

**BEFORE THE GREATER WELLINGTON REGIONAL COUNCIL AND HUTT
CITY COUNCIL
EASTERN BAYS SHARED PATH PROJECT**

Under the Resource Management Act 1991

In the matter of applications for resource consents by Hutt
City Council under section 88 of the Act, to
carry out the Eastern Bays Shared Path Project

**STATEMENT OF EVIDENCE OF DR ALEXANDER BRYAN WILFRIED JAMES
(FISH PASSAGE) ON BEHALF OF THE APPLICANT**

30 November 2020

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QUALIFICATIONS AND EXPERIENCE

1. My full name is **Dr Alexander Bryan Wilfried James**. I am a Senior Freshwater Ecology Scientist at EOS Ecology, where I have worked for 11 years. My role entails undertaking freshwater ecology research and consultancy work for various clients including large multidisciplinary consultancies, local councils, regional councils, government departments and agencies, and private individuals.
2. My evidence is given on behalf of Hutt City Council ("**HCC**") in relation to its applications under section 88 of the Resource Management Act 1991 ("**RMA**") for resource consents for the Eastern Bays Shared Path Project (the "**Project**").
3. I have the following qualifications and experience relevant to the evidence I shall give:
 - (a) I hold a PhD in freshwater ecology and BSc (Hons) in ecology, both from Massey University.
 - (b) I also hold a BSc (majoring in Ecology, Geology and Biology) from Victoria University of Wellington.
 - (c) In the 11 years I have worked at EOS Ecology I have worked on various projects that involve consideration of fish passage. I have produced freshwater ecology assessments of environmental effects for various infrastructure projects that included assessment of fish passage, including roads (eg Christchurch's West Belfast Bypass and Northern Corridor) and flood protection infrastructure (eg Pinehaven Stream Improvement Project). I have also reviewed numerous consent applications on behalf of regional councils that involve culverts and fish passage.
 - (d) Prior to my role at EOC Ecology, I was a self-employed freshwater ecologist from 2007 to 2009, where I undertook one of the first assessments of fish passage barriers in the Manawatū-Whanganui Region.
4. I am a member of a number of relevant associations including:
 - (a) New Zealand Freshwater Sciences Society since 2002 ("**NZFSS**"); and
 - (b) Engineering New Zealand/Water NZ Rivers Group since 2018.
5. I confirm that I have read the 'Code of Conduct' for expert witnesses contained in the Environment Court Practice Note 2014. My evidence has been prepared in compliance with that Code. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not

omitted to consider material facts known to me that might alter or detract from the opinions I express.

BACKGROUND AND ROLE

6. In preparing my evidence I have:
 - (a) reviewed the technical report¹ I produced for the Project and associated information;
 - (b) reviewed Tonkin & Taylor's beach nourishment technical report;²
 - (c) read the set of proposed resource consent conditions dated 22 October 2020; and
 - (d) read the Greater Wellington Regional Council's ("**GWRC**") section 42A reports in relation to fish passage.
7. I prepared the technical report *Eastern Bays Shared Path: Freshwater Fish Passage Requirements* dated March 2019, which was included as Appendix B to the Project's Assessment of Effects on the Environment ("**AEE**"). In this evidence, I will refer to this as my "**technical report**".
8. In light of the potential impacts that beach nourishment may have on fish passage (including the increased likelihood that pipe outlets may become blocked with sand and gravel), my evidence includes consideration of the evidence of **Richard Reinen-Hamill**. I will also provide inputs for the proposed beach nourishment plan ("**BNP**"), including provisions to minimise the likelihood of beach nourishment adversely affecting fish passage.

SCOPE OF EVIDENCE

9. The purpose of my evidence is to outline potential effects that the construction and operation of the Project is likely to have on fish passage.
10. My evidence addresses:
 - (a) the methodologies followed to identify existing fish passage in the Eastern Bays from Point Howard to Sunshine Bay and including Windy Point (the "**Project area**");
 - (b) an overview of existing fish passage in the Project area, to provide context for the Project;
 - (c) the potential effects of the Project on fish passage;

¹ Appendix B to the AEE: James, A. 2019. Eastern Bays Shared Path: Freshwater fish passage requirements. EOS Ecology Report No. HUT01-18016-01. 26 p.

² Appendix F to the AEE: Tonkin & Taylor. 2019. Eastern Bays Shared Path project – consent level beach nourishment design and effects assessment. Prepared for Hutt City Council. Tonkin & Taylor. 21 p. + appendices.

- (d) steps taken to address potential adverse effects, including through project design and proposed mitigation measures included in the conditions; and
- (e) responses to submissions and the GWRC section 42A report.

EXECUTIVE SUMMARY

11. The Project area includes 14 pipe outlets which are either confirmed (five), possible (six), or unlikely (three) to have migratory freshwater fish in their catchments. These outlets are identified in Table 7 of my technical report.
12. In undertaking my assessment of the potential effects of the Project on fish passage, I have adopted a conservative approach by assuming fish are present in all affected catchments. The proposed conditions reflect this conservative approach by ensuring fish passage of all 14 outlets is either improved or at least maintained at the current level (see Condition EM.12).
13. Of these 14 pipe outlets:
 - (a) 11 are at or below current beach levels. Three culverts currently extend beyond the extent of the proposed seawall and may not require any pipe extensions. The other eight will require installation of extensions to the existing pipes to the face of the new concrete seawall or rock revetment. These extensions should not result in any alteration to fish passage provided erosional and depositional processes around those outlets remain the same.
 - (b) Three are elevated above current beach levels and will also require extension of pipes to the face of the new seawall or rock revetment. However, given their elevation, the extension design will need to ensure they do not become perched fish barriers.
14. The Project proposes beach nourishment for sections of beach at Point Howard, Lowry Bay, and York Bay (as described in the evidence of **Mr Reinen-Hamill**). There is the potential the addition and subsequent movement of sand and gravel material at these locations could block culvert outlets and have adverse effects on fish passage.
15. The following resource consent conditions are proposed to avoid and/or mitigate any potential adverse effects of the Project on fish passage:
 - (a) Condition GC.7 requires the Construction and Environmental Management Plan ("**CEMP**") to include consideration of fish passage at the locations specified in Condition EM.12.
 - (b) Condition EM.12 requires that at the outlets identified in Table 7 of my technical report the Consent Holder must:
 - (i) ensure that fish passage is improved or maintained at the existing level; and

- (ii) involve a qualified freshwater ecologist in the design of culvert extensions, alterations, and any specific fish passage features.
 - (c) Condition EM.14 requires the BNP to include minimising the potential to block stream outlets with fish passage during beach nourishment by avoiding initial placement of sediment from within 20m of existing outlets, monitoring stream outlets over the first year after placement, and requiring any blockages to be cleared.
16. Overall, with the implementation of the proposed conditions attached to the evidence of **Ms van Halderen**, the Project will have negligible to less than minor adverse effects on the passage of migratory freshwater fish.

METHODOLOGY

17. To determine existing fish passage in the Project area I carried out a desktop assessment of GIS data and grey literature and then completed a site visit of the Project area on 7 March 2018. The methodology for these two steps is set out below.

Desktop assessment

18. Prior to visiting pipe outlets in the Project area, I carried out a desktop assessment to determine which pipe outlets were most likely to have freshwater habitat upstream where freshwater fish may be present.
19. The desktop assessment involved an assessment of the following data sources:
- (a) aerial photographs;
 - (b) topographic maps;
 - (c) the New Zealand Freshwater Fish Database ("**NZFFD**");
 - (d) previous information collated on outlets by GHD in 2018³ and Fred Overmars in 2018;⁴
 - (e) the River Environment Classification ("**REC**") layer;
 - (f) HCC GIS layers of stormwater pipes, stormwater inlets and outlets and waterways (hydrology); and
 - (g) Schedule F1B – inanga spawning habitat in GWRC's Proposed Natural Resources Plan ("**PNRP**").

³ GHD. 2018. AD16-4183 beach stormwater outlets detailed design report. Prepared for Wellington Water Limited. GHD, Wellington. 28 p + appendices.

⁴ Appendix C to the AEE: Overmars, F. 2019. An assessment of environmental effects of the proposed Eastern Bays Shared Path project on coastal vegetation and avifauna. Mapua, NZ: Sustainability Solutions. 122 p, + appendices.

20. My assessment of these data sources enabled me to identify outlets that appeared to be at the bottom of catchments of sufficient size to have permanent freshwater habitats upstream. This assessment identified 14 pipe outlets, which then formed the basis of the site visit.

Site visit

21. On 7 March 2018 I visited the 14 pipe outlets that were identified in the desktop assessment as being of potential importance to fish passage (see Figure 1 in **Appendix A**). Having undertaken the desktop assessment, and a site visit, I am confident that all outlets of potential importance to fish passage have been identified.
22. Where access allowed, I visited and photographed the freshwater habitats of the identified outlets upstream of Marine Drive.
23. I did not undertake any fish sampling, as I was familiar with existing fish information from some of the affected stream catchments, and the Project involves only extensions to existing culverts, rather than installation of new culverts. However, I carefully conducted a visual search for fish where access allowed, and where appropriate habitat was present (eg, pools and runs).

Categorisation

24. Based on the desktop assessment and the site visit, the presence of fish in each catchment was assigned as either:
 - (a) "confirmed" (fish known to be present based on existing information or observation during the site visit);
 - (b) "possible" (quite likely to have fish but no actual data/sighting to confirm); or
 - (c) "unlikely" (catchment is unlikely to have fish).

EXISTING FISH PASSAGE

Background context

25. Before assessing the Project's potential impacts (in particular through the proposed beach nourishment and culvert extensions) on fish passage, discussed in more detail below, it is important to understand the background context and the existing environment of the Project, in order to gain a comprehensive understanding of those potential impacts and how significant they are.
26. For example, when considering the possible effects that beach nourishment or the Project more generally may have on fish passage in and around the Project area, it is relevant to note that the starting position is not one of ideal

unimpeded fish passage conditions. The outlets of all affected streams originate from existing pipes, which were presumably installed when Marine Drive was established. As things currently stand, some piped stream outlets and other stormwater outlets are frequently partially to fully blocked as a result of storms and redistribution of beach gravels.

27. Additionally, some of the identified streams appear to have very small catchments upstream of Marine Drive that are likely to have minimal or potentially no, suitable habitats for fish. These include 421 Marine Drive Stream, Sunshine Bay Stream, and Waerenga Road Stream.
28. While no specific assessment of habitat quality or ecological value were made of freshwater habitats upstream of the Project area, I can make general comments based on my observations and catchment land use. Freshwater habitat quality upstream of Marine Parade was generally high, particularly upstream of the urban areas, on account of the stream channels being of a natural and unmodified form, with regenerating native forest being the dominant land use. This indicates there is likely to be very good fish habitat in many of the catchments and that at a minimum, maintenance of existing fish passage through culverts in the Project area must be maintained with any culvert extensions.

Overview of species in Project area

29. Many of New Zealand's endemic and native freshwater fish are diadromous, which means they migrate between freshwater and the ocean at some stage in their lifecycles. The most likely freshwater fish species to be found in the Eastern Bays streams affected by the Project⁵ is banded kōkopu (*Galaxias fasciatus*), which has the ability to live in very small streams and navigate long sections of piped stream to find suitable habitat. Banded kōkopu have been previously found in three of the streams that discharge to Te Whanganui-a-Tara / Wellington Harbour through the Project area – Lowry Bay North Stream, Lowry Bay South Stream and York Bay North Stream. There is also the possibility that other diadromous species - in particular eels (*Anguilla* spp.) and kōaro (*Galaxias brevipinnis*) - could be present in some of the larger streams.
30. Of the 14 pipe outlets identified in the Project area:
 - (a) five pipe outlets were confirmed to have fish upstream;
 - (b) six pipe outlets were assessed as possibly having fish upstream; and

⁵ As set out in my technical report, the streams affected by the Project are: Howard Road Stream, Wilmore Way Stream, Lowry Bay North Stream, Whiorau Grove Stream (associated with two outlets), 30 Cheviot Road Stream, Lowry Bay South Stream, Gill Road Stream, York Bay North Stream, York Bay South Stream, 421 Marine Drive Stream, Mahina Bay Stream, Sunshine Bay Stream and Waerenga Road Stream.

- (c) three pipe outlets were assessed as unlikely to have fish upstream (although further investigation of upstream habitats and a fish survey would be required to confirm this).
31. Tables 1 – 5 of my technical report outlines the pipe outlets in the different bays and the likelihood of fish upstream.

Culverts where fish presence upstream has been confirmed

32. Of the five pipe outlets confirmed to have fish upstream, two are in Lowry Bay (Lowry Bay North Stream and Lowry Bay South Stream), two are in York Bay (York Bay North Stream and York Bay South Stream) and one is in Mahina Bay (Mahina Bay Stream).
33. More detail about those outlets is provided in sections 3.2.2, 3.2.5, 3.3.1, 3.3.2 and 3.4.2 of my technical report, including as follows:
- (a) In the Lowry Bay North Stream, the outlet currently appears to be at least partially blocked by beach substrate most of the time.⁶
 - (b) In the Lowry Bay South Stream, the site visit as well as photos taken by GHD⁷ demonstrate the opening of the pipe varies over time depending on beach sediment level. In addition, while it has been concluded (as part of a separate resource consenting process) that the outlet is not connected to any upstream freshwater habitats, my investigation based on HCC GIS and a site visit clearly shows that there is open freshwater habitat upstream.⁸
 - (c) In the York Bay North Stream the pipe outlet was fully open at the time of the site visit. There are two permanently flowing streams discharging to the bay (despite topographic maps and the River Environment Classifications ("**REC**") noting only a single stream outlet).⁹
 - (d) In the York Bay South Stream the pipe outlet was open at the time of the site visit, with a cobble-pebble substrate filling the bottom of the pipe. There are two permanently flowing streams discharging to the bay (despite topographic maps and the REC noting only a single stream outlet). The level of the pipe and beach at the time of the site visit provided ideal conditions for fish passage.¹⁰
 - (e) In the Mahina Bay Stream, the outlet was completely obscured by sediment at the time of the site visit. A fish observed in a pool

⁶ Section 3.2.2 (page 8) of my technical report.

⁷ GHD. 2018. AD16-4183 beach stormwater outlets detailed design report. Prepared for Wellington Water Limited. GHD, Wellington. 28 p + appendices

⁸ Section 3.2.5 (page 10) of my technical report.

⁹ Section 3.3.1 (page 12) of my technical report.

¹⁰ Section 3.3.2 (page 12) of my technical report.

upstream of Marine Drive during the site visit indicated that the outlet must be open enough to provide fish passage at times.¹¹

Culverts where fish presence upstream is possible

34. Of the six pipe outlets that were assessed as possibly having fish upstream, one is in Sorrento Bay (Howard Road Stream) and the other five are in Lowry Bay (Wilmore Way Stream, Whiorau Grove Stream (two outlets), 30 Cheviot Road Stream and Gill Road Stream).
35. More detail is provided in sections 3.1.1, 3.2.1, 3.2.3, 3.2.4 and 3.2.6 of my technical report, including as follows:
 - (a) The Howard Road Stream is very small and shallow, draining a steep, narrow catchment before being piped beneath Marine Drive and discharging on to intertidal bedrock. The discharge point was elevated above beach level and does not appear to be regularly blocked by beach gravels.¹²
 - (b) The Wilmore Way Stream outlet is in an elevated position, dropping to a pebble beach below, meaning that it is rarely, if ever, blocked by intertidal gravels. Upstream of Marine Drive limited fish habitat was available in the form of shallow pools interspersed by very shallow surface flow (1-2cm deep).¹³
 - (c) The Whiorau Grove Stream discharges to the Lowry Bay beach via two louvered outlets. It is highly likely this stream has suitable fish habitat in its catchment. At the time of the site visit both outlets were mostly buried by beach sediments.¹⁴
 - (d) The 30 Cheviot Road Stream outlet was half buried by beach gravels at the time of the site visit and may be connected to an open, flowing natural channel upstream that could have fish habitat.¹⁵
 - (e) The Gill Road Stream outlet was fully open at the time of the site visit with flowing surface water present.¹⁶

Culverts where fish presence upstream is unlikely

36. Of the three pipe outlets that are unlikely to have fish upstream, one is in Mahina Bay (421 Marine Drive Stream) and two are in Sunshine Bay (Sunshine Bay Stream and Waerenga Road Stream).

¹¹ Section 3.4.2 (page 15) of my technical report.

¹² Section 3.1.1 (page 5) of my technical report.

¹³ Section 3.2.1 (page 7) of my technical report.

¹⁴ Section 3.2.3 (page 9) of my technical report.

¹⁵ Section 3.2.4 (page 9) of my technical report.

¹⁶ Section 3.2.6 (page 11) of my technical report.

37. More detail is provided in sections 3.4.1, 3.5.1 and 3.5.2 of my technical report, including as follows:
- (a) The 421 Marine Drive Stream outlet was completely filled with gravel with no surface flow evident at the time of the site visit. Upstream of Marine Drive this stream flowed through a perched culvert making it unlikely that fish were present.¹⁷
 - (b) The Sunshine Bay Stream outlet was located in the existing seawall well above the beach level at the time of the site visit. The upstream catchment could not be assessed during the site visit, however, because it is very short and steep, it is unlikely to have suitable fish habitat upstream.¹⁸
 - (c) The Waerenga Road Stream outlet was almost completely buried by beach sediments at the time of the site visit. The upstream catchment could not be assessed during the site visit, however, because it is very short and steep, it is unlikely to have suitable fish habitat upstream.¹⁹

POTENTIAL EFFECTS

Construction effects

38. During construction there may be periods when fish passage is temporarily impeded as pipes are extended and seawalls are constructed. Given the temporary nature of the construction, the duration and nature of any such impedence is likely to be relatively short-term. In any event I note that the CEMP, the purpose of which is to set out procedures and methods to be undertaken to avoid or minimise adverse effects arising from the construction works (Condition GC.6), requires the consideration of fish passage (Condition GC.7), the improvement or maintenance of fish passage at the existing level (Condition EM.12) and the involvement of a qualified freshwater ecologist in the design of culvert extensions, alterations, and any specific fish passage features (Condition EM.12).

Operational effects

Effects of the new pathway and seawall

39. Three of the 14 pipe outlets are seaward of the toe of the proposed seawall (Whiorau Grove Stream outlet at chainage 1550, 30 Cheviot Road Stream, and Waerenga Road Stream). The Project will not affect these outlets and extensions will not be required. Provided these outlets are in adequate condition, they will likely remain as is and continue to exist and operate in their current state.

¹⁷ Section 3.4.1 (page 15) of my technical report.

¹⁸ Section 3.5.1 (page 16) of my technical report.

¹⁹ Section 3.5.2 (page 16) of my technical report.

40. The remaining 11 pipe outlets will require an extension in the order of up to a few metres in length to accommodate the pathway and seawalls. It is understood that *"the required extensions will simply comprise lengthening the culvert using standard couplers connecting onto new plastic pipes that will be tied into the wall to be flush with seawall."*²⁰
41. Although pipe extensions can theoretically have an adverse effect on fish passage, this is unlikely to be the case with the Project. This is because the species most likely to be present in the affected catchments (ie, banded kōkopu and eels) have extreme abilities to traverse instream barriers including sections of piped streams. In addition, the nature of the outlets means that instream water velocity is unlikely to be an issue.
42. Of the 11 pipe outlets requiring extension, eight were at or below the beach level (as observed during the site visit). For those outlets, when the extension is constructed, there will be little change to the current state in terms of fish passage. The new outlets will function in a similar fashion to the existing outlets given that they will be located at a similar height and there will be no great alteration to the surrounding beach substrate size. For some of these outlets their level relative to beach substrate means they are periodically blocked/buried by beach sediments, and it is likely that this will continue to be the case following pipe extension.
43. Of the 11 pipe outlets requiring extension, three were elevated above the beach level (as observed during the site visit). If the extended outlet of these pipes is situated on the face of the seawall above beach level with a vertical drop to the beach (eg, over the edge of the curve on a double or triple curved seawall), then this could have an adverse effect on fish passage. Measures to address this potential effect are outlined below.

Effects of the proposed beach nourishment

44. Additionally, beach nourishment is proposed for sections of the beach at Point Howard, Lowry Bay, and York Bay (as described in the evidence of **Mr Reinen-Hamill**). There is the potential that the addition and subsequent movement of sand and gravel material at these locations could block culvert outlets and consequently have adverse effects on fish passage. Measures to address this potential effect are also addressed below.

STEPS TAKEN TO ADDRESS POTENTIAL ADVERSE EFFECTS

45. My technical report proposed a number of avoidance and mitigation measures. These measures are set out in full at 5.1 – 5.2.6 of my technical

²⁰ Stantec. 2018. Eastern Bays shared path design features report. Prepared for Hutt City Council. Stantec, Wellington. 24 p.

report and reproduced (in summary form) in Table 1 of **Appendix B** of my evidence.

46. In summary, my recommendations are as follows:
- (a) In undertaking my assessment of the potential effects of the Project on fish passage, I have adopted a conservative approach by assuming fish are present in all affected catchments. The proposed conditions reflect this conservative approach by ensuring fish passage of all 14 outlets is either improved or at least maintained at the current level (see Condition EM.12).
 - (b) For the three outlets that are currently elevated above the existing beach level, the pipe extension should be designed to ensure that they do not become perched with an overhang.
 - (c) For the 11 pipe outlets that are currently at beach level, modest pipe extensions should not result in any alteration to fish passage provided the erosional and depositional processes around those outlets remain the same. As **Dr Michael Allis** states, "*The net effect of this Project on the existing environment (baseline situation) will be a minor overall change to the nearshore hydrodynamics and sediment behaviour of the beach and rock platforms.*"²¹
 - (d) HCC should adopt the outlet-specific proposal for the seven outlets noted at 5.2.1 – 5.2.6 of my technical report. These proposals include consideration of fish passage improvements for three sites that currently have elevated outlets, one site which currently has a buried outlet with louvers attached, and two sites where duckbill outlet valves have been consented that would, if implemented, impede fish passage.
 - (e) A freshwater ecologist with fish passage experience should be involved in the detailed design of the outlets.
 - (f) HCC should avoid blockages of outlets by beach nourishment gravels through not installing gravels within 10m of certain outlets, and monitoring these outlets during peak migration period of banded kōkopu.
47. HCC has adopted the recommendations in my technical report through proposed conditions GC.7, EM.12, and EM.14.
48. In my opinion, with the implementation of the avoidance and mitigation measures contained in the conditions attached to Ms Halderen's evidence, the Project will have negligible to less than minor adverse effects on fish passage.

²¹ Appendix E of Project AEE: Allis, M. (2019) Eastern Bays Shared Path: Coastal Physical Processes Assessment. Prepared for Hutt City Council. NIWA Client Report No. 2018075HN. 115 p + appendices.

RESPONSE TO SUBMISSIONS

49. Of 200 submissions, only three make any mention of freshwater ecology. One specifically mentions fish passage, another mentions fish, and the third mentions urban streams in general.
50. Steve Bielby (6) states the Project *"is an opportunity for GW to address its history of turning our beautiful Eastbourne streams into drains and remove flood protection and other barriers. A requirement should be that design complies with the fish passage regulations."*
51. I cannot comment on GWRC flood protection infrastructure and barriers in the affected streams as these were not assessed and are outside the Project area and scope. By fish passage regulations I assume the submitter is referring to the Freshwater Fisheries Regulations (1983), which give the Department of Conservation specific fish passage responsibilities. I reiterate that in my view, with the implementation of the proposed avoidance and mitigation measures, the Project will have negligible to less than minor adverse effects on fish passage.
52. The recently released Resource Management (National Environmental Standards for Freshwater) Regulations (2020) also include specific regulations relating to culverts and fish passage, although these do not apply to structures existing before 2 September 2020 or any later extensions to those structures. Finally, I note that proposed consent conditions GC.7, EM.12, and EM.14 will ensure that fish passage through the Project area is improved or at least maintained at the existing level.
53. Ruth Gilbert (163) is concerned the recommendations of scientific experts on fish, birds, and other environmental mitigation measures contained in the environmental reports will not be adhered to. From a fish passage perspective, I am satisfied that HCC has adopted the recommendations in my technical report through proposed conditions GC.7, EM.12, and EM.14. These conditions should address the submitter's concern.
54. Wellington Water Limited (79) considers the Project to provide an opportunity to reconnect communities with their waterways through incorporation of design features to indicate when users are crossing a natural stream, and by erecting signage with stream names and historical information. They also suggest daylighting to make streams a feature and point of engagement for the public. I support design features and signage to increase the community's connections with the waterways in their neighbourhoods and note that condition LV.7 provides opportunity for such signage as appropriate. As to stream daylighting, while I support this activity in general, the Project has no scope for such an undertaking given the proximity of the road and the fact that a wider shared path is being created. Nor do I consider such an outcome is required to address the Project's effects.

RESPONSE TO COUNCIL OFFICER'S SECTION 42A REPORT

GWRC

55. The GWRC section 42A report agrees with my assessment and with the consent conditions I have proposed to minimise impacts of the Project on fish passage.
56. GWRC has recommended an additional consent condition requiring monitoring of fish passage (and remedial actions to be taken if the Project is shown to impede fish passage) at the culverts to be altered by the Project (proposed condition EM.13 of the section 42A report Appendix A). I support the intention for some form of fish passage monitoring, however in its current form, the monitoring aspect is impossible to implement. It stipulates that an appropriate monitoring methodology be selected from Chapter 7 of the New Zealand Fish Passage Guidelines²². These guidelines specifically recommend two methods to use, both of which are not practical for this Project given the intertidal location of the affected culverts:
- (a) The before-after, control-impact ("**BACI**") method requires at a minimum, single survey reaches upstream and downstream of the structure of interest. In the case of the culverts affected by the Project, the downstream reaches are the ocean, hence it is impossible to have a sensible downstream site.
 - (b) The mark and recapture methodology requires catching fish, marking them somehow (eg, with dye) and then releasing them directly downstream of the structure to see if they can pass. Given all the affected culvert outlets are in the intertidal zone and the ocean is downstream, this is not practical.
57. If some form of fish passage monitoring involving a fish survey were undertaken then this would be restricted to freshwater habitats upstream of Marine Parade. Such monitoring relying on fish surveys would be problematic as it would be difficult to attribute any observed reduction in fish passage solely to the culvert extensions for the following reasons:
- (a) Beyond adding extensions of the same diameter, the Project is not altering the existing culverts, and there is the potential some of these may already impede fish passage in some catchments.
 - (b) Any fish surveys upstream of the Project area may happen to miss any whitebait or juvenile fish, given the extended period of upstream migration from the ocean (August to December for banded kōkopu), leading to a false negative result.

²² National Institute of Water & Atmospheric Research & Department of Conservation. 2018. New Zealand fish passage guidelines for structures up to 4 metres. NIWA Client Report No: 2018019HN. 226 p.

- (c) There is the potential whitebait do not enter the affected streams every year either as a result of blockage of the outlets during the migration period or if offshore whitebait simply do not choose to enter these small catchments.
58. As the Project is only extending existing culverts, rather than installing entirely new culvert structures, I believe monitoring should focus on the culvert extensions themselves. Because the culvert extensions are occurring in a dynamic erosional and depositional environment, monitoring over multiple years is required to determine if the extended outlets are performing in a similar fashion to the existing outlets. I propose redrafting the EM.12 condition to:

At the key culvert outlets listed in Table 7 of Appendix B to the AEE, the Consent holder shall:

- (a) Ensure culvert extensions associated with the Project are designed in consultation with a qualified freshwater ecologist so as to improve, or at least maintain, existing fish passage. These details will be included in the engineering plans specified in Condition C1.
- (b) Gain pre-construction information on the existing culvert outlets, via inspection by a qualified freshwater ecologist on at least four occasions during low tide and taking detailed photos and measurements (including distance of invert above or below current beach level, height of any perch, height of headroom, depth of any flowing surface water). Outlets will also be visited once at high tide to determine the level of outlet inundation.
- (c) Monitoring post-construction outlet characteristics every six months for three years from Completion of Construction of the Project by repeating the procedure outlined in (b) above at low tide. Outlets will also be visited three times (yearly) at high tide to determine the level of outlet inundation. Monitoring of all culvert outlets will be combined.
- (d) Engage the qualified freshwater ecologist in (b) to provide a report to the Consent Holder confirming that the outlet structures are operating as intended in (a) and if any more than minor issues for fish passage are identified with the outlet structure through the examination in (c) the freshwater ecologist shall identify remedial actions to ensure operation as intended in (a) is achieved.
- (e) Provide a copy of the report under (d) to the Manager, Environmental Regulation within 2 weeks of receipt and within 12 months of receipt have completed any identified remedial actions and confirm in writing to the Manager, Environmental Regulation that the works have been completed.

Appendix H Sharyn Westlake expert review

59. Sharyn Westlake's review identifies an inconsistency regarding the beach nourishment avoidance zone around culvert outlets (20m in my technical report vs. 10m in that of **Mr Reinen-Hamill**). Further, Ms Westlake suggests a 10m avoidance zone would be appropriate. I concur and am happy to amend my original recommendation from 20m to 10m.

Dr Alexander Bryan Wilfried James

30 November 2020

APPENDIX A – LOCATIONS OF THE PIPE OUTLETS ASSESSED FOR FISH PASSAGE

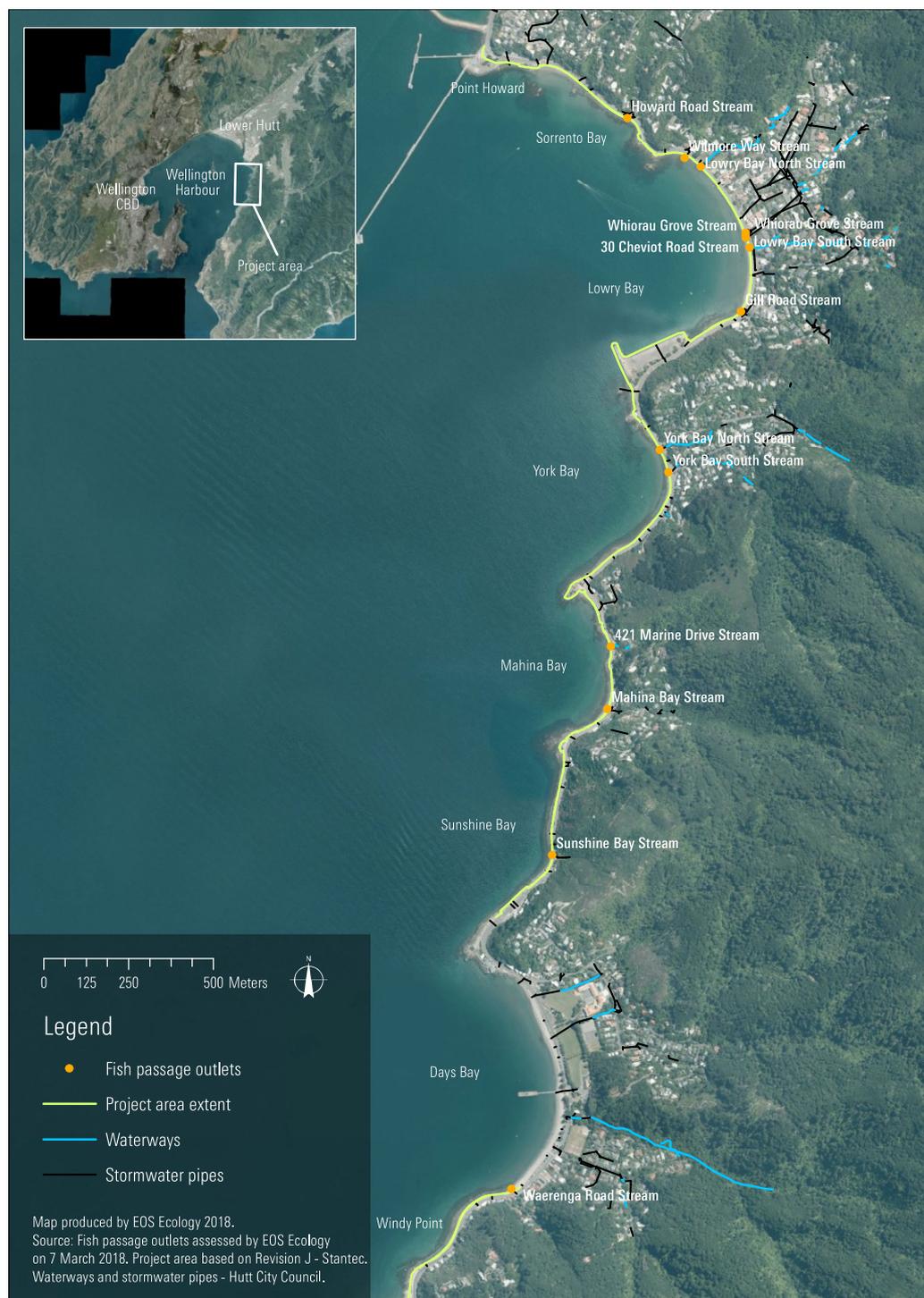


Figure 1²³ – Locations of the 14 pipe outlets in the Project area investigated for fish passage by EOS Ecology on 7 March 2018.

²³ Note this figure is Figure 1 in my technical report (Appendix B to the AEE).

APPENDIX B – DETAILS OF THE PIPE OUTLETS/CATCHMENTS ASSESSED FOR FISH PASSAGE

Table 1²⁴ – Details of the pipe outlets/catchments in the Project area assessed for fish passage by EOS Ecology

Stream	Approx. chainage (m)	Fish upstream	Outlet level relative to beach	Proposed seawall type	Recommendation
Howard Road Stream	1016	Possible	Elevated	Double curve concrete	See Section 5.2.1. Ensure extended outlet is not perched. Potential ramp or mussel spat rope requirement.
Wilmore Way Stream	1245	Possible	Elevated	Double/triple curve concrete	See Section 5.2.2. Ensure extended outlet is not perched. Potential ramp or mussel spat rope requirement.
Lowry Bay North Stream/ Overmars' Site 01	1300	Confirmed	Beach level (partially buried)	Double curve concrete	No specific recommendation.
Whiorau Grove Stream	1540 & 1550	Possible	Beach level (both buried)	Chainage 1540: Double curve concrete Chainage 1550*: Single curve concrete	See Section 5.2.3. Ensure any new outlet involving louver devices allows for fish passage.
30 Cheviot Road Stream* Also Outlet 44 in GHD (2018)	1552	Possible	Beach level (partially buried)	Single curve concrete	See Section 5.2.4. Review consented duckbill valve installation. Thorough catchment investigation including fish survey.
Lowry Bay South Stream/Overmars' Site 02 Also Outlet 45 in GHD (2018)	1590	Confirmed	Beach level (buried)	Single curve concrete	See Section 5.2.5. Review consented duckbill valve installation.
Gill Road Stream	1784	Possible	Beach level	Double curve concrete	No specific recommendation.
York Bay North Stream /Overmars' Site 03	2375	Confirmed	Beach level	Triple curve concrete	No specific recommendation.
York Bay South Stream /Overmars' Site 04	2450	Confirmed	Beach level (partially buried)	Double curve concrete	No specific recommendation.
421 Marine Drive Stream	3095	Unlikely	Beach level (buried)	Double curve concrete	No specific recommendation.
Mahina Bay Stream /Overmars' Site 05	3280	Confirmed	Beach level (buried)	Double curve concrete	No specific recommendation.
Sunshine Bay Stream	3784	Unlikely	Elevated	Double curve concrete	See Section 5.2.6. Ensure extended outlet is not perched at low tide. Potential ramp or mussel spat rope requirement.
Waerenga Road Stream*	5011	Unlikely	Beach level (buried)	Double curve concrete	No specific recommendation.

* Outlets that appear to be seaward of the toe of the proposed seawall, hence will probably not require pipe extensions

²⁴ Note that this is Table 7 in my technical report (Appendix B to the AEE).