

Before the Board of Inquiry
Waterview Connection Project

in the matter of: the Resource Management Act 1991

and

in the matter of: a Board of Inquiry appointed under s 149J of the Resource Management Act 1991 to decide notices of requirement and resource consent applications by the NZ Transport Agency for the Waterview Connection Project

Rebuttal evidence of **Eddie Sides (Freshwater Ecology)** on behalf of the **NZ Transport Agency**

Dated: 2 February 2011

Hearing start date: 7 February 2011

REFERENCE: Suzanne Janissen (suzanne.janissen@chapmantripp.com)
Cameron Law (cameron.law@chapmantripp.com)

Chapman Tripp
T: +64 9 357 9000
F: +64 9 357 9099

23 Albert Street
PO Box 2206, Auckland 1140
New Zealand

www.chapmantripp.com
Auckland, Wellington,
Christchurch



INDEX

INTRODUCTION3

PURPOSE OF EVIDENCE.....3

MATTERS RESOLVED DURING CAUCUSING3

COMMENT ON SECTION 42A REPORTS7

OUTSTANDING MATTERS.....8

ANNEXURE A: AMENDMENTS TO PROPOSED CONDITIONS AGREED DURING
CAUCUSING.....10

ANNEXURE B: EXPERT CAUCUSING JOINT REPORT: FRESHWATER ECOLOGY (DATED
27 JANUARY 2011)12

ANNEXURE C: STREAMWORKS LAYOUT PLAN.....13

REBUTTAL EVIDENCE OF EDDIE SIDES ON BEHALF OF THE NZ TRANSPORT AGENCY

INTRODUCTION

- 1 My full name is Edward St.George Sides. I refer the Board of Inquiry to the statement of my qualifications and experience set out in my evidence in chief (*EIC*) (dated November 2010).
- 2 I repeat the confirmation given in that statement that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court.

PURPOSE OF EVIDENCE

- 3 The purpose of this rebuttal evidence is to respond to certain aspects of the evidence lodged by submitters.
- 4 Submitters concerns were primarily focused on Oakley Creek, being the main watercourse affected by the Project. The expert ecological evidence presented on behalf of submitters¹ and the s42A Report on Freshwater Ecology² generally accepted my assessment of the ecological values of Oakley Creek, and of the effects of the Project on these values. Some of the submitters, however, felt that mitigation measures were not adequate, and some proposed specific amendments to the NZTA's proposed conditions. I note that most of these issues, at least in respect of the experts, were resolved during expert caucusing in freshwater and vegetation held on 27 January 2011.
- 5 In my evidence below, I briefly summarise the issues resolved through expert caucusing, and address the outstanding matters. During caucusing a number of amendments to the NZTA's proposed conditions were agreed. These are attached as **Annexure A**. For convenience, the signed Expert Caucusing Joint Report on Freshwater Ecology is attached as **Annexure B**.

MATTERS RESOLVED DURING CAUCUSING

Stream realignment and rehabilitation

- 6 Ms Bronwen Rhynd (167 & 179-1) on behalf of Living Communities & Friends of Oakley Creek (*FOOC*), requested clarification that offset mitigation for the Project is in addition to and in combination with offset mitigation proposed for the Mairoro Street Project.³ I can confirm that the off-setting mitigation for both projects is cumulative, and will be undertaken in Alan Wood Reserve. The

¹ Being that of Shona Myers and Bronwen Rhynd on behalf of Living Communities (Auckland) Ltd and Friends of Oakley Creek.

² Prepared by Dr Ryder (dated November 2010), being Appendix B to EMS' section 42A Report (dated 7 December 2010).

³ Rhynd Evidence, Submitter No 167 & 179-1, paragraph 9.7.

mitigation works will be integrated under a Streamworks Environmental Management Plan (SWEMP).⁴ This approach is supported by the Auckland Council.⁵

- 7 I have assessed the amount of off-setting mitigation required for both projects⁶; established that there is sufficient stream length available to achieve this mitigation; and developed rehabilitation guidelines.⁷
- 8 The lengths of stream affected can be summarised as follows:
- 8.1 There is 2,750m of Oakley Creek proposed for rehabilitation in the Oakley Creek Realignment and Rehabilitation Guidelines (being the length between Richardson Road and New North Road).
- 8.2 The realignments necessary for this Project's highway construction (coloured khaki on the Streamworks Layout Plan⁸ which is attached as **Annexure C**) measure about 870m and will be completed in accordance with the Oakley Creek Realignment and Rehabilitation Guidelines. These works are separate from any mitigation required as offset mitigation by virtue of the Stream Ecological Valuation (SEV) assessments. So, $2,750 - 870 = 1,880\text{m}$ left.
- 8.3 The other realignments (coloured light green on the Streamworks Layout plan) will also be done in accordance with the Oakley Creek Realignment and Rehabilitation Guidelines. These sections measure 448m in length. The 343m of SEV mitigation required of the Waterview Project is within this area. So, $1,880 - 343 = 1,537\text{m}$ left.
- 8.4 All other stream rehabilitation will also be completed in accordance with the Oakley Creek Realignment and Rehabilitation Guidelines. This will include the 767m of SEV mitigation required of the Maioro Interchange Project. So, $1,537 - 767 = 770\text{m}$ left.
- 9 During expert caucusing, I confirmed that the rehabilitation of the Project's stream diversions would not be included as off-setting

⁴ Refer proposed Streamworks condition STW.20.

⁵ Julian Evidence, section 9 (subject to concerns about shading which I discuss later in my evidence).

⁶ Technical Report G.6, Section 8 and Maioro Interchange SEV Report. (Boffa Miskell, 2009).

⁷ See Oakley Creek Realignment and Rehabilitation Guidelines, 2010 (Technical Report G.6, Appendix C).

⁸ Streamworks and Flood Protection Oakley Creek Realignment layout plan 20.1.11-3-D-D-330-211 rev A. Technical Report: Assessment of Stormwater & Streamworks Effects, Appendix A. I note that this plan shows the area of rehabilitation required for realignments necessary for the Project, not the full area of Oakley Creek rehabilitation between Richardson Road and Bollard Avenue.

mitigation, and that the total length subject to riparian revegetation will exceed the minimum required for off-setting mitigation.

- 10 A new Streamworks condition STW.20A was agreed during expert caucusing and is included in Annexure A. It is also noted in the Expert Caucusing Joint Report, at paragraph 11 (see Annexure B).

Riparian planting

- 11 In her evidence on behalf of Auckland Council, Dr Andrea Julian proposes an amendment to STW.20 recommending that riparian planting areas should achieve 70% stream shade at maturity.⁹ As described in the rebuttal evidence of Mr Slaven,¹⁰ it is anticipated that this will be generally be achieved in the proposed planting scheme, which includes canopy trees at a density of 1 per 10m² and shrubs and ferns at 1m and 0.5m centres, respectively.
- 12 As part of the expert caucusing on vegetation (which I also attended on 27 January 2011), agreement was reached to amend condition STW.20(d) with the effect that the riparian planting will be required *“to achieve an overall average of 70% shading of stream at maturity within those reaches where realignments or the SEV off-setting mitigation associated with the Project are proposed.”*

Monitoring

- 13 Proposed monitoring for the Project is summarised in Appendix P of the CEMP (Technical Report G.21). I have listed the monitoring to be undertaken in the Oakley Creek receiving environment in Table 1, below. In my opinion, the proposed monitoring program is comprehensive and will allow effects to be detected and quantified, and, where necessary, mitigated.

Table 1. Proposed Stream monitoring, Oakley Creek.

Parameter	Purpose	Management Plan
Water flows (and levels)	Monitor effects of groundwater drawdown on stream flows	Groundwater Management Plan
Turbidity	Monitor effects of sediment discharge on suspended sediment levels in stream	Erosion and Sediment Control Plan (ESCP)
pH	Monitor effects of concreting works on pH in the receiving environment	ESCP
Water Quality	Monitor effects of stormwater discharges on contaminant levels in the stream	CEMP and ESCP
Fish	Monitor effects on fish communities in the stream	Ecological Management Plan (<i>ECOMP</i>)
Macroinvertebrates	Monitor effects on macroinvertebrate communities in the stream	ECOMP
Cross-sections	Monitor sediment deposition on the streambed	ECOMP

⁹ Julian Evidence, Submitter No. 111-12, paragraph 9.1.

¹⁰ Slaven, rebuttal evidence, in response to Dr Julian.

- 14 Ms Shona Myers (167 & 179-2) suggested the following amendments¹¹ to the monitoring program:
- 14.1 Fish and macroinvertebrate monitoring at least twice per year to allow for seasonal variation;
 - 14.2 Monitoring of water levels, water velocity and turbidity.
- 15 Amendments to Freshwater condition F.3(b) regarding monitoring and responding to effects on baseflows were agreed during the expert freshwater caucusing and are set out in Annexure A. These amendments confirm twice-yearly ecological monitoring. Monitoring of velocity was not included as it is highly variable throughout the stream and over time, and is not very closely linked to biological response.
- 16 I note that anticipated reductions in stream baseflows will be between 2% and 6%,¹² and that hydrological modelling was based on water draining into the tunnel, and did not include the mitigating effects of water pumped from the tunnel and discharged back into the stream. Hydrological effects were addressed in caucusing by amendments to Condition G.12 and F.5 to ensure that flow records are reviewed by a hydrologist and a freshwater ecologist (Annexure A).

Other Issues

- 17 Other environmental issues raised by FOOC and resolved in expert caucusing included reductions in stream base flows,¹³ preservation of basalt columns¹⁴ and a cascade feature near the confluence of the Stoddard Road tributary with the main Oakley Creek,¹⁵ and Ms Myers seeks the use of natural materials and soft substrates in stream rehabilitation.¹⁶
- 18 In response I note that:
- 18.1 The cascade issue is addressed in STW.20, and this and the basalt columns are addressed in the rebuttal evidence of Tim Fisher as a streamworks issue.
 - 18.2 Hydrological issues are discussed in paragraph 16 above.
 - 18.3 The materials and design of realignments are described in the Oakley Creek Realignment and Rehabilitation Guidelines. I

¹¹ Myers Evidence, page 20. (The twice yearly fish and macroinvertebrate monitoring is also recommended by Dr Ryder in his Section 42A Report at paragraph 8.4).

¹² As noted in evidence of Ann Williams

¹³ John Evidence, section 8.

¹⁴ John Evidence, section 11.10.

¹⁵ John Evidence, section 11.3.

¹⁶ Myers Evidence, section 5.19.

consider that Ms Myers' concerns about materials are adequately covered by these Guidelines.

COMMENT ON SECTION 42A REPORTS

- 19 In the EMS section 42A report¹⁷ it is noted that Dr Ryder generally found the conditions and management plans relating to freshwater to be acceptable.
- 20 The importance of the Oakley Creek Realignment and Rehabilitation Guidelines is noted.¹⁸ I concur with this.
- 21 In the s42A Addendum report,¹⁹ EMS propose a change to condition STW.20 to provide for consultation with iwi and FOOC. In my opinion consultation should not be addressed in the Streamworks conditions. I understand that this matter is addressed in the rebuttal evidence of Ms Amelia Linzey.
- 22 In his Freshwater Ecology Review Appendix to the s42A Report, Dr Ryder concluded that the assessment methods and conclusions in relation to freshwater ecology were appropriate²⁰ and that mitigation for effects on freshwater were "robust and appropriate".²¹
- 23 Dr Ryder also recommended that a trigger level for responding to baseflows should be set.²² While the subject of discussion, a trigger level for baseflows was not set during caucusing, but conditions were amended to clarify the process of monitoring, reporting and responding to changes in baseflows.²³

Fish passage at Oakley Creek Waterfall

- 24 Dr Ryder recommended that further consideration be given to improving fish passage at the Oakley Creek waterfall.²⁴ In my opinion this would improve local biodiversity, but would artificially alter the natural character of the stream. In my opinion this goal is appropriate IF the primary object is maximising fish biodiversity. If the goal is to make Oakley Creek as "natural" as possible, it would not be appropriate to install a fish pass. It is also notable that the waterfall in the lower Creek is a regionally rare feature and this makes the upstream fish community unusual. In my opinion a fish pass should not be progressed at this stage.

¹⁷ EMS Section 42A report (7 December 2010), Section 14.1.4

¹⁸ EMS Section 42A report (7 December 2010), Section 14.3.7

¹⁹ EMS Section 42A Addendum report (20 December 2010), Section 3.9.2

²⁰ Ryder Section 42A report, paragraphs 5.9 and 6.22.

²¹ Ryder Section 42A report, paragraph 7.2.

²² Ryder Section 42A report, paragraph 9.3.

²³ Refer to amended Groundwater condition G.12 and Freshwater condition F.5 as set out in Annexure A.

²⁴ Ryder Section 42A report, paragraphs 6.36 and 7.4.

OUTSTANDING MATTERS

Cumulative Effects

- 25 Ms Wendy John on behalf of Friends of Oakley Creek (FOOC) suggests²⁵ that cumulative effects have been underestimated and consequently not sufficiently mitigated for. This includes concerns that assessments have been fragmented, and that cumulative effects of multiple stressors or of multiple projects along the creek have not been sufficiently mitigated.
- 26 In my opinion, the assessment has been multi-disciplinary and has involved close cooperation between specialists, for example between freshwater ecology, stormwater, groundwater, and erosion and sediment control.
- 27 With respect to multiple stressors (such as the combined “cocktail” effect of multiple contaminants entering a stream), the Project focuses on controlling stressors generated by the Project, these being construction sediment and operational stormwater. By controlling key parameters (such as sediment), the potential for combined effects is reduced. Furthermore, stormwater treatment ponds will remove multiple contaminants. This approach is, in my opinion, appropriate and effective.
- 28 In my opinion, the level of environmental protection for this Project generally exceeds relevant guideline levels (for example for sediment control and stormwater treatment). Mitigation and monitoring also exceed minimum requirements. Cumulative effects will therefore be lower than for a project that only met minimum standards.
- 29 The Project will also deliver cumulative positive effects. For example, riparian planting will control water temperatures, enhance botanical values, provide habitats for herpetofauna and birds, and improve functional connectivity along the stream corridor and between the stream and adjacent terrestrial environments. The Project’s rehabilitation of Oakley Creek and associated planting aims to deliver a net environmental gain for Oakley Creek’s freshwater ecological communities.
- 30 In my opinion the proposed mitigation will adequately address environmental effects on the stream, including cumulative effects, and no further mitigation is required.

Pixie Stream off-setting mitigation

- 31 As discussed in my evidence in chief, off-setting mitigation will be undertaken for extending the SH16 culvert at Pixie Stream, Te Atatu. I have approached the Natural Heritage Advisor: Land and Water at the Auckland Council. The Auckland Council agree that there are locations that would benefit from rehabilitation and I will

²⁵ John Evidence, Submitter No 179-1, section 4.

be discussing possible options with them. While this mitigation is subject to third-party agreement, both parties are supportive of stream rehabilitation and I believe the details can be resolved through consultation.

Erosion due to tunnel vibration

- 32 Stream erosion resulting from tunnel vibration was identified as a potential issue by FOOC.²⁶ I have consulted with geotechnical engineer Mr Peter Millar (the Project's vibration expert), who has confirmed that vibration standards designed to prevent superficial damage to buildings will provide more than adequate protection against stream bank instability. In my opinion the risk of bank failures due to vibration will be negligible.

Litter trap

- 33 FOOC suggest that additional litter generation resulting from the Project should be mitigated by installation of an in-stream litter trap.²⁷ There is already one litter trap installed in the lower Oakley Creek, directly opposite Cowley Street. In my opinion there is insufficient evidence to justify installation of a second in-stream litter trap. While the number of people using the area will likely increase, the number of rubbish bins and level of park maintenance will also increase, while litter will be prevented from entering the stream by riparian vegetation zones.



Eddie Sides
February 2011

²⁶ John Evidence, section 7

²⁷ John Evidence, section 13.

ANNEXURE A: AMENDMENTS TO PROPOSED CONDITIONS AGREED DURING CAUCUSING²⁸

F.3	<p>The freshwater monitoring programme shall, as a minimum, be undertaken in accordance with the following frequency:</p> <p>(a) Prior to construction – two baseline surveys;</p> <p>(b) During construction – <u>twice per year annually</u> for fish, and macroinvertebrates and three times per year for cross sectional profiles, <u>within one month</u> prior to, the beginning of the earthworks season during and <u>within one month either side of at</u> the end of the earthworks season;</p> <p>(c) Post construction – on an annual basis for a maximum period of three years, or less if the Auckland Council is satisfied that no adverse effects have occurred or are likely to occur from the Project.</p>
F.5	<p>The NZTA shall review the freshwater monitoring results, provided from Conditions F.2 to F.4, and results in monitoring detailed in earthworks Conditions E.9 and E.19 <u>and Groundwater Condition G.12</u>. In the event that potential adverse effects are identified, the NZTA shall develop and implement appropriate contingency plans and/or remedial measures in accordance with the measures set out in the ECOMP.</p>
STW.1	<p>General conditions</p> <p>The streamworks and associated works (<u>such as stormwater outfalls</u>) shall be undertaken in accordance with the plans and information contained within Technical Report G.15 <i>Assessment of Stormwater and Streamworks Effects and Technical Report G.22 Erosion and Sediment Control Plan</i>, submitted with this application. <u>The design of streamworks and associated works shall follow the principles expressed in the Oakley Creek Re-alignment and Rehabilitation Guidelines, Appendix C of Technical Report G.6 Assessment of Freshwater Ecological Effects.</u></p>
STW.20	<p>Streamworks Environmental Management Plan (SWEMP)</p> <p>The NZTA shall submit for approval review to the Auckland Council a Streamworks Environmental Management Plan (SWEMP) which shall include details of the final freshwater mitigation and environmental enhancement works associated with the Project <u>to confirm it is consistent with the design set out in Technical Report G.15 and principles of the “Western Ring Route – Maioro Street Interchange and Waterview Connection - Oakley Creek Realignment and Rehabilitation Guidelines” described in STW.21.</u> This SWEMP shall cover the mitigation for the loss of an area of</p>

²⁸ The rebuttal evidence of Mr Fisher includes a full set of the revised streamworks conditions.

	<p>Pixie Stream, Oakley Creek and the Stoddard Road tributary. It shall be submitted to the Auckland Council at least 40-20 working days prior to the proposed enhancement works being commenced under this consent and shall include, but not be limited to, the following:</p> <ul style="list-style-type: none"> (a) The nature of works to be undertaken; (b) The location of works; (c) Detailed design and plans of all enhancements to the stream bed and/or stream channel, including any structures or other engineering works. <u>This includes replication of the existing waterfall located on the Stoddard Road tributary near the confluence with Oakley Creek in a similar position within the new realignment;</u> (d) Riparian planting programmes, including detailed planting plans and specifications relating to species mix, location, density, size and maintenance; and (e) Timing of implementation; and (f) The outcomes of consultation with Iwi (Ngati Whatua o Orakei and Te Kawerau Tribal Authority) and Friends of Oakley Creek. <p><u>Advice Note: The intent is to include the SEV off-setting mitigation associated with the Maoro Interchange Project within Hendon park and Alan Wood Reserve, and to the same shading standard as specified in Condition STW 20(d).</u></p>
<u>STW20A</u>	<p><u>The realignments necessary for highway construction will be rehabilitated separately to the Project's SEV off-set mitigation requirement of 343 metres. The Project's SEV off-set mitigation requirements will be undertaken within the areas demarcated as "Oakley Creek Rehabilitation A-D" as shown on Drawing 20.1.11-3-D-D-330-211 Rev A.</u></p> <p><u>Advice Note: The SEV off-set mitigation associated with the Maoro Interchange Project is intended to be undertaken upstream and downstream of those areas shown for Realignment and Rehabilitation on Drawing 20.1.11-3-D-D-330-211 Rev A, for the purposes of creating a coherent ecological corridor in this area.</u></p>
G.12	<p>The continuous monitoring results shall be reviewed on a monthly basis to determine if there is any effect of the tunnelling on base flows in Oakley Creek. The results shall be <u>reviewed by a hydrologist and freshwater ecologist and</u> included in the 3 monthly groundwater reports, and provided to the Auckland Council.</p>

**ANNEXURE B: EXPERT CAUCUSING JOINT REPORT: FRESHWATER
ECOLOGY (DATED 27 JANUARY 2011)**

Before the Board of Inquiry
Waterview Connection Project

in the matter of: the Resource Management Act 1991

and

in the matter of: a Board of Inquiry appointed under s 149J of the Resource Management Act 1991 to decide notices of requirement and resource consent applications by the NZ Transport Agency for the Waterview Connection Project

Expert Caucusing Joint Report to the Board of Inquiry – Freshwater Ecology

Dated: 27 January 2011

Due: 7 February 2011



EXPERT CAUCUSING JOINT REPORT TO THE BOARD OF INQUIRY

INTRODUCTION

- 1 This joint signed report is written in response to the Board of Inquiry's Minute and Directions dated 23 December 2010. The Directions require the experts, following caucusing, to provide a report by 10am on 7 February 2011 that includes:
 - Areas that have been resolved and how.
 - Areas that are not resolved, and succinctly why.
 - 2 This report relates to the caucusing topic of Freshwater Ecology.
 - 3 Caucusing meeting(s) were held on Thursday 27th January 2011.
 - 4 Expert attendees at the meetings were:
 - Mr Eddie Sides – Associate Principal Boffa Miskell Ltd (for NZTA)
 - Mr Tim Fisher – Senior Stormwater Engineer Tonkin & Taylor (for NZTA)
 - Ms Shona Myers – Auckland Manager Wildland Consultants Ltd (for Friends of Oakley Creek & Living Communities)
 - Mrs Bronwyn Rhynd – Director Stormwater Solutions Consulting Ltd (for Friends of Oakley Creek & Living Communities)
 - Dr Greg Ryder – Director Ryder Consulting Ltd (for EPA).
 - 5 Mr Slaven (Vegetation expert witness for NZTA) was present in recognition of the overlap between vegetation and freshwater / streamworks in relation to issues raised in the evidence of experts appearing for submitters. Those issues pertained to the revegetation proposals for the realignments and rehabilitation of Oakley Creek in Sector 9.
 - 6 Ms Ann Williams (Groundwater expert witness for NZTA) was present in recognition of issues raised in the submitters experts evidence relating to the need for linkages between freshwater ecology and groundwater in terms of monitoring and results interpretation.
- AREAS THAT HAVE BEEN RESOLVED**
- 7 In order to address the concerns raised in the evidence of Ms Myers in relation to Conditions F.5, G.1 and G.10 (page 20 of her

evidence) and in the s.42 report by Dr Ryder in relation to linking groundwater and freshwater monitoring :

- (a) Amend Condition G.12 as follows:

The continuous monitoring results shall be reviewed on a monthly basis to determine if there is any effect of the tunnelling on base flows in Oakley Creek. The results shall be **reviewed by a hydrologist and freshwater ecologist and** included in the 3 monthly groundwater reports, and provided to the Auckland Council.

- (b) Amend Condition F.5 to read as follows:

The NZTA shall review the freshwater monitoring results, provided from Conditions F.2 to F.4, and results in monitoring detailed in earthworks Conditions E.9, E.19 **and Groundwater Condition G.12**. In the event that potential adverse effects are identified, the NZTA shall develop and implement appropriate contingency plans and/or remedial measures in accordance with the measures set out in the ECOMP.

- 8 To address concerns raised in the evidence of Ms Myers in relation to Condition STW.1 (page 21 of her evidence), amend STW.1 to refer to the need to follow the Oakley Creek Realignment and Rehabilitation Guidelines (this has been dealt with under Stormwater caucusing). It was noted that STW.15 addresses the matter of supervision by a qualified freshwater ecologist.

- 9 In response to concerns raised in the evidence of Ms Myers (paragraph 5.24 – page 16 of her evidence), add to Condition STW.20(c) the following:

Detailed design and plans of all enhancements to the stream bed and/or stream channel, including any structures for other engineering works. **This includes replication of the existing waterfall located on the Stoddard Road tributary near the confluence with Oakley Creek in a similar position within the new realignment.**

- 10 To address concerns raised in the evidence of Ms Myers in relation to Condition F.3 (page 20 of her evidence), amend Condition F.3 (a) – (c) to read as follows:

The freshwater monitoring programme shall, as a minimum, be undertaken in accordance with the following frequency:

- (a) Prior to construction – two baseline surveys;

- (b) During construction - **twice per year** for fish, macroinvertebrates **and** cross sectional profiles, **within one month** prior to **the beginning of the earthworks season** and **within one month either side of** the end of the earthworks season;
- (c) Post construction - on an annual basis for a maximum period of three years, or less if the Auckland Council is satisfied that no adverse effects have occurred or are likely to occur from the Project.
- 11 To address concerns raised in the evidence of Ms Myers and Ms Rhynd and in the s.42 report by Dr Ryder in relation to clarification of the extent and location of the SEV off-set mitigation associated with the Project, it is proposed to include a new Condition STW.20A to read as follows:

The realignments necessary for highway construction will be rehabilitated separately to the Project's SEV off-set mitigation requirement of 343 metres. The Project's SEV off-set mitigation requirements will be undertaken within the areas demarcated as "Oakley Creek Rehabilitation A - D" as shown on Drawing 20.1.11-3-D-D-330-211 Rev A.

Advice Note : The SEV off-set mitigation associated with the Maoro Interchange Project is intended to be undertaken upstream and downstream of those areas shown for Realignment and Rehabilitation on Drawing 20.1.11-3-D-D-330-211 Rev A, for the purposes of creating a coherent ecological corridor in this area.

AREAS THAT HAVE NOT BEEN RESOLVED

- 12 No Freshwater Conditions are unresolved.

Date: 27 January 2011



Mr Eddie Sides

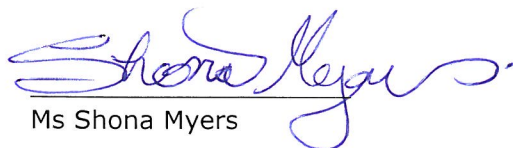


Dr Tim Fisher





Mrs Bronwyn Rhynd



Ms Shona Myers

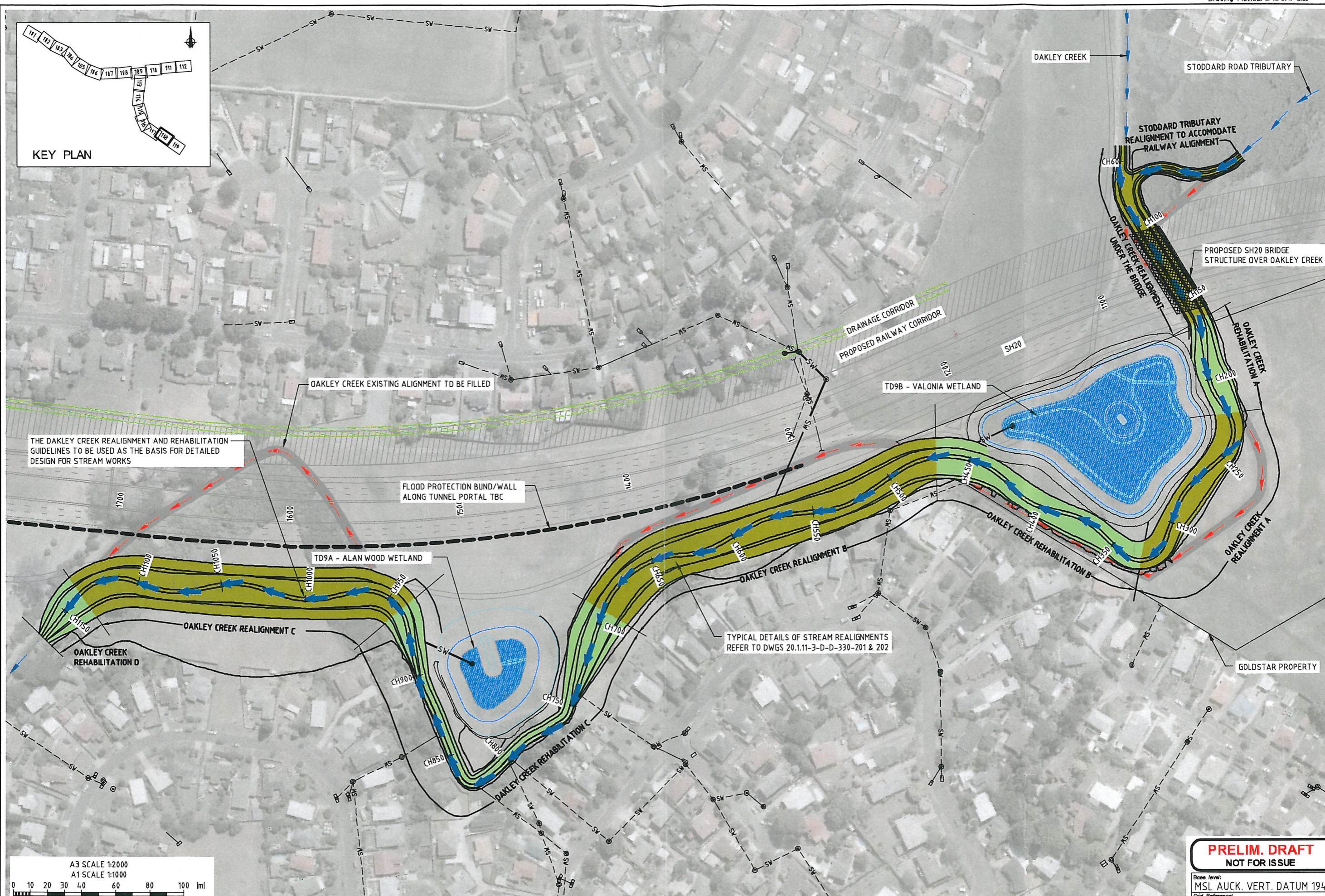
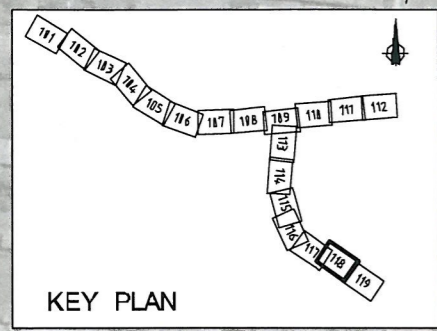


Dr Greg Ryder



Handwritten initials and signature in blue ink, including the number 35.

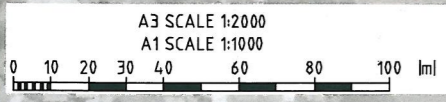
ANNEXURE C: STREAMWORKS LAYOUT PLAN



THE OAKLEY CREEK REALIGNMENT AND REHABILITATION GUIDELINES TO BE USED AS THE BASIS FOR DETAILED DESIGN FOR STREAM WORKS

FLOOD PROTECTION BUND/WALL ALONG TUNNEL PORTAL TBC

TYPICAL DETAILS OF STREAM REALIGNMENTS REFER TO DWGS 20.1.11-3-D-D-330-201 & 202



PRELIM. DRAFT
NOT FOR ISSUE

Base level:
MSL AUCK. VERT. DATUM 1946
Grid Reference:
MT EDEN 2000

No.	Revision	By	Chk	Appd	Date
A	CONSENT ISSUE	JATG	KANM	KJD	30.07.11

Drawing Originator:
Tonkin & Taylor
 Environmental and Engineering Consultants

Original Scale (A1)	1:1001	Designer	EHF
Reduced Scale (A3)	1:2111	Reviewer	TSRF
		Drafting Checked	-
		Consultant Approval	-
		Received by Beco	RM

NZ TRANSPORT AGENCY
WAKA KOTAHU

Project: **WATERVIEW CONNECTION PROJECT**
SH16 / SH20

Title: **STREAMWORKS & FLOOD PROTECTION OAKLEY CREEK REALIGNMENT LAYOUT PLAN**

Originator No.	
Project No.	20.1.11-3-D-D-330-211
Rev.	A

P:\CA0\20111-3\DWG\300_SW\330\20.1.11-3-D-D-330-211.dwg, 210, 29, 0.10 4:38:53 p.m., Sat, 1.2

Document No. 20.1.11-3-D-D-330-211.dwg