Roydon Quarry, SH1 / Dawsons Road Queue Management Plan

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<th>Description</th>
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1 Introduction

1.1 Background

Fulton Hogan is seeking resource consent for a new quarry to be accessed from Jones Road to the west of Dawsons Road. In broad terms, the consent application is to allow for maximum quarry traffic generation of up to 1,200 heavy vehicle movements per day (600 movements inwards, 600 movements outwards), and a lesser 800 vehicles per day averaged over 60 calendar days.

The assessments prepared as part of the consent application have identified that a high proportion of the generated traffic would use State Highway 1 (SH1) via Dawsons Road, crossing the main south railway line.

A potential effect of the quarry that has been assessed in detail is the safety impact of queuing in the vicinity of the roundabout NZTA is constructing at SH1 / Dawsons Road / Waterholes Road as part of Christchurch Southern Motorway Stage 2 ("CSM2"). There are two matters identified:

- The northbound queue generated by the Dawsons Road railway level crossing, and any impacts when it extends back to the SH1 roundabout. This involves a potential change to the normal queuing at the roundabout when the queue extends back.
- The southbound queue generated on the Dawsons Road (north) approach to the SH1 roundabout, and any impacts if when it extends to the railway. This may involve a change if drivers crossing the railway ignored the 'keep clear' markings and/or mis-judged the available space on the other side of the railway crossing, and a train is travelling through the level crossing.

In both cases, the effect relates to changes in the likelihood of queuing extending to either the roundabout or railway level crossing, and the consequential impact of any queue on the safety and efficiency of traffic.

A management plan approach has been put forward as a response to addressing remaining areas of concern from the road controlling authorities. That allows for actual effects on the transport network to be taken into account through monitoring, and mitigation (if any) to be put in place based on re-evaluation of the roundabout operation following the monitoring.

1.2 Report Purpose

This report sets out a draft management plan approach to monitoring and mitigation (if needed) for the queue back from the Dawsons Road railway crossing to the SH1 roundabout, and from the SH1 roundabout to the railway, as a result of changes in traffic patterns associated with the Quarry.

The management plan is expected to be a requirement of a proposed condition of consent for the quarry. Draft wording for the condition of consent associated with the management plan is included in Appendix A.

The monitoring and mitigation required by the management plan condition is to address changes to safety risk as a result of queue back from the railway line or roundabout. Safety risk at the SH1 intersection will include within the roundabout circulating lanes, as well as on approach and exit lanes. Safety risk at the railway is in relation to the movement across the railway. The design plans that the management plan is based on are attached in Appendix B.

2 Safety Risk Assessment

2.1 Assessment Framework

Any mitigation required to be put in place by Fulton Hogan will relate to an assessment of the effect on road safety. The effect of the quarry in this case relies on assessment of a future transport network (changes due to CSM2) and resulting changes in traffic conditions. It also relates to a relatively low frequency event where a train generates a railway level crossing closure that results in a queue extending to the SH1 roundabout, or a queue from SH1 extending to the railway when a train is passing through. The effect assessment can be considered in terms of the change in risk to safety of road users.

A commonly used method for assessing road safety risk is set out through the NZTA road safety audit process. The expected crash frequency is qualitatively assessed on the basis of expected exposure (how many road users will be exposed to a safety issue) and the likelihood of a crash resulting from the presence of the issue.
severity of a crash outcome is qualitatively assessed on the basis of factors such as expected speeds, type of collision, and type of vehicle involved. Safety concerns are summarised by a concern assessment rating matrix.

**Table 2-1: Concern Assessment Rating Matrix**

<table>
<thead>
<tr>
<th>Severity (likelihood of death or serious injury)</th>
<th>Frequency (probability of a crash)</th>
</tr>
</thead>
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<tr>
<td>Very likely</td>
<td>Frequent  Common  Occasional  Infrequent</td>
</tr>
<tr>
<td>Likely</td>
<td>Serious   Significant  Moderate</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Significant  Moderate  Minor</td>
</tr>
<tr>
<td>Very unlikely</td>
<td>Moderate   Minor   Minor</td>
</tr>
</tbody>
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Typical guidance for a suggested action for each concern category is given in Table 2-2.

**Table 2-2: Concern Categories**

<table>
<thead>
<tr>
<th>Concern</th>
<th>Suggested action</th>
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<tr>
<td>Serious</td>
<td>Major safety concern that must be addressed and requires changes to avoid serious safety consequences.</td>
</tr>
<tr>
<td>Significant</td>
<td>Significant safety concern that should be addressed and requires changes to avoid serious safety consequences.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Moderate safety concern that should be addressed to improve safety.</td>
</tr>
<tr>
<td>Minor</td>
<td>Minor safety concern that should be addressed where practical to improve safety.</td>
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A method also used for assessing level crossing safety is the Level Crossing Safety Impact Assessment (LCSIA), a process carried out for KiwiRail which identifies the level of crash risk of existing or upgraded crossings, or a change in use at the crossing. The crash risk is represented as a score for the level crossing, which is then placed in risk bands representing the likelihood of death or serious injury. Criteria are applied to determine if changes in risk are acceptable. The LCSIA process has already been used for an assessment of the change in level crossing crash risk as a result of the quarry, and associated network changes.

**2.2 Assessed Level of Safety Risk**

**2.2.1 Northbound Queue Back from Railway to Roundabout**

Scheme stage and detailed design stage road safety audits of the NZTA roundabout have not identified queue back from the railway into the SH1 roundabout, or from the SH1 roundabout into the railway as a road safety concern, indicating any concerns have at the time of design not met the threshold for comment. It is noted that the NZTA roundabout design will be subject to further post-construction road safety audit as part of its commissioning.

The risk to safety needs to take into account the likelihood of queues occurring that extend from the railway line to the roundabout, the likelihood of an increase in collisions within the roundabout or its vicinity (including approach and exit lanes), and the safety consequence of any collisions.

In terms of likelihood, extensive modelling undertaken for the Quarry proposal has identified that there is the potential for queueing without or with the quarry. The frequency will likely increase once the quarry is operational, but will still be very low in terms of overall operational time of the roundabout, and would not occur each time a train passes through the level crossing.

Assessments of safety risk are that the safety concern associated with queue back from the railway into the roundabout are of a low enough concern that they can be confirmed and mitigated (if necessary) through the management plan process. The observation of actual road user responses, and monitoring of safety performance provides NZTA, Fulton Hogan (and Kiwi Rail as required) the opportunity to confirm the need for
and type of any mitigation. This will take into consideration the level of safety concern identified, and how the quarry related traffic is contributing to any change in safety concern.

### 2.2.2 Southbound Queue Back from SH1 Roundabout to Railway

An LCSIA was included in the Fulton Hogan consent application for the change in use of the level crossing and the proposed improvement works on the north side of the railway. That did allow for the proposed CSM2 roundabout as a reference against which the quarry was compared. The crossing was identified as having a Medium Low risk band under the scenarios of without and with quarry. This change was considered acceptable to Kiwirail, and represents a “relatively safe level crossing situation”.

To address the residual concerns of the road controlling authorities, the risk to safety needs to take into account the likelihood of queues occurring that extend from the SH1 roundabout to the railway line, the frequency of trains, the level of compliance with signage and markings, and where any misjudgement of the space available for queuing could result in a vehicle straddling the railway level crossing. Based on the active and passive measures in place at the crossing, the risk of collision between a vehicle and a train would be assessed.

The detailed traffic modelling indicated that queues would generally be contained within the available queue distance, although it is recognised that there is some potential for occasional queues to extend at least close to the railway. As drivers approach from the north a precise decision making process is involved as to whether there is space on the southern side of the railway. The modelling suggests only a small difference in queue length between the without and with quarry scenarios, although the mix of traffic changes with more heavy vehicles with the quarry. This should be at least partly addressed in the with quarry scenario by removing or improving the short stacking distances on the north side of the railway easing the decision making.

### 2.3 Initial Considerations to Address Risk

The SH1 roundabout is currently being constructed, and it is understood no physical changes are being made to address any safety concerns associated with queue back. Through the assessment process, and ongoing consultation with NZTA and Kiwirail, potential responses to address the risk of concern to NZTA have focused on mitigation that warns vehicle drivers of risks associated with the queuing. This has included:

- Monitoring of traffic volumes and queuing, and its influence on roundabout and railway operation and road safety;
- Potential mitigation in the form of queue activated warning signs on the basis of Level Crossing Safety Impact Assessment “LCSIA” recommendations and use as the standard warning device of queues in the vicinity of railways; and
- Potential mitigation in the form of railway activated warning signs, possibly linked to variable message signs.

This management plan sets out a potential framework for monitoring performance, and developing mitigation if required, based on the level of safety concern.

### 3 Objectives of Management Plan

The objective of the Plan shall be to ensure that the operation of the quarry does not result in a change in safety risk:

- At the roundabout on SH1 / Dawsons Road (including within the roundabout, and on its approach and exit lanes), specifically arising from queue back from the adjacent railway level crossing.
- At the Dawsons Road railway level crossing associated with changes in the southbound queue on Dawsons Road from the SH1 / Dawsons Road roundabout.

Safety at the roundabout and railway associated with the queue back shall be assessed in accordance with a fit for purpose Safety Risk Assessment which is carried out in accordance with the approach set out within Section 2 of this draft Roydon Quarry, SH1 / Dawsons Road Queue Management Plan. This will involve management measures to monitor and review changes in operation and safety from the queuing events.

Where a change in safety risk is identified, mitigation is to be provided by Fulton Hogan to address the change in safety concern at the roundabout on SH1 / Dawsons Road.

The proposed approach to monitoring and mitigation are set out in the following sections of this report.
4 Monitoring

**Phase 1: Baseline Traffic Monitoring - Before the Quarry is Operational**

As a new roundabout is being installed by NZTA at SH1 / Dawsons Road and will be open in 2020 (before the Quarry is operational), it is likely that a post construction safety audit will be carried out by NZTA of the CSM2, including at the SH1 / Dawsons Road roundabout. There is a possibility that the audits could recommend design provisions to address any safety concerns raised with the railway level crossing. Through the commissioning period, it is likely that the major changes in traffic patterns will start to establish and should form a baseline for future monitoring.

**Actions:**

1. Meet with NZTA and KiwiRail to discuss any feedback from its post construction review of the roundabout operation, and whether measures have been planned or implemented that would also address any of the queueing concerns.

2. At least 3 months after CSM2 and the SH1 roundabout opening, Fulton Hogan to source or undertake a 7-day automatic traffic count on Dawsons Road between SH1 and Jones Road to establish changes in traffic patterns that have occurred due to CSM2. Pre-CSM2 traffic counts were included in the Integrated Transport Assessment for the Quarry application.

3. Compare the traffic counts to the modelled traffic forecasts, and assess the need for video (or other appropriate method such as installation of loop detectors) monitoring during the busiest period to determine whether there are observations of queue back from the railway line, or from the SH1 roundabout to the railway line. The monitoring would identify how traffic responds to the queue back.

   For the queue back from the railway, the effectiveness of such monitoring can be considered based on the modelling outputs for the without quarry scenario, where it was determined that a volume of approximately 200vph in the northbound direction on Dawsons Road would generate a probability of queue back to the roundabout greater than 5% of times that a train passes (during the period that the train passes), and 300vph northbound would generate a queue back approximately 30% of the times that a train passes.

4. Undertake a safety assessment, with reference to the assessment framework in Section 2.1 of this plan, of the observed queueing behaviour and traffic responses to the northbound and southbound queueing on Dawsons Road. As part of that assessment, a review will be undertaken of crash records at the roundabout since opening of the roundabout, and identify any safety trends of concern including issues resulting from vehicles queueing back from the level crossing (such as an increase in frequency of crashes or typical crash types having higher severity outcomes that would normally be anticipated).

5. Fulton Hogan to meet with NZTA and KiwiRail to review the monitoring outcomes, and consideration of need for mitigation.

**Outcomes**

1. Agree whether NZTA will have a responsibility in monitoring (and mitigating) any safety concerns in the short term, considering the changes in travel patterns and observations of queueing.

2. Agree whether there is still the potential need for mitigation, and whether it should be installed at the outset, based on the observations, and consideration of assessments undertaken.

3. Where the need for mitigation is not clearly identified as part of Phase 1, further monitoring will be required during the quarry opening period. It may also be determined that additional monitoring during the pre-opening period would be effective, if volumes are near the threshold where queue back may be observed over a limited monitoring period.

**Phase 2: Monitoring Post Opening of Quarry**

The quarry will take some time to become fully operational, and that offers the opportunity to confirm some of the potential variables such as changes in traffic patterns due to the other mitigation put in place (e.g. the...
safety improvements at Jones Road / Dawsons Road proposed as an aspect of the quarry development), and the change in queuing due to the quarry.

Actions:

1. Meet with NZTA and KiwiRail to discuss any further feedback from its on-going review of the roundabout operation (including recorded notifications of concerns, near misses, or vehicle incidents from their network managers and road users), and whether mitigation has been implemented that would also address any concerns with the quarry.

2. Undertake a 7-day automatic traffic count on Dawsons Road between SH1 and Jones Road to establish changes in traffic patterns that have occurred due to the quarry related network changes, and linked to quarry traffic generation records.

3. Compare the traffic counts to the modelled traffic forecasts [used for the quarry assessment], and confirm the need for video [or other appropriate method] monitoring during the busiest period to determine whether there are observations of queue back from the railway line. The monitoring would identify how traffic responds to the queue back.

4. Undertake a safety assessment, with reference to the assessment framework in Section 2.1 of this plan, of the observed queueing behaviour and traffic responses to the northbound and southbound queueing on Dawsons Road. In addition, a review will be undertaken of crash records at the roundabout since the opening of the roundabout, and operation of the quarry, and identify any safety trends of concern including issues resulting from vehicles queueing back from the level crossing [such as an increase in frequency of crashes or typical crash types having higher severity outcomes that would normally be anticipated].

5. Fulton Hogan to meet with NZTA and KiwiRail to review the monitoring outcomes, and consideration of need for mitigation.

Outcomes

1. Agree whether there is still the potential need for mitigation, and whether it should be installed based on the observations, and consideration of assessments undertaken.

2. Where the need for further monitoring is identified, the requirements will be set out.

Phase 3: Repeat Monitoring - Established Quarry (or post Mitigation Implementation)

Where agreed as required during Phase 2, monitoring after opening of the quarry will be required to represent conditions associated with full operation of the quarry. The monitoring is expected to be as per Phase 2, and in the absence of agreed mitigation will be undertaken annually for up to three years, or until mitigation has been installed (if required).

5 Mitigation

5.1 Approaches to Mitigation

A suite of potential mitigation options is presented, to be confirmed following monitoring based on current best practice for managing traffic movements and queues in the vicinity of roundabouts and railways.

The mitigation should be sufficient to achieve the level of safety concern at the level identified in Phase 1 monitoring [without quarry], or so that the remaining concern after mitigation is no more than a minor safety concern.

Where there is no change in the assessed safety concern due to the quarry, then Fulton Hogan will not be required to implement any form of mitigation.

It is anticipated that qualified transport engineers representing each of Fulton Hogan, NZTA, and KiwiRail will review the level of safety concern and specific mitigation package through a workshop process.
The concepts to be put forward for initial consideration and refinement are set out below. This is not intended to be an exhaustive list of potential mitigation, with the actual provision to be confirmed following the review and workshop process.

5.2 Queue Back from Railway Line to Roundabout

5.2.1 Review Static Warning Signage

The most basic option will be to review the effectiveness of existing static signage on the approach to the roundabout, and ensure it meets the guidance and requirements of the NZTA Traffic Control Devices Manual for warning of the presence of the railway. It is noted that the CSM2 detailed design drawings currently do not show any railway warning signage on the roundabout approaches from SH1 or Waterholes Road (which is a recommendation of the NZTA Traffic Control Devices Manual), so there may be opportunity to revise the advance warning signage. Some example signage for consideration is set out below (which would be adapted for the roundabout):

![WXL2 Signage]

5.2.2 Advance Queue Warning

**Vehicle Detection**

The method recommended to Fulton Hogan by its expert advisers is the use of vehicle activated queue warning signs on the approach(es) to the roundabout. A queue that is detected as approaching the roundabout would set off the queue warning signs, which would include alternating orange lights.

It is expected one or more detectors would need to be installed on Dawsons Road, linked to advance warning signs on SH1 approach from the west, and potentially from the south on Waterholes Road and the east on SH1. This would be considered based on the agreed level of likelihood and concern of queues influencing each of the roundabout approaches. Examples of standard signage to be considered include:

![Queue Warning Signage]

It is anticipated some of the existing (planned as part of CSM2) signage may need to be relocated to ensure an appropriate sequence of guidance and warning on the approach to the roundabout. That will be considered once the CSM2 signage is put in place, as exact positioning is determined at the time of construction.

**Railway Detection**

If the frequency of queue back is considered sufficiently high that all railway level crossing closures should activate an advance warning, then a railway activated warning sign could be implemented. There would need to be certainty that there is a high likelihood of queue back most of the time. As there is not a short stacking
issue (defined as separation less than 26m from the railway) the use of railway detection would need to be carefully considered.

The signs would most likely be of the same message as identified by the vehicle detected sign. However, both methods of detection offer opportunities for use of different sign and warning types.

5.2.3 Variable Message Sign

A more complex Variable Message Sign has been suggested as a potential option by NZTA. The otherwise blank digital sign would be activated by the presence of a queue on Dawsons Road, or train passing through the level crossing (as per the advance queue sign). The variable message would then convey a warning or message to drivers approaching the roundabout. The nature of the variable message sign is such that the message could be refined over time, or be used for other general road information messages when not activated for the warning.

5.2.4 Other Measures

It is noted that other measures could be contemplated, and developed through the ongoing monitoring workshop process. An example of more active control of traffic is through the use of queue or railway activated traffic signals (as has been installed at the Halswell Junction Road / Springs Road intersection). Such measures would be contemplated if the signage or warning system has not achieved the required outcomes (which is considered unlikely).

5.3 Queue Back from Roundabout to Railway Line

5.3.1 Review Static Warning Signage and Road Markings

The most basic option will be to review the compliance and effectiveness of static signage on the approach to the railway crossing, and ensure it meets the guidance and requirements of the NZTA Traffic Control Devices Manual for warning of the presence of the railway.

It is noted that the CSM2 detailed design drawings currently do not show yellow box markings on the railway (which is a recommendation of the LCSIA for Fulton Hogan).

A consideration would be a downstream marker, sign, or road marking highlighting the necessary distance required for long vehicle to queue clear of the railway. Such a treatment could be highlighted to those inducted to the Fulton Hogan quarry, and would quickly highlight when a queue exceeds the available downstream storage distance.

5.3.2 Active Warning Signage

KiwiRail in discussions mentioned the possibility of a warning sign ahead of the railway crossing activated by a queue length detector. Similar to the signage options set out in 5.2, such a sign would add caution for drivers to be aware of the shorter downstream storage distance.

5.3.3 Downstream “Escape Bay”

The NZTA Traffic Control Devices Manual provides an option of a downstream “escape bay”. This could be installed on the eastern side of Dawsons Road immediately south of the railway to provide additional storage distance if a driver misjudges the gap available for queueing.

6 Reporting

A summary of monitoring undertaken, meetings held to review monitoring and mitigation, and agreed outcomes is to be conveyed back to the Consent Authority and NZTA, in accordance with the consent condition requirements:

- Phase 1 Baseline monitoring - prior to commissioning of the works at Jones Road / Dawsons Road.
- Phase 2 Monitoring Post Opening of Quarry - within 6 months of quarry open to the public.
- Phase 3 Repeat monitoring –Annually for up to three years, or as agreed with the road controlling authority.

Stantec
Status - Draft | 15 November 2019 | Project Number - 310200203 | Roydon SH1, Railway Crossing Queue Management Plan - 191113.docx Page 8
Appendix A

Proposed Condition of Consent
1. Within three months of the date of commencement of this consent the Consent Holder shall submit a Roydon Quarry, SH1 / Dawsons Road Queue Management Plan ('the Plan') to the Team Leader - Compliance Environmental Services, Selwyn District Council (compliance@selwyn.govt.nz) for certification.

2. The Plan required by condition 1 shall be prepared by a suitably qualified, independent and experienced traffic engineer and shall be in general accordance with the draft Roydon Quarry, SH1 / Dawsons Road Queue Management Plan attached as [insert reference to draft plan provided to hearing panel] (prepared by Stantec: Version X November 2019).

3. The objective of the Plan shall be to ensure that the operation of the quarry does not result in a change in safety risk at the roundabout on SH1 / Dawsons Road.

Safety at the roundabout shall be assessed in accordance with a fit for purpose Safety Risk Assessment which is carried out in accordance with the approach set out within Section 2 of the draft Roydon Quarry, SH1 / Dawsons Road Queue Management Plan attached as [insert reference to draft plan provided to hearing panel] (prepared by Stantec: Version X November 2019) or any subsequent amendment made to that Section within the Plan required by condition 1.

4. The Plan shall include details relating to:
   a. The monitoring required to identify any changes in the operation and safety risk at the SH1 / Dawsons Road roundabout arising from the impact of quarry operations on northbound traffic queuing back from the railway level crossing into the roundabout, and southbound traffic on Dawsons Road queuing back from the SH1 towards the railway, including:
      i. baseline traffic monitoring (required to be undertaken prior to the quarry becoming operational);
      ii. monitoring post the quarry becoming operational; and
      iii. where required, repeat monitoring for an established and operational quarry;
   b. How it will be determined whether mitigation is required and the methods required to address the assessed safety risk arising from the operation of the quarry;
   c. The procedures and timeframes for the installation of the mitigation measures (if any);
   d. How any required mitigation will be monitored for effectiveness and any ongoing review requirements for the Plan; and
   e. Reporting requirements.
5. Prior to submitting the Final Roydon Quarry, SH1 / Dawsons Road Queue Management Plan to the Council for certification the Consent Holder shall provide the New Zealand Transport Agency and KiwiRail with the opportunity to participate in a collaborative workshop with the Consent Holder to discuss a draft of the Plan ('Draft Plan').

6. If New Zealand Transport Agency and / or KiwiRail agree to participate in a workshop:
   a. The Consent Holder shall provide a copy of the Draft Plan to one or both (depending on which attends) of the organisations at least 10 days before the workshop;
   b. The Consent Holder shall circulate a record of the workshop discussion to the attendee(s) within 5 working days of the completion of the workshop.
   c. The attendee(s) shall be given the opportunity to provide written feedback to the Consent Holder on the Draft Plan within 15 working days of the completion of the workshop.
   d. If no feedback is received by that deadline the Consent Holder can proceed to finalise the Plan.

7. If New Zealand Transport Agency and/or KiwiRail decline the opportunity to participate in a collaborative workshop the Consent Holder shall provide a copy of the Draft Plan to the relevant organisation and they shall be given 15 working days to provide written feedback to the Consent Holder on its content.

8. At the completion of the process set out in conditions 5, 6 and/or 7, the Consent Holder shall submit the completed Plan to the Consent Authority for certification that it is consistent with the objective set out in condition 3. The Consent Holder shall ensure that all written feedback received from the New Zealand Transport Agency or KiwiRail on the Draft Plan in accordance with conditions 6 or 7 is provided to the Consent Authority at the time the Plan is submitted for certification, along with a clear explanation of where any comment has or has not been incorporated into the Plan and the reasons why.

9. The Consent Holder shall ensure that a copy of the certified Plan is provided to the Community Liaison Group at the nearest scheduled meeting.

10. Once certified, the Consent Holder shall implement the Plan.

11. Once the Plan is certified, the Consent Holder shall report to the New Zealand Transport Agency, KiwiRail, Community Liaison Group and the Consent Authority at the following times:
   a. At the completion of baseline monitoring and prior to the quarry commencing operation;
   b. Six months after the quarry commences operation; and
c. Annually thereafter for a period of three years, or until the New Zealand Transport Agency and KiwiRail agree no further monitoring and mitigation is needed to achieve the objective set out in condition 3, whichever is earlier.

Each report shall contain the following details:

d. A description of the monitoring undertaken during the reporting period and analysis of the results;

e. A description of any mitigation measures implemented during the reporting period, or planned for the following reporting period;

f. Any amendments identified as being necessary to the Plan for the following reporting period.

12. The Plan is intended to be an adaptive document. It may be updated by the Consent Holder at any time provided that prior to doing so further consultation and collaboration occurs with the New Zealand Transport Agency and KiwiRail. Any changes made to the Plan shall be consistent with achieving the objective set out within condition 3. Any updated provisions shall only apply once the updated Plan has been re-certified by the Consent Authority.
NOTES:

1. ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN

2. ALL SIGNAGE LOCATIONS DISPLAYED ON THE DRAWINGS ARE TO BE REFERED TO AS INDICATIVE ONLY.


4. DIMENSIONS ARE IN METRES.

5. MAIN SOUTH ROAD — WHALER ROAD

6. CHAINAGE LEFT LANE 480-100100-250

7. LAMINAIRE TYPE - A

8. LAMINAIRE TYPE - B

9. LAMINAIRE TYPE - C

10. LAMINAIRE TYPE - D

11. LAMINAIRE TYPE - G

12. LAMINAIRE TYPE - J

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14. LAMINAIRE TYPE - M

15. LAMINAIRE TYPE - N

16. LAMINAIRE TYPE - P

17. LAMINAIRE TYPE - Q

18. LAMINAIRE TYPE - R

19. LAMINAIRE TYPE - S

20. LAMINAIRE TYPE - T

21. LAMINAIRE TYPE - U

22. LAMINAIRE TYPE - V

23. LAMINAIRE TYPE - W

24. LAMINAIRE TYPE - X

25. LAMINAIRE TYPE - Y

26. LAMINAIRE TYPE - Z