocets, Blue-billed Duck, and Freckled Duck, have been recorded at the Ramsar Site (DELWP, 2018).

The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site meets five of the nine criteria for Ramsar listing (DELWP, 2018; Attachment C).

- Criterion 2: Supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
- Criterion 4: The Ramsar site supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.
- Criterion 5: Wetlands in the Ramsar Site regularly supports 20,000 or more waterbirds.
- Criterion 6: Port Phillip Bay (Western Shoreline) and Bellarine Peninsula regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
- Criterion 8: An important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

The major values of the Ramsar Site are described by the Strategic Management Plan (Parks Victoria and DSE, 2003, DELWP, 2018, Venant 2019).

The most relevant values to this assessment are the habitat types which are found at the Lake Connewarre Complex and onsite at the discharge zone. These include saltmarshes and estuarine wetlands which support internationally significant numbers of Curlew Sandpipers (*Calidris ferruginea*) and Sharp-tailed Sandpipers (*Calidris acuminata*), which largely contribute to listing criteria 2 and 6 (Parks Vic and DSE 2003, Department of the Environment 1999; DELWP 2018). The foreshore, littoral zone and open water of Lake Connewarre provides an area of saltmarshes and estuarine wetlands (samphire, saltbush and aquatic plants) as well as the sandy and exposed sediments along the lake edge (littoral habitat) which could potentially be affected additional flows from the development. There is also the foreshore floodplain habitat surrounding Lake Connewarre above normal lakes levels and the littoral zone habitat around the edges of Lake Connewarre and its open water habitat. These are all potentially affected by the development in different ways, so are considered separately.

4.4 Foreshore Habitat Values

Just prior to entering Lake Connewarre, the waterway, ultimately conveying the runoff from the Ash Road Development, is controlled by a private dam. The private dam outlets into the foreshore land area. The waterway does not continue across the foreshore and into the Lake, as runoff disperses across the foreshore and into the Lake. The outfall of the creek system into Lake Connewarre potentially affects about 150m of foreshore habitat which is about 0.7ha in total area.

The areas were inspected in 2017, and twice in 2019, for previous work. No site inspection was undertaken for this evidence. To provide context for this potential impact into a Ramsar Site context, a Victorian Biodiversity Atlas (VBA) search was conducted in Jan 2017, Sept 2019, Dec 2019; for other work and, then again, in Nov 2021, for this evidence). These searches covered the foreshore habitat was undertaken along the part of Lake Connewarre close to the outfalls from the proposed development and within a significant buffer zone of similar habitat to identify potentially affected species.

There were no flora or fauna species, at all, recorded on the Victorian Biodiversity Atlas in the potentially impacted foreshore habitat zone in the Ramsar Site (VBA Search Jan 2017, Sept 2019 and Dec 2019). That said, the riparian and littoral habitat zone of the Lake Connewarre section of the Ramsar Site is known to support international significant numbers of Curlew Sandpipers and Sharp-tailed Sandpipers (Parks Vic and DSE, 2003), and impacts will be assessed for these species regardless of recordings in the database (it is known that these species can be mobile between parts of the foreshore and Lake).

The habitats within this zone consist of samphire and lignum swamp (which is illustrated in Plates 1 to 3). The current condition of samphire and lignum swamp is poor in the potentially affected zone due to clearance, grazing and weeds (it is private land and has been subject to stock grazing for many years). The samphire and lignum vegetation community on either side of the potential impact site (foreshore zone) is much more extensive, and in healthier condition. This means the vegetation in the potentially affected area is already made up of tolerant species and is less likely to change further.

Plate 1: Foreshore to the East of Mollers Lane and area of the outfall of the stormwater from Ash Road, showing degraded samphire and lignum vegetation and potentially affected by the Ash Road Development.

Plate 2: Foreshore to the West of of Mollers Lane showing high quality samphire, chenopod (saltbush) and lignum vegetation in natural condition which will be unaffected by the Ash Road Development.

4.5 Littoral Zone and Open Water Habitat Values

The lake edge (littoral zone) and open water habitat is in good condition with a natural water regime with few habitat alterations (Plates 3-5). Waves and tidal events, as well as Barwon River inflows, are likely to be the main hydrologic drivers of the system, rather than local inflows. Local stream flows which are relatively small in the scale of other hydrological drivers (waves, tidal events and Barwon River inflows).

A search of the listed species on the Victorian Biodiversity Atlas of the Littoral Zone and Open Water Habitats zone was undertaken to identify potentially affected species. The search area included 1km either side of the proposed outfall along the edge of Lake Connewarre and out into the Lake by approximately 250m from the highwater mark. The search showed here were no listed flora or fauna species, recorded on the Victorian Biodiversity Atlas in the potentially impacted foreshore or open water habitat zone in the Ramsar Site (VBA Search - Jan 2017, Sept 2019 and Dec 2019; Nov 2021). That said, the littoral habitat of the Lake Connewarre complex of the Ramsar Site is known to support internationally significant numbers of Curlew Sandpipers and Sharp-tailed Sandpipers (Parks Vic and DSE, 2003), and impacts will be assessed for these species regardless of recordings in the database (as these species frequently move between areas of the foreshore and Lake). This habitat is illustrated by the photos in Plates 3 to 5.

Plate 3: Samphire vegetation community found in both the littoral zone and the foreshore habitat.

Plate 4: Littoral habitat zone next to potential outfall, showing freshwater inflows across the aquatic plants, *Ruppia polycarpa* and *Lepilaena cylindrocarpa.*

Plate 5: Open water habitat of Lake Connewarre near Mollers Lane.

4.6 Potential Impacts

The previous assessment of the potential ecosystem changes undertaken by Venant (2019) was assessed and is re-affirmed in this evidence. The assessment considers the broader Lake Connewarre as well as the foreshore and littoral zone.

4.6.1 Lake Connewarre - Open Water and Littoral Habitat

The modelling shows that there is likely to be a small increase in flows reaching Lake Connewarre of less than 6% throughout the year (see Venant 2019). Further, this is a very small increase in total volume compared to the volume of water in Lake Connewarre. It is therefore unlikely to affect any of the ecological components in Lake Connewarre or the littoral zone unless significant sediment or nutrient flows reach the littoral habitat The littoral zone regularly receives freshwater inflows under the current regime. These will be mitigated by water sensitive urban design (WSUD) within the development. The effective increases in flows are less than 15ML/month at most during any month and are minor compared to the flows of ~300 ML/month from the catchment itself and almost negligible compared to the overall volumes, tidal exchange and mixing within Lake Connewarre and the flows into the Lake from the Barwon River.

4.6.2 Foreshore Habitat

The significant flow changes noted in Venant (2019) are likely to lead to significant changes to water quality or ecology of the foreshore habitat in a small area (~0.7ha) adjacent to Lake Connewarre (Venant 2019). Nutrient and sediment changes into this section of Lake Connewarre could have localised impacts, given the increase of low salinity water inflows. However, given the very small area of the Ramsar Site which is affected, even under extreme conditions, there is low risk to Ramsar values in the foreshore habitat zone.

4.6.3 Ramsar and EPBC Act Impacts

There are five criteria which the EPBC Act uses to assess impacts on Ramsar sites and EPBC listed species and for determining if an action is likely to have a significant impact on ecological character. These include:

1. Area of the wetland being destroyed or substantially modified.
2. A substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland.
3. The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected.
4. A substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health.
5. An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.

The internationally significant birds, Curlew Sandpipers (*Calidris ferruginea*) and Sharp-tailed Sandpipers (*Calidris acuminate*), are listed for the Ramsar Site although none were specifically recorded at the Foreshore Site (VBA Search Jan 2017, Sept 2019 and Dec 2019; Nov 2021). These birds prefer feeding in the exposed muddy and sandy margins of wetlands particularly those that are regularly inundated and exposed alternately, and shelter in the foreshore habitat such as the margin of Lake Connewarre (Parks Vic and DSE, 2003, Department of the Environment 1999, DELWP 2018). This habitat is at low risk of being affected by this development (despite the scale of the hydrological changes locally, given the exposed muddy and sandy margins are a product of the wave action from the lake).

Further, mitigation measures under consideration, such as, the pipeline diversion, Water Sensitive Urban Design (WSUD), within the development in accordance with the proposed stormwater management plan (Spiire 2020), habitat improvements upstream and creation of wetlands to detain and treat stormwater are likely to reduce the impacts further to these species or their habitat.

In summary, the EPBC Act (Australian Government 1999) deems a significant action to be one which will have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in one or more of five criteria. These are examined in Table 1.

Table 1: EPBC Act criteria and assessment of the stormwater outflows from the proposed development of Ash Road.

No.	Criteria for determining of an action is likely to have a significant impact on ecological character	Assessment
1	Area of the wetland being destroyed or substantially modified.	The area of saltmarsh and other aquatic plant habitat in the foreshore and littoral zone which may be potentially affected by the development would be a very small area (~0.7ha). Waves and tidal events as well as Barwon River inflows are likely to be the main hydrologic drivers of the system, rather than local inflows. The scale of local hydrological changes from increased run-off (less than 6%) of the local catchment is minor. Further still, these amounts are very minor compared to the flows from the Barwon River, resulting in almost no expected changes to the Lake and littoral conditions.
2	A substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland.	Modelling showed that the development will cause up to about ~90% increase in flows to the foreshore habitat in summer (see Venant 2019). This may have significant impacts on the foreshore habitat, but this is only a small area inundated (see Venant 2019) of ~0.7ha, which is a very small area of the total habitat in the Ramsar Site. Water Sensitive Urban Design (WSUD) will reduce the possible water quality impacts.
3	The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected.	The area of saltmarsh and other aquatic plant habitat in the foreshore and littoral zone which may potentially be affected by the development would be a very small area (~0.7ha). Sandpipers which are listed and important for that part of the Ramsar Site, do prefer feeding in the exposed muddy and sandy margins of wetlands, such as the margin of Lake Connewarre. These species are not recorded at the foreshore near the proposed outfall in VBA

No.	Criteria for determining of an action is likely to have a significant impact on ecological character	Assessment
		searches from 2017 to 2021. This habitat is at low risk of being affected by this development (given the scale of the hydrological changes). Mitigation measures such as WSUD within the development, habitat improvements upstream and creation of wetlands to detain and treat stormwater will further reduce the impacts to these species or their habitat.
4	A substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	The small creek system has relatively small inflow, generally <50 ML/month, compared to Barwon flows of the 10,000 ML/month. These inflows are unlikely to affect the whole of Lake Connewarre. Furthermore, the increase in flow is less than ~15 ML/month. While localised impacts may occur, they will be infrequent and WSUD mitigation measures are likely to reduce these risks.
5	An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.	The development is unlikely to facilitate the establishment of invasive species. In fact, rehabilitation of the Development Site upstream, may reduce risks from invasive species, that could be controlled in rehabilitating the creek environment.

This assessment concludes that it is unlikely that this development would trigger provisions under the EPBC Act (Australian Government 1999) as:

- The small scale of hydrological changes from increased run-off (up to 6% of the local catchment and even less when compared to the flows from the Barwon River) would result in no expected changes to littoral zone and open water conditions. Further it does not have a substantial change on the hydrological regime of the wetland, and those changes are unlikely to have a large effect on volumes, durations or extent of natural flows;
- The development only affects a small area of the foreshore habitat of Lake Connewarre (~0.7ha) and even though there is a large increase in flows to this area, the impacts would be minor across the Ramsar Site meaning that the habitat or lifecycle of listed species, will not be seriously affected;
- The development is unlikely to affect water quality of Lake Connewarre at all and only potentially affects the water quality of the shoreline of Lake Connewarre in a very minor way. WSUD measures will reduce these impacts further;
- The development will not cause invasive species establishing or expanding at Lake Connewarre.

In relation to Victorian Government legislation, the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (Department of Sustainability and Environment 2006) sets out what might a 'significant effect on the environment' be? The criteria for assessing the potential for a development to cause a significant effect on the environment includes the following:

- significance of the environmental assets affected is influenced by the:
    - character of the potentially affected environmental assets;
    - geographic occurrence of the environmental assets; and
    - values or importance of the assets;
- potential magnitude, extent and duration of adverse effects on environmental assets in the short, medium and longer term; and
- potential for more extended adverse effects in space and time.

These guidelines are assessed on essentially the same criteria as the Ramsar/EPBC requirements as these are the most significant values of the region, but other values are considered (Venant 2019).

For the same reasons as the Ramsar/EPBC assessment, it is regarded as unlikely that this development would trigger Victoria's EES provisions due to the limited nature of impacts occurring, the low number of significant environmental assets potentially affected and the limited impacts across space and time.

4.7 Relevance of other documents

Document	Relevance to evidence or where evidence addresses issues raised by document
03 - Schedule 46 to clause 43.02 (DDO) (Exhibited)	Directly relevant as it sets up system to ensure the proposed amendment's objectives are met: • Clear ecological, hydrological and water objectives: "To ensure best practice stormwater management and water quality treatment to prevent any adverse impact on downstream areas, in particular on Lake Connewarre." • Contains Design features which ensure Water Sensitive Urban Design (WSUD) principles are followed as set out in the "Urban Stormwater: Best Practice Environmental Management Guidelines (CSIRO, 1999), Infrastructure Design Manual, and City of Greater Geelong Design Notes." • A stormwater management system should be designed to ensure that: ○ no adverse impacts to any surrounding land, upstream or downstream including to Lake Connewarre. ○ peak discharge rates and pollutant loads of all stormwater leaving the site post-development are regulated to integrate with downstream infrastructure, at no greater than pre-development rates. This stormwater system provides for the mitigation of hydrological and water quality impacts from urban development onsite, which is assumed to be in place in assessing impacts in Table 1 of the evidence.
05 - DDO46 Map (Exhibited)	Map covering area that amendment applies.
06 - Draft Permit (Exhibited)	This permit sets out the criteria for stormwater management in terms of water quality and quantity as well as broader stormwater and environmental management and maintenance. The most relevant are: • Condition 4. Prior to the lodgement of the Functional Layout Plan for the first stage of development, an addendum to the Ash Road East Stormwater Management Plan and Ash Rd Development - Flows to Lake Connewarre Impact Assessment for the South East Leopold Growth Area must be submitted and approved by the Responsible Authority. The assessment must include but not be limited to an assessment of; a) the adopted ultimate stormwater management plan for Mollers Lane development PP-1463-2016, approved by the City of Greater Geelong b) any interim stormwater measures approved c) the constructed outfall infrastructure to Lake Connewarre d) and propose a stormwater strategy design response to the ultimate stormwater management plan and constructed assets. The addendum assessment must be submitted to and approved by the Responsible Authority, to the satisfaction of the Responsible Authority.

Document	Relevance to evidence or where evidence addresses issues raised by document

	• Condition 6a. The stormwater drainage system on the site must be designed such that stormwater run-off exiting the land meets the current best practice performance objectives for stormwater quality as follows:
	  ○ 80% retention of the typical annual load of suspended solids;
	  ○ 45% retention of the typical annual load of total phosphorous;
	  ○ 45% retention of the typical annual load of total nitrogen; and
	  ○ 70% retention of the typical annual load of gross pollutants.
	• Condition 6b. Site run-off shall be limited to equivalent pre-developed levels for rainfall events up to and including the critical 1% AEP event, to the satisfaction of the Responsible Authority.
	• Condition 6c. Water Sensitive Urban Design (WSUD) Landscape Plans:
	"Unless otherwise approved in writing by the Responsible Authority, prior to works commencing for each relevant stage of the subdivision, plans which outline the WSUD landscaping elements must be submitted to and approved by the Responsible Authority."

14 - Biodiversity Assessment (Ecolink Consulting, July 2018)	This document sets out biodiversity management guidelines and assessments carried out on the subject land. It indicates the land is highly modified and few of the original nature values persist. It does not comment on the discharge location of the stormwater on the edge of Lake Connewarre.
15 - Growling Grass Frog Survey Report (Ecolink Consulting, December 2020)	Survey for Growling Grass Frogs resulted in no records of that species but did identify the presence of 4 other species, at the development site. It is unlikely for any frog species to inhabit the saline habitats along the foreshore or Lake Connewarre in any case.
16 - Stormwater Management Plan Report (Spiire, February 2020) (the Spiire Report)	This report is directly relevant as it models the likely stormwater impact from the development and designs. It proposes a system of stormwater management and water quality treatment options which exceeds requirements as set out in the proposed amendment.
17 – Ash Rd Development – Flows to Lake Connewarre Impact Assessment (Venant Solutions Report 2019)	The Venant (2019) Report directly assessment the stormwater run-off to the creek system and Lake Connewarre. It is summarised, reviewed and refined by the evidence provided in sections 4.1 to 4.5.
18 - Landscape Masterplan (Tract, December 2020)	This plan gives effect to the criteria and designs set out in documents 03, 05, 06 and 16.
22.1 - Eastern Ash Pty Ltd - Exhibition Submission to Amendment C391	This document provides strong support for the Amendment and provides submissions to the exhibited amendment as well as a revised concept plan to respond the condition 1 of the exhibited planning permit (document 06).

Document	Relevance to evidence or where evidence addresses issues raised by document
23 - Amendment C391 Combined Submissions_Redacted 16.07.2021*	*Submission 05 refers to the need to protect the ecological character of Lake Connewarre and may require an application to Commonwealth Government to allow them to assess if the development is a controlled action.* The evidence provided above addresses these issues in detail. The evidence is that the mitigation elements and WSUD design would mean any impacts are reduced to such a level they would not cause an adverse impact on the ecological character of the Lake Connewarre component of Ramsar site. *Submission 07 believes the development may impact upon the Ramsar Wetlands of Lake Connewarre.* The evidence is that the mitigation elements and WSUD design would mean any impacts are reduced to such a level they would not cause an adverse impact on the ecological character of the Lake Connewarre component of Ramsar site. *Submission 010 highlights a lack of integration of stormwater between the Ash Rd development and Mollers Lane development.* Document 25 (letter from Spiire to Council dated 17 July 2021) highlights the need for an integrated stormwater solution for multiple developments. However, the level of impacts from either development are not large, so this is seen as a planning issue and not one concerning impacts on Lake Connewarre or its ecological character (however, refer to the response to document 25 below). *Submission 011 states the ecological significance of Lake Connewarre may be impacted.* The evidence provided is that the mitigation elements and WSUD design would mean any impacts are reduced to such a level they would not cause an adverse impact on the ecological character of the Lake Connewarre component of Ramsar site. *Submission 013 states the development will directly affect Lake Connewarre with respect to wildlife and marine (sic) habitat.* The evidence provided is that the mitigation elements and WSUD design would mean any impacts are reduced to such a level they would not cause an adverse impact on the ecological character of the Lake Connewarre component of Ramsar site. *Submission 015 states there may be leakage to the delicate waterways of Lake Connewarre (presumably from flow impacts from upstream).* The evidence provided addresses this concern and indicates that the

Document	Relevance to evidence or where evidence addresses issues raised by document
	mitigation elements and WSUD design mean any downstream impacts on Lake Connewarre are minor. *Submission 016 states there may be impacts on the natural environment and wildlife.* While not stated directly, we assume this also refers to lake Connewarre (as well as the development site). The evidence provided addresses this concern and indicates that the mitigation elements and WSUD design mean any downstream impacts on Lake Connewarre are minor.
24 - CCMA submission to exhibited Amendment C391*	*This submission supports the overall amendment with the proviso that additional stormwater harvesting (perhaps through oversizing the wetland and use of water for irrigation of public space) and the authority wishes to review the plan prior to adoption.* The evidence provided addresses this concern and indicates that the mitigation elements and WSUD design mean any downstream impacts on Lake Connewarre are minor.
25 - Letter from Spiire to Council dated 17 July 2021	*This document summarises the nature of the future SELGA stormwater system and confirms the requirements of the SELGA outfall arrangement.* This outfall would develop an integrated solution to stormwater to multiple developments – Ash Road, Mollers Lane and potentially others. Importantly, it removes the significant impacts to the foreshore habitat (described in the evidence in sections 4.4 and 4.6.2 and in Table 1 – second criteria) and addresses issues that submission 05 raises on erosion along the natural creek and gully and impacts this may cause.

* Italics is summary of submission and non-italicised text is the author's response.

4.8 References

Australian Government. 1999. Environmental Protection and Biodiversity Conservation Act, 1999. Commonwealth of Australia.

Department of the Environment. 1999. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Information Sheet.

Department of Environment, Land, Water and Planning. 2018. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site Management Plan Summary. Department of Environment, Land, Water and Planning, East Melbourne.

Parks Victoria and DSE. 2003. Port Phillip Bay Western Shoreline and Bellarine Peninsula Ramsar Site Strategic Management Plan.

Spiire 2020, ASH ROAD EAST LEOPOLD STORMWATER MANAGEMENT PLAN Report for EASTERN ASH PTY LTD. Authors: A. Davidson Spiire Australia Pty Ltd. Project Number 305162.

VBA Search. 2021. Online search of the foreshore of Lake Connewarre at https://vba.dse.vic.gov.au/. Undertaken Jan 2017, Sept 2019 and Dec 2019; Nov 2021.

Venant Solutions. 2019. Ash Road Development, Flows to Lake Connewarre Impact Assessment Report. Venant Solutions Report No. R.M00258.001.01 for Spiire.

5 DECLARATION BY THE EXPERT

I have made all the inquiries that I believe are desirable and appropriate and no maters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Sincerely,

Lancelot Neil Lloyd, B.Sc., M.Sc.
Director and Principal Ecologist

Lloyd Environmental Pty Ltd

6 ATTACHMENT A: CV OF LANCE N LLOYD

Lance Lloyd, B.Sc., M.Sc.

Principal Ecologist,
Lloyd Environmental P/L

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Somers, Vic, 3927

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Lance Lloyd has **over 30 years** practical experience across SE Australia, and the Pacific Islands, in freshwater, estuarine, coastal and inland environments in ecology and management requirements. **Native fish ecology** and **water management** are his passions and he has published widely in **ecology**, **water** and **flow management**, and **wetland management** in scientific papers and management reports. He has substantial expertise and experience in **fish biology**, general **fauna ecology**, and habitat assessment of freshwater and other ecosystems across SE Australia (Qld, New South Wales, Victoria, Tasmania and South Australia). His major research and consulting projects, and several published papers have focused upon flows, fish and ecology.

Skills and Expertise

He played a key role in developing **environmental water** concepts and has applied these concepts to over 40+ environmental flow assessments on rivers, wetlands and estuaries. He has published widely in **fish ecology and aquatic fauna**, water, wetland management, and environmental flows in scientific papers and management reports. He has developed widely adopted methodologies for environmental water requirement (EWR) assessments for rivers, wetlands and estuaries for the Victorian and Australian Governments. He was the co-author of FLOWS, the Victorian state-wide guidelines for environmental flow assessments of rivers and contributed to FLOWS Edition 2. He led the development of EEFAM, the estuary environmental flow assessment methodology for Victoria.

Lance has been an innovator in **wetland ecology** and **Ramsar** assessments, having been appointed by the Department of the Environment (then SEWPaC) to a panel for 'The Development and Technical Review of Ramsar Wetland Documentation', working closely with the Department to update and refine the Guidelines for the preparation of Ecological Character Descriptions (ECD), preparation of ECDs and Ramsar Information Sheets (RIS), and reviewing multiple ECDs, RISs and Ramsar Management Plans. Lance has undertaken ecological or environmental studies at each of Victoria's Ramsar sites over the last 24 years.

A key component of his work has been **stakeholder and community consultation**. A majority of management projects undertaken by Lloyd Environmental have involved varying degrees of stakeholder consultation.

He has extensive experience working with various **indigenous and Traditional Owner** groups across Australia, New Zealand and the South Pacific on water and fish-related projects. This has included working with the Wadawurrung to develop cultural flows recommendations on the Upper Barwon River, in Victoria, and very recently providing flow recommendations to meet cultural objectives for the GunaiKurnai on the Latrobe River and wetlands. Two environmental water projects for the Gunditjmara for the culturally significant landscapes of Lake Condah and Darlot Creek. He has also worked with indigenous communities in southern Victoria (Bunurong), northern Victoria (Yorta Yorta), southern NSW (Barkindji) and Tasmania (for truwana - Cape Barren Island). In the last 5 years, he has worked with NZ Govt asses R&D proposals which are required to have a very strong requirement of incorporating Maori knowledge (Vision Matauranga) into all of their research. This work has required understanding of indigenous people's use of the land and water in the past and currently and how environmental water and wetland management would enhance their utility and cultural value.

Lance has had **significant local experience in the Barwon River system** and its tributaries. He has undertaken multiple FLOWS studies of the Barwon, a study of the Lower Barwon Wetlands, a project which examined the Impacts on Reedy Lake Eel Fisheries from water regime management and impact assessments for the Ramsar wetlands in the lower Barwon.

Positions Held

Current:

Principal Ecologist & Director, Lloyd Environmental Pty Ltd (1998 on)

Honorary Research Fellow, Federation University Australia (2014 on)

Member, Independent Technical Review Panel for the Barwon Downs Remediation and Environment Protection Plan, Southern Rural Water (2020 on)

Chair, Great Australian Bight Resource Assessment Group, AFMA (2013 on)

Member, Great Australian Bight Management Advisory Committee, AFMA (2013 on)

Member, Southern and Eastern Scalefish and Shark Fishery RAG, AFMA (2013 on)

Member, College of Assessors, MBIE, New Zealand Government (2015 on)

Previous:

Member, Victorian Catchment Management Council (2015-2018)

Chair, Translocation Evaluation Panel, Fisheries Victoria, DPI (2004 -2017)

Science Advisor, Water Quality Advisory Panel, MDBA (2005 – 2012)

Member, Fisheries Co-Management Council, Victoria (2002-2005)

Member, FRDC Fisheries Research Advisory Board, Victoria (2003-2005)

Rivers Program Co-ordinator, SI & E Program, Consultant to the MDBC (1998-2005)

Divisional Manager, Environmental Services Division, WATER ECOscience Pty Ltd (1994-1998)

Principal Scientist, Environmental Assessment Section, State Water Laboratory (1992-1994)

Senior Wetland Ecologist & Team Leader, Floodplain Ecology, Dept of Cons & Envt. (1990-92)

Research Officer, River Murray Laboratory, Uni of Adelaide (1986-1989)

Professional Affiliations

Australian Society of Fish Biology (Member, 1981 to present)

Australian Institute of Biology (Member since 1989; President, 2005 to 2016)

Australian Society for Limnology (Life Member, 1981 to present)

River Basin Management Society (Member, 1990 to present; President, 1999-2002)

Education & Qualifications:	Master of Science, University of Adelaide, 1987 Bachelor of Science, University of Adelaide, 1981 MAIBiol [Member, Australian Institute of Biology, 1989]
Further Study:	Accredited Water Stewardship Training and Advisor (Alliance for Water Stewardship – Asia Pacific) Media Training Course, Econnect Communications Pty Ltd (2004) Project Management Matrix System Workshop (MDBC 2003) Short Course on Stormwater Management (Monash Uni/CRCCH 1999) Prince2 Project Management Course (Tanner James - 1998) Peak Performance Leadership (LBA Consulting - 1998) Financial Management & Strategic Marketing Skills Courses (APESMA - 1995) Project Management (Training Interventions Australia - 1994) AEAM Computer Model Training Course (DCNR, Melbourne – 1992/1994) REALM Computer Model Training Course (DWR, Melbourne -1992)
OTHER POSITIONS:	President**, River Basin Management Society** (‘99 – ‘02) Member**, Water Quality & River Health Working Group, MDBC** (‘92 – ‘95) Member**, WQ Monitoring & Reporting Working Group, DPIE,** (‘92 – ‘95) Member**, Water Resources Council of South Australia,** (‘88 – ‘89) Member**, Community Advisory Committee, MDB Ministerial Council** (’89 & ‘90)

Project Experience

Lance has been involved in many strategically important projects in SE Australia for over 30 years. Some examples include:

- Environmental Flows of the Upper Barwon Catchment (2018)
- Expert advice regarding the Armstrong Creek residential development near Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar wetland, Victoria (2016)
- Flow/ecology relationships and scenarios for the Lower Barwon Wetlands environmental entitlement Project (2011-2012)
- Impacts on Reedy Lake Eel Fisheries from Water regime management
- Environmental Flows of the Barwon River and its Estuary (2006)
- Lower Moorabool Habitat Pools, CCMA (2020)
- Co-author of FLOWS methodology for EWR determination in rivers in Victoria (2002)
- EEFAM, the estuary environmental flow assessment methodology for Victoria (2008-2011)
- Seven Creeks Ecological Risk Assessment Project (2009)
- Tullaroop Creek Flows: Ecological Risk Assessment (2008)
- Ecological Risk Assessments of Broken Creek and Broken River (2008)
- Broken Creek Waterway Management Strategy (2004)
- Ovens River Environmental Water Management Plan (2015)
- SA River Murray Weir Operating Strategy (2009 - 2010)
- Coliban River Risk Assessment, Water Quality Impacts and Flows Study (2006)
- Environmental Flow Assessment of Lake Condah, Darlot Ck & Fitzroy Estuary (2007)
- Victorian Environmental Watering Partnership Risk Framework (2013)
- Mallee SDL Offset Works Risk Assessments Project (2014)
- Environmental Flow Options for the Hattah Lakes (2005)
- Lindsay Island Floodplain Fish Requirements Study (2012)
- Mallee Floodplain Wetlands Works and Measures Program (2012-2013)
- Environmental Guidelines Report for River Murray Operations (2010)
- Environmental Water Requirements of Water Dependent Ecosystems of the SA River Murray (2009-2010)
- Environmental Flow Options for Lindsay-Wallpolla Island (Mildura – Border; 2005)
- Water Management Opportunities for Floodplain Wetlands: Robinvale to Wallpolla Island, Mildura, Victoria, Mallee CMA, 2006
- Refinement of Ecological Objectives & Flow Requirements for Gunbower Creek (2015)
- Environmental flow options for River Murray - Nyah to Mildura (2006)
- Kings Billabong Water Regime Manipulation Feasibility Study (2006 and 2012)
- Audit of Northern Mallee Pipeline (Environmental Releases) Project
- SA River Murray Weir Operating Strategy
- Integrated Watering Strategy for Murray Wetlands
- Expert advice regarding the Armstrong Creek residential development near Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar wetland, Victoria. 2016.
- Audit of Northern Mallee Pipeline (Environmental Releases) (1999-2000)
- East Coast Lagoons Cape Barren Island Ramsar Site Management Plan (2016-17).
- Winton Wetlands Fish & Aquatic Habitat Management Plan and Restoration (2014 on)
- Implications of Environmental Trajectories for Limits of Acceptable Change at the Riverland Ramsar Site, South Australia (2016).
- Gippsland Lakes Environmental Strategy (2012).
- Gippsland Lakes Environmental Strategy Business Implementation Plan (2012).
- Ecological Character Descriptions - Gippsland Lakes and Corner Inlet Ramsar Sites (2007)
- Bass River and Estuary Environmental Flow Determination Project (2009)
- Lake Innes Restoration Plan (2012)
- Lake Condah Water Restoration Project: Hydrological Feasibility Study (2006)
- Lake Condah Weir Fishway Design (DSE)
- Lake Mokoan Restoration Program (1991-2001)

Publications

Lance Lloyd has established a substantial publication record with over 150 publications in local and international journals, books and management reports, some examples are below:

Arthington, A.H. & L.N. Lloyd. 1989. Introduced Poeciliids in Australia and New Zealand. In: Meffe, G.K. & K.F. Snelson (Eds). *Ecology and Evolution of Livebearing Fishes (Poeciliidae).* Prentice Hall, New Jersey, USA.

Boulton, A.J. & L.N. Lloyd. 1991. Aquatic macroinvertebrate assemblages in floodplain habitats of the lower River Murray. Regulated Rivers, 6: 183-201.

Boulton, A.J. & L.N. Lloyd. 1992. Flooding frequency and invertebrate assemblages emerging from floodplain sediments at Chowilla, lower River Murray, SA. *Regulated Rivers 7*: 137-151.

Bunn, S.E., P.I.Boon, M.A.Brock, N.J.Schofield, J.W.Bennett, J.A.Davis, C.M.Finlayson, R.H.Froend, R.Hall, L.N.Lloyd ,G.Lukacs, S.Moore ,M.McDonald, D.S.Mitchell, R.G.Pearson, J.Roberts and K.Schlusser. (1997). *National Wetlands R&D Program Scoping Review*. Land and Water Resources R&D Corporation Occasional Paper 01/97.

Cooling, M. L. Lloyd, D. Rudd & R. Hogan. (2002). Environmental Water Requirements and Management Options in Gunbower Forest, Victoria. Aust. J. Water Resources 5 (1): 75-88.

Lloyd, L. and Newall, P. (2009). Translocation risk assessment for Devilbend and Bittern Reservoirs for stocking select recreational fish species. Lloyd Environmental, for Fisheries Victoria, DPI Victoria.

Lloyd, L.N. & J.F. Tomasov. 1985. Taxonomic status of the mosquitofish. *Gambusia affinis* (Poeciliidae), in Australia. *Aust. J. Mar. Freshw. Res. 36*: 447-51.

Lloyd, L.N. & K.F. Walker. 1986. The distribution and conservation status of small fish in the River Murray in S.A. *Trans. Roy. Soc. S.A. 110*(2):49-57.

Lloyd, L.N. & Walker, K.F. 1989. Management of snags (woody debris) and river and floodplain vegetation for native fish in the Murray-Darling River System. In: Lawrence, B. (Ed.) 1989. Proc. of the Native Fish Management Workshop. Murray-Darling Basin Commission, Canberra, Australia.

Lloyd, L.N. 1986. An alternative to insect control by "mosquitofish*", Gambusia affinis*. In: St. George, T.D., B.H. Kay & J. Blok, *Arbovirus Research In Australia*. Proceeding of the 4th Australian Arbovirus Symposium, Brisbane. 1986.

Lloyd, L.N. 1990. Ecological interactions of *Gambusia holbrooki* with Australian native fish. In: Pollard, D.A. ASFB *Workshop on introduced and translocated fishes and their ecological effects*. Bureau of Rural Resources Proceedings No. 8, AGPS, Canberra.

Lloyd, L.N. 1990. Fish Communities. In: O'Malley, C. & F. Sheldon. *Chowilla Floodplain Biological Study*. Nature Conservation Society of South Australia, Adelaide, SA.

Lloyd, L.N., A.H. Arthington & D.A. Milton. 1986. The mosquitofish - a valuable mosquito control agent or a pest? In: Kitching (Ed). The ecology of exotic plants and animals: some Australian case studies. John Wiley & Sons, Brisbane.

Lloyd, L.N., Anderson, B.G., Cooling, M., Gippel, C.J., Pope, A.J. and Sherwood, J.E. 2012. Estuary Environmental Flows Assessment Methodology for Victoria. Lloyd Environmental Pty Ltd Report to the Department of Sustainability and Environment, Melbourne Water and Corangamite CMA, Colac, Victoria, Australia.

Lloyd, L.N., B.P. Atkins, P.I. Boon, J. Roberts and T. Jacobs. 1994. Natural Processes in floodplain ecosystems. IN: Proceedings of the Murray-Darling Basin Floodplain Wetlands Management Workshop. MDBC, Canberra.

Lloyd, L.N., J.T. Puckridge & K.F. Walker. 1991. The significance of fish populations in the Murray-Darling system and their requirements for survival. In: Dendy, T. & M. Coombe (Eds). Conservation in Management of the River Murray System. Dept of Envt & Planning, Adel., S.A.

Lloyd, L.N., Newall, P.R., Loffler, T. and Knight, C.D. (2008). Tullaroop Creek Flows Ecological Risk Assessment. Lloyd Environmental report to Central Highlands Water, Mt Waverley, Victoria.

Lloyd, L.N., Vietz, G.J. Newall, P.R. and Feehan, P. 2010. Environmental Guidelines Report: Guidelines for the operation of River Murray System storages. Lloyd Environmental Pty Ltd report to the Murray-Darling Basin Authority, Syndal, Victoria. 30 September 2010.

Newall, P., Tiller, D. and Lloyd, L.N. (2012). Technical Report for Freshwater Monitoring Framework and Report Card for the Tamar Estuary and Esk Rivers Program. Report to NRM North, 13 August 2012. Lloyd Environmental Pty Ltd, Syndal, Victoria, Australia.

NRM North (2013). Tamar Catchment Freshwater Report Card 2013. Tamar Estuary and Esk Rivers Program. Lloyd Environmental & James Creative for NRM North, Launceston, Tasmania. (Authors: Lance Neil Lloyd, James Porrovecchio, Peter R Newall & David Tiller).

Shirley, M., B. Abernethy, P. Close, L. Lloyd, R. Nathan, G. Quinn & B. Zampatti. (2002). A method for determining environmental water requirements in Victoria. Report to DNRE Melb., Vic.

7 ATTACHMENT B: DOCUMENTS REVIEWED

Index from Maddocks

TAB NO	DESCRIPTION OF DOCUMENT	DATE
AMENDMENT C391ggee DOCUMENTATION (as exhibited)		
1.	Explanatory Report	
2.	Instruction Sheet	
3.	Schedule 46 to Clause 43.02 (**DDO46**)	
4.	GRZ1 Map sheet	
5.	DDO46 Map sheet	
6.	Draft Planning Permit	
7.	Draft Section 173 Agreement	
SUPPORTING DOCUMENTS		
8.	Planning Report (Tract)	December 2020
9.	Planning Permit application form	
10.	Concept Subdivision Plan (Tract)	
11.	Traffic and Transport Assessment Report (Cardno) a) Appendix A – Road section b) Proposed roundabout at Walkers Road and Ash Road c) Ash Road Upgrade Plan; d) Bellarine Highway turning lane plan	December 2018
12.	Aboriginal and Historical Heritage Assessment (Ecology and Heritage Partners)	August 2018
13.	Environmental Site Assessment (Coffey)	October 2019
14.	Biodiversity Site Assessment (Ecolink Consulting)	July 2018
15.	Growling Grass Frog Survey Report (Ecolink Consulting)	December 2020
16.	Stormwater Management Plan Report (Spiire)	February 2020

TAB NO	DESCRIPTION OF DOCUMENT	DATE
17.	Flows to Lake Connewarre Impact Assessment (Vernant Solutions)	December 2019
18.	Landscape Masterplan (Tract)	December 2020
19.	Native Vegetation Removal Report	May 2019
20.	Vegetation Removal Plan	
21.	Feature and Level Survey (Spiire)	
SUBMISSIONS		
22.	Submission on behalf of Eastern Ash and revised concept plan	28 June 2021
23.	All submissions (redacted)	
24.	CCMA Referral Response	
25.	Letter from Spiire Consulting to Council	17 July 2021
COUNCIL REPORTS		
26.	Ordinary Meeting of Council – Minutes and Agenda (containing Officer Report)	8 September 2020
27.	Ordinary Meeting of Council – Minutes and Agenda (containing Officer Report)	28 September 2021
OTHER RELEVANT DOCUMENTS		
28.	*Leopold Structure Plan*	2011
29.	*South East Leopold Framework Plan*	2016
30.	*Planning Panels Guide to Expert Evidence*	

8 ATTACHMENT C: RAMSAR CRITERIA MET BY PORT PHILLIP BAY (WESTERN SHORELINE) AND BELLARINE PENINSULA RAMSAR SITE

Criterion No.	Description/evidence
Criterion 2	Supports vulnerable, endangered, or critically endangered species or threatened ecological communities. The site regularly supports one wetland dependent ecological community and 12 fauna species listed under the EPBC Act and or IUCN Red List (http://www.iucnredlist.org/): these include the Coastal saltmarsh – vulnerable ecological community (EPBC Act); the Australasian bittern (*Botaurus poiciloptilus*) – endangered (EPBC Act & IUCN); Australian fairy tern (*Sternula nereis nereis*) – vulnerable (EPBC Act); Bar-tailed godwit (*Limosa lapponica baueri*) – vulnerable (EPBC Act) and near threatened (IUCN); Curlew sandpiper (*Calidris ferruginea*) – critically endangered (EPBC Act) and near threatened (IUCN); Eastern curlew (*Numenius madagascariensis*) – critically endangered (EPBC Act) and endangered (IUCN); Great knot (*Calidris tenuirostris*) – critically endangered (EPBC Act) and endangered (IUCN); Hooded plover (*Thinornis rubricollis rubricollis*) – vulnerable (EPBC Act); Lesser sand plover (*Charadrius mongolus*) – vulnerable (EPBC Act); Red knot (*Calidris canutus*) – endangered (EPBC Act) and near threatened (IUCN); Orange-bellied parrot (*Neophema chrysogaster*) – critically endangered (EPBC Act and IUCN); Australian grayling (*Prototroctes maraena*) – vulnerable (EPBC Act) and near threatened (IUCN); Growling grass frog (*Litoria raniformis*) – vulnerable (EPBC Act) and endangered (IUCN).
Criterion 4	The Ramsar site supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula supports large numbers of migratory waterbirds, breeding of waterbirds and frogs, nursery grounds for fish and supports waterfowl during moulting of their primary flight feathers.
Criterion 5	Wetlands in the Ramsar Site regularly supports 20,000 or more waterbirds Waterbird counts across the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site are very high (mostly due to the large numbers of birds supported by the Western Treatment Plant). Counts of shorebirds have been consistently > 20,000 from 1981 to 2017 (data from BirdLife Australia) and counts of waterfowl are generally > 80,000.
Criterion 6	Port Phillip Bay (Western Shoreline) and Bellarine Peninsula regularly supports 1% of the individuals in a population of one species or subspecies of waterbird. Data provided by BirdLife Australia and from the DELWP Annual Summer Waterfowl Counts, indicate that 12 species meet this criterion: Australasian shoveler (*Anas rhynchotis*); Australian fairy tern (*Sternula nereis nereis*); Australian shelduck (*Tadorna tadornoides*); Blue-billed duck (*Oxyura australis*); Chestnut teal (*Anas castanea*); Curlew sandpiper (*Calidris ferruginea*); Double-banded plover (*Charadrius*

Criterion No.	Description/evidence
	bicinctus); Hoary-headed grebe (*Poliocephalus poliocephalus*); Musk duck (*Biziura lobata*); Pink-eared duck (*Malacorhynchus membranaceus*); Red-necked stint (*Calidris ruficollis*) and Sharp-tailed sandpiper (*Calidris acuminata*).
Criterion 8	An important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend. Seagrass beds and other habitats within the Ramsar site are known to provide important nursery habitat for a number of fish species, including several that are recreationally important.