

Report pursuant to s 42A Resource Management Act 1991

**In the matter of:**

A Notice of Requirement to construct, operate, use, maintain and improve approximately 11.5km of new State Highway connection between Ashhurst and Woodville

**And:**

A hearing by Manawatu District Council, Palmerston North City Council and Tararua District Council pursuant to s 102

**Requiring Authority:**

New Zealand Transport Agency

**Hearing date:**

25 March 2019

Section 42A Technical Evidence: Construction and Earthworks

By: Gregor Mclean

NJ-015652-992-521-V1:KZ-e



# Contents

1	Introduction .....	4
1.1	Expert Witnesses – Code Of Conduct .....	5
2	Background and Scope of Evidence.....	5
2.1	Background .....	5
2.2	Scope of evidence.....	6
2.3	Reports and material considered.....	7
2.4	Site visit .....	7
2.5	Statutory Context.....	7
3	Existing Environment .....	8
4	Project Effects .....	9
4.1	Construction Phase Effects .....	9
5	Management of Effects .....	15
6	Designation .....	16
7	Review of submissions .....	17
8	Draft Requirement conditions.....	18
9	Conclusions .....	18

# 1 Introduction

1. My full name is Gregor John McLean. I hold a Bachelor of Arts (Geography/Environmental Planning) from Massey University and a Post Graduate Diploma in Natural Resource Management from Lincoln University. I have the status of a Certified Professional in Erosion and Sediment Control (CPESC Number 7628).
2. I am a Director and Environmental Consultant at SouthernSkies Environmental Limited. I have been in that position since 2003. My role involves erosion and sediment control design, consenting and implementation, project environmental management plans, monitoring and site auditing and development and delivery of erosion and sediment control training.
3. I have 23 years experience in the above areas including:
  - a) Environmental auditing for Greater Wellington Regional Council and Auckland Council;
  - b) Development and delivery of Erosion and Sediment Control training;
  - c) Preparation of chemical Flocculation Management Plans including soil bench testing;
  - d) Independent Erosion and Sediment Control expert for the Board of Inquiry – Transmission Gully Project and Erosion and Sediment Control expert for Mill Creek Windfarm; and
  - e) Co-Author of the Erosion and Sediment Control Standard for the New Zealand Transport Agency (August 2010) and Auckland Council Erosion and Sediment Control Guideline (2015).
4. I have prepared this evidence on behalf of the Territorial Authorities, Palmerston North City Council, Manawatu District Council and Tararua District Council (the “**Territorial Authorities**”) in relation to the Notices of Requirement (“**NOR**”) for Te Ahu a Turanga – Manawātū Tararua Highway Project (“**the Project**”) lodged by the New Zealand Transport Agency (“**NZTA**”). I understand that my evidence will accompany the planning report being prepared by the Territorial Authorities under s 42A of the Resource Management Act 1991 (“**RMA**”).

## **1.1 Expert Witnesses – Code Of Conduct**

5. I confirm that I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that except where I state I am relying on information provided by another party, the content of this evidence is within my area of expertise.
6. During the writing of this evidence I became aware that a colleague from the SouthernSkies Auckland office was involved with a tender for the Project. I have considered my obligations under the Code of Conduct and am satisfied that I am able to comply. I have not had any discussions with that individual regarding the NOR and the content of my review. For the avoidance of doubt, I reiterate that the opinions set out in this report are my own as an independent expert witness.

## **2 Background and Scope of Evidence**

### **2.1 Background**

7. The Project is defined as the construction, operation, use, maintenance and improvement of approximately 11.5km of new State Highway connection between Ashhurst and Woodville under the RMA. This proposed new section of State Highway will replace the indefinitely closed State Highway 3 route through the Manawatu Gorge. A detailed description of the Project is set out in Part C of the Assessment of Environmental Effects (“AEE”) submitted by NZTA and a summary description is set out in the s 42A Planning Assessment.
8. The construction of the Project will generate approximately 6,000,000m<sup>3</sup> of excavated (cut) material (excluding topsoil). Approximately 3,800,000m<sup>3</sup> of this cut material will be placed as structural fill for embankments along the proposed route. The remainder of the excess cut material (2,200,000m<sup>3</sup>) will be disposed of within the designation boundaries either in spoil disposal sites or in landscape areas adjacent to structural embankments to avoid the need to export material off site for disposal.

## 2.2 Scope of evidence

9. I have been asked to assess the construction management elements of the NOR. My assessment considers the following matters:

- a) Key issues in contention;
- b) The statutory context;
- c) An overview of the existing environment in terms of the NOR corridor soils, topography and watercourses;
- d) Adequacy of NZTA's investigations and interpretation of the findings of those investigations;
- e) Likely key effects (positive and adverse) on the environment of allowing the Project;
- f) Appropriateness of any proposed mitigation measures or monitoring;
- g) Submissions relating to construction management, including erosion and sediment control; and
- h) Any other matters.

10. My evidence is focussed on construction management, specifically erosion and sediment control, including stream works. It is acknowledged that this will be largely addressed through the regional council consenting process. In this regard my evidence has focussed on the effects of construction and the management of those effects within the NOR corridor.

11. My evidence should be read in conjunction with expert evidence of the other experts that have contributed to the s 42A Planning Assessment. In particular, the evidence of Mr Logan Brown (Freshwater) and Mr James Lambie (Ecology) is relevant in varying ways to the consideration of the matters that I address.

## **2.3 Reports and material considered**

12. As part of preparing this statement of evidence, I have read the following reports and documents:

- a) Te Ahu a Turanga; Manawatū Tararua Highway Project, Notices of Requirement for Designations - Volume 2: Assessment of Effects on the Environment and Supporting Material, dated 31 October 2018;
- b) AEE Part J Appendix 2 – ECDF;
- c) AEE Part J Appendix 3 - Preliminary Road Design Philosophy Report;
- d) Technical Assessment 4 - Landscape and Natural Character;
- e) Technical Assessment 4 Appendix 4.A - Natural Character Assessment;
- f) Technical Assessment 6 - Terrestrial Ecology;
- g) Technical Assessment 6 Appendix 6.A - Terrestrial Vegetation and Habitats;
- h) Technical Assessment 6 Appendix 6.C - Freshwater report; and
- i) Appendices Manawatu Gorge Alternatives Detailed Business Case Appendix I – Preliminary Geotechnical Appraisal.

## **2.4 Site visit**

13. I undertook a site visit on 23 November 2018 with the s 42A Reporting Team and NZTA representatives and I am familiar with the surrounding environment.

## **2.5 Statutory Context**

14. The relevant statutory documents and provisions relevant to the evaluation of the NOR are set out in the s 42A Planning Assessment.

15. The statutory framework provides some guidance to managing the effects of earthworks and management approaches in protected areas or landforms. When considering these statutory matters, it is NZTA's position in relation to the management of earthworks (Section 44.11 AEE page 203) that:

*To the extent that the Project is able to respond to these provisions as part of the NORs, the proposed designation provides:*

- *a corridor within which a road can be constructed with acceptable effects;*
- *adequate area to accommodate earthworks and the erosion and sediment control measures that may be necessary to manage them;*
- *clear design outcomes in the ECDF in relation to earthworks, slope treatments and topsoil management; and*
- *a management plan framework that foreshadows the implementation of an appropriate regime for the management of effects on water resources and water bodies.*

### **3 Existing Environment**

16. Section 7.1 of the AEE (page 21) describes the topography of the NOR corridor as:

*The landscape traversed by the proposed designations comprises steep hill country ranging from 200 metres above sea level to the south and 400 metres above sea level to the north, with deeply incised gullies that contain remnant or regenerating native vegetation and areas of exotic scrub.*

17. Section 7.2 of the AEE (page 26) describes the Landform, Geology and Natural Hazards of the proposed designation. In particular:

*The wider Project area has a complex geology, with a number of geological formations showing contrasting geological behaviours. It is a seismically active area due to the presence of a number of active and inactive fault lines, including the Wellington and Mohaka Faults. The proposed designation crosses two active faults and, therefore, there is a risk of rockfall, landslides and ground rupture as a result of a seismic event.*

*River flooding as a result of sustained or high intensity rainfall is the most frequent and widespread hazard throughout the Manawatu – Whanganui Region. Significant flood events occurred in 2004 and 2015 that impacted wide parts of the region, including the Project area. The primary flood risk areas in the lower river system of the Manawatu River are Palmerston North, Feilding, Foxton and Foxton Beach, while Pahiatua is the primary risk area in the upper catchment.*

*The geology and terrain traversed by the proposed designation means that there is also some risk of slips in significant storm events.*

18. The Manawatu Gorge Alternatives Detailed Business Case – Appendix I - Preliminary Geotechnical Appraisal describes Route Option 3 (Short List Option 3) as:

*...most favourable when considering geotechnically risk and resilience. While it still presents significant geotechnical complexity and risk, it is shorter and has relatively smaller exposure to the general geotechnical risks across the site compared with the other routes.*

19. The general geotechnical risks in terms of earthworks (cut faces, fill embankments, bridges and site drainage) are described in Section 8 of that report.

20. There are eight catchments across the NOR corridor with 24 watercourses (ephemeral and perennial) that are impacted by the construction of the road. In addition, a bridge will traverse the Manawatu River. Technical Assessment 6 – Appendix 6C Freshwater – Ecological Impact Assessment, provides a description of the freshwater ecological condition and values of the sites watercourses. In some instances there are streams with significant identified ecological values.

21. Essentially the description of the site, geotechnical condition and watercourses highlight the complexity of the NOR corridor in terms of management of environmental effects (temporary, short and longer term). While this will influence the detailed design and the construction of the Project over time, they are also relevant considerations for designation of the road corridor, and I discuss this below.

## **4 Project Effects**

### **4.1 Construction Phase Effects**

22. NZTA at Section 10 (page 37) of the AEE describes a broad overview of the construction methodology and a description of the key elements of construction. At the next phase of the Project, being the detailed design and resource consenting phase, a detailed construction methodology will be developed by NZTA.

23. At Section 10.4 (page 40) of the AEE, NZTA outlines “Early Construction Activities - Enabling Works” for which management plans are not considered necessary. The suite of enabling works is quite extensive and includes “preliminary activities” like:

- a) Pre-construction site surveys;
- b) Site establishment;
- c) Site compounds;
- d) Site access and haul roads;
- e) Protection and relocation of utilities;
- f) Property access;
- g) Ecological surveys and relocations;
- h) Te Apiti wind farm reconfiguration;
- i) Vegetation clearance and protection; and
- j) Erosion and sediment control.

24. In its s 92 response dated 15 January 2019 NZTA stated that:

*“It is still developing the scope of enabling works that are necessary to ensure the broader construction programme and projected opening date can be achieved, and limited in scale and anticipated effects on the environment.”*

25. NZTA anticipates that enabling works will either be authorised by separate regional resource consents, permitted activities under relevant district planning documents, or authorised by reference to an Outline Plan of Works.

26. I am concerned at the broad scale of the enabling works as defined by NZTA. The potential scale of enabling works in terms of land and stream disturbance could be extensive. I am of the opinion that any enabling works should form part of a management plan process or at the very least, be included within conditions that require regulatory review and certification to ensure that the effects are adequately managed within the NOR corridor.

27. Some aspects of the works listed in the enabling works definition could also pre-determine the outcome of other management plans, which may not be certified at this stage. For example, the establishment of erosion and sediment control measures should

not occur until the overarching ESCP and Site Specific/ Activity Specific ESCP's have been prepared and certified. For that reason I have recommended that the NOR conditions reflect a management structure which results in oversight of the enabling works from a construction effects perspective. The s 42A Planning Report sets out these matters further.

28. A range of erosion and sediment control measures will need to be installed prior to earthworks and stream works being undertaken. I expect these to be installed in accordance with best practice. It is proposed that the contractor will prepare an Erosion and Sediment Control Plan (“**ESCP**”) as part of the suite of management plans offered up by NZTA. The ESCP is normally an overarching plan, which relies on site or activity specific ESCPs being submitted at a later date, and prior to any earthworks taking place. This enables specific construction activities or site areas to be addressed in detail, with regional council and stakeholder, including contractor, input following (or at the time of) detailed design being finalised.

29. I recommend that the overarching ESCP be provided as part of the NOR process. This also addresses the issues with enabling works, as already detailed in this evidence. A detailed activity or site specific ESCP can then be provided and approved prior to works commencing, as part of the regional council consents. This should ensure adequate erosion and sediment controls for the duration of the construction of the road, including suitable protection for the many watercourses.

30. It is unclear from the AEE what best practice Erosion and Sediment Control Guideline / Standard will be utilised in preparing the various management plans, however this will form part of the regional consenting phase. It is noted that the One Plan, rule 13-6 contains an advice note with reference to the *Erosion and Sediment Control Guidelines for the Wellington Region* (“**Wellington Guidelines**”) when referring to methods to avoid, remedy or mitigate sediment runoff.

31. The One Plan also acknowledges that depending on where the earthwork site is located and the extent of the earthworks, higher standards may need to be met than those set out in the Wellington Guidelines. These could apply, for example, in construction locations near a sensitive water body or soils with high clay content.

32. The NOR corridor environment (geology, topography and watercourses), the values of receiving environments, and the expected duration of what will be extensive construction

works will, in my opinion, require industry best practice erosion and sediment control to be implemented, as secured through conditions of consent.

33. The Project requires considerable earthworks with an estimated 2,200,000m<sup>3</sup> of excess cut to be disposed of within the NOR corridor. This volume could however, change (increase or decrease) as a result of detailed design, geotechnical investigations and when responding to ground conditions during construction, requiring revised design. In this regard the footprint of the works may also change (increase or decrease). The NOR corridor therefore needs to be large enough to accommodate these potential changes to design and construction methodology.
34. NZTA has indicated a number of spoil sites within the NOR corridor. I am comfortable that there is adequate room within the designation to accommodate the excess cut material. NZTA has indicated that the 'proposed spoil sites' shown on the indicative plans illustrate areas of land for disposal considerably in excess of the area required. In particular, I note the NZTA s 92 response (dated 15 January 2019) which states that the proposed spoil site located at chainage 4400 to 5300 could by itself accommodate the current estimated excess fill. The same can also be said of the spoil sites located between chainage 11500 and 12900.
35. I do have concerns with the location of some of the spoil sites within the NOR corridor and in particular, where they are shown to be located on the headwaters of streams. At this stage, I have relied on the design outcomes indicated in the Environmental and Cultural Design Framework ("**ECDF**") which stipulate that the spoil sites should be designed to minimise impacts on waterbodies.
36. However, it is important that the spoil sites are located carefully as part of detailed design to ensure management of effects on stream systems, and specifically reclamation. In particular, the location of the spoil sites needs to be managed to ensure that additional streams are not reclaimed. I do not consider that the ECDF has sufficient robustness to solely rely on that document, and I have therefore recommended a change to the Construction Environmental Management Plan ("**CEMP**") condition. This condition now explicitly requires the location of spoil sites and the avoidance of reclamation to be addressed as part of the CEMP.
37. The impact on vegetation, streams and wetlands from the spoil sites and temporary works, such as construction access, could result in additional environmental effects that

have not been considered or assessed by NZTA. I note that these concerns are shared by Mr Brown and Mr Lambie for the Territorial Authorities.

38. NZTA have advised the Territorial Authorities in its s 92 response (dated 15 January 2019) that the impact on vegetation or wetlands does not differ depending on whether the construction activities are temporary or permanent. For that reason NZTA do not see a need to assess the effects of temporary or permanent works separately.
39. NZTA is correct provided that all works (including temporary works) are located within the permanent footprint of the indicative design shown within the NOR corridor (i.e. the extent of cut and fill shown on indicative design drawings) and avoid spoil sites being located on the headwaters of streams.
40. For example, approximately 450 metres of stream would be covered by the earthworks footprint in the QEII east covenant.<sup>1</sup> In this same area it is also proposed that the clearance of indigenous vegetation should be limited to 20 metres beyond the extent of fill and 5 metres beyond the extent of cut.<sup>2</sup> However, it is unclear if these extents have considered the required space for erosion and sediment control devices.
41. To install a sediment retention pond (“SRP”) or a number of decanting earth bunds for these works you may require up to 75 metres from the toe of fill, whereas a silt fence (“SF”) would only require a small area of clearance. If there is not a sufficiently cleared area below the extent of fill, less efficient devices would need to be implemented to control the physical works.
42. In terms of efficiency a SRP can be 90% efficient<sup>3</sup> compared to 50% for a SF. In terms of the sediment loss and subsequent impact on the receiving environment this could increase the potential sediment discharge to the receiving environment by 40% for the duration of those works. This increase would have a subsequent environmental effect on the receiving environment particularly when dealing with areas of high natural character, such as in the case of the Eastern QEII. In those areas it is very unlikely that use of a SF, instead of a SRP, would be best practice. Therefore the NOR corridor needs to provide sufficient room for a SRP to be installed and maintained in these sensitive areas.

---

<sup>1</sup> Technical assessment 4 - Landscape and Natural Character – Paragraph 237.

<sup>2</sup> Technical assessment 6 Appendix 6.A - Terrestrial Vegetation and Habitats – Section 5.3.3 page 49.

<sup>3</sup> Landcare Research July 2016, Scientific basis for erosion and sediment control practices in New Zealand.

43. To ensure the workability of the NOR corridor in delivering a road with acceptable effects, the effects envelope defined for vegetation clearance and stream disturbance needs to account for these additional mitigation works. As far as I understand, for the likes of the example above, it has not been taken account of.
44. In terms of the effects of sediment on streams, NZTA has confirmed that these have not been assessed at this stage and that the assessment will be undertaken prior to the lodgement of regional consents. Instead, the Freshwater Report relies on an indicative design detail, with an envelope of scale of effect (Table 6.C.9) which excludes construction effects.
45. Technical Assessment 6 Appendix 6.C - concludes that: *“the magnitude of effect on aquatic ecological values from erosion and sedimentation, in our experience from other large-scale roading projects, is likely to be low against the background, even though a substantial amount of sediment may be discharged. This is provided by a robust and enforced erosion and sediment control plan designed and implemented to the permitted standards outlined in section 8 of the “Erosion and Sediment Control Guidelines for the Wellington Region” dated September 2002, as described under the Horizons One Plan”.* Section 8 of the ESC Guidelines is Forestry Operations and is an incorrect reference.
46. In the absence of any detailed freshwater ecology assessment and detail regarding works methodologies and erosion and sediment control at this stage, I agree it is difficult to assess the likely impacts of sediment on freshwater values. NZTA itself has recognised however that there are a number of sites with high ecological effects (see Table 6.C.9). These will require careful management.
47. As a matter of general principle, so long as there is adequate detail adhering to best practice guidelines/standards within the ESCP and Site Specific ESCP’s, and all construction works, including enabling works, are addressed, implemented and managed through management plans, I am of the opinion that the effects of construction, specifically sediment and dust, can be appropriately managed.
48. However, at this stage of the process it is still necessary, in my opinion, for NZTA to establish that the NOR corridor can provide sufficient room for any best practice mitigation to be put in place, including in difficult or vulnerable (high value) sites.

## 5 Management of Effects

49. NZTA has proposed a suite of management plans to establish the environmental requirements for the Project. The plans also provide a mechanism by which performance-based consent conditions for the entire Project can be implemented (refer Figure 32 from the AEE).

Figure 32 – Proposed Management Plan Framework



50. The use of management plans for large projects is common practice. There are many examples of management plan conditions that have been imposed on large scale infrastructure projects throughout New Zealand.

51. The CEMP provides an overarching management framework that will manage environmental effects, which arise from the construction of the Project. The CEMP is intended to cover all anticipated construction elements and provide details of a wide range of matters including environmental policy, objectives and performance standards.

52. The CEMP will have a number of supporting plans including those set out in (page 164) Table 35 of the AEE. None of those relate specifically to earthworks, sediment discharge or stormwater run off at this stage. Instead, when referring to Figure 32 (above) these matters / potential effects are to be addressed at the resource consenting phase through ESCPs and (to a lesser extent) potentially the Freshwater Ecology Management Plan.

53. The CEMP and any supporting plans will require review and amendment during the life of the Project (including as detailed design progresses) to reflect changes to activities, risks, mitigation measures, responsibilities and management processes. The ability to make

changes to management plans is critical to continually improving the effectiveness of the plans and the mitigation measures that they provide. The CEMP does provide for the ability to make changes to the CEMP, but does not give the Territorial Authorities any visibility of this. This has been partly addressed by NZTA at condition 5(d) and condition 10(xii). The proposed amendments to this condition within the s 42A Planning Report provide for that visibility.

54. In addition to the management plans, NZTA has prepared an ECDF. The preliminary ECDF provides a design framework within which the design of the proposed Project will be developed. It identifies design principles, constraints and opportunities that guide the design of the Project. The intention of NZTA is that the ECDF will be further developed, in consultation with stakeholders, to include design solutions that respond to designation (and future resource consent) conditions and ultimately inform the design of the Project, including the management plans.

55. I note that the updated ECDF (condition 11) may not derogate from the principles in the preliminary ECDF. This means that the principles as set out in the ECDF must address all key points (albeit on a preliminary basis) at this stage.

56. The ECDF at Section 3 Emerging Design Outcomes contains specific matters in relation to Ecologically Sensitive areas, Earthworks / Spoil Disposal (including cut / fill batters and topsoil), Water Bodies (Culverts / Stormwater Treatment Wetlands and Revegetation). These will be incorporated into detailed design.

57. In my experience during the detailed design and construction phase other disciplines, such as geotechnical design may override some of the ECDF design outcomes. For example, during construction unexpected ground conditions may be experienced and the design of the batter, including stabilisation would need to respond to these conditions. To ensure resilience of the road this may result in the least preferred stabilisation techniques such as shotcrete being used. As far as possible key environmental outcomes should be recorded in conditions.

## **6 Designation**

58. I have considered whether there is adequate area within the NOR corridor to accommodate earthworks and the erosion and sediment control measures that may be necessary to manage them. I am generally comfortable, although (as already indicated

through one example earlier in my evidence) I have concerns about the NOR corridor width in some areas of the proposed designation.

59. When having regard to the Indicative Alignment Plans (A01 – 09) within the AEE, the designation width in some areas would be problematic in terms of implementing industry best practice erosion sediment control and response to any design or construction changes. For example at Chainage 3850 the Manawatu River Bridge is in close proximity to the boundary; at Chainage 6650 and at Chainage 7350 the fill batter extends beyond the southern designation boundary; and at Chainage 8050 the Te Apiti Wind Farm road reconfiguration sits on the southern designation boundary.

60. It is understood that detailed design of the road is yet to be completed, however to enable a design and construction response to ground condition changes, ensuring sufficient width in the designation beyond the extent of the cuts and fills is imperative to ensure that the earthworks and stream works can be appropriately managed. I have addressed this point earlier in my evidence, however, I recommend these matters be addressed at an early stage to provide certainty that the NOR corridor can accommodate necessary erosion and sediment control measures.

## **7 Review of submissions**

61. S295 - Royal Forest & Bird Protection Society Incorporated at paragraph 24 disagrees with the 'Freshwater - Ecological Impact Assessment' which states that "the downstream reaches [of the Manawatu River and its tributaries] are unlikely to be directly affected by the Project (i.e. the activity is unlikely to diminish the natural state of the waterways". Forest and Bird consider that works associated with the construction of the Highway (in particular earthworks, temporary water takes, vegetation clearance, sediment and contaminant runoff, etc.) can create a substantial direct impact on the state of these waterways if not managed correctly and can create a lasting long-term impact, particularly in the case of sedimentation.

62. I agree that construction works, including the proposed enabling works, can have an adverse environmental effect on watercourses if not managed appropriately. However, I am comfortable that industry best practice erosion and sediment controls if implemented, coupled with appropriate monitoring, will enable likely sediment related environmental effects to be appropriately managed. This issue would need to be further addressed

through the management plans and through the ESCP's. I provide comment on the proposed conditions later in this evidence.

63. S312 – Ag Research Limited – At Section 3 Effect of proposed designation, the submitter comments that: “in addition to the loss of the long-term phosphorus fertiliser and sheep grazing experiment, there will also be construction effects and long-term environmental impacts on the wider Research Station. The key concerns during construction are fugitive dust, sediment and water runoff, emissions from construction vehicles and noise effects on stock. These effects could alter the physical soil conditions, impact the pasture and change the way stock graze the research blocks”.

64. As discussed above, I reiterate that provided industry best practice erosion and sediment controls are implemented, coupled with appropriate monitoring, then the likely sediment related environmental effects can be appropriately managed. In relation to dust, NZTA will prepare a Construction Air Quality Management Plan, which will address dust management from construction activities. This plan will be prepared at the resource consent stage of the Project.

## **8 Draft Requirement conditions**

65. The relevant conditions I have considered and made recommendations (as detailed in my report) in respect of are:

- a) Condition 5 Outline Plan or Outline Plans (Permanent Works);
- b) Condition 5A – Outline Plan or Outline Plans (Enabling Works);
- c) Condition 10 – Construction Environmental Management Plan; and
- d) Condition 11 - Environmental and Cultural Design Framework.

## **9 Conclusions**

66. I am concerned at the broad scale of the enabling works definition. Given the extent of these potential works, I am of the opinion that any enabling works should form part of a management plan process or at the very least, be included within conditions that require regulatory review and certification to ensure that the effects are adequately managed.

67. The location of the spoil sites needs to be managed to ensure that additional streams are not reclaimed.

68. I consider that there is generally adequate area within the NOR corridor to accommodate the earthworks and the erosion and sediment control measures that may be necessary to manage them. There are some areas of specific concern regarding the corridor width when accounting for additional mitigation works (over the effects envelope) for vegetation clearance and stream disturbance. It is unclear whether the extent of vegetation clearance and impact on streams have considered the required space for erosion and sediment control devices. There needs to be sufficient width in the NOR corridor beyond the extent of the cuts and fills to accommodate necessary mitigation measures and I recommend this matter is addressed at an early stage.

69. Provided adequate detail adhering to best practice guidelines / standards is provided within the ESCP and Site Specific ESCP's, and all construction works, including enabling works are addressed, implemented and monitored through management plans, I consider that the effects of construction, specifically sediment and dust, can be appropriately managed.

A handwritten signature in blue ink, appearing to read 'Gregor McLean', is written over a light blue horizontal line.

**Gregor McLean**