Appendix A

Alternative Workshop Report and Appendices

Kiwi Point Quarry Expansion

Alternatives Workshop Report

Prepared for City Networks Business Unit

Wellington City Council

Kiwi Point Quarry

Ngauranga

December 2016

INCITE

Quality Information

Date 16 December 2016

Prepared by Aaron Edwards

Reviewed by Lindsay Daysh, Logen Logeswaran (WCC)

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
1	13 December 2016	Draft for Project Manager review	Lindsay Daysh	
2	16 December 2016	Final	Lindsay Daysh	
3				

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Executive Summary

The purpose of this report is to outline the process and results from a workshop assessment of potential options for the expansion of the Kiwi Point Quarry (the Project). The Project seeks to potentially enable a change to the District Plan provisions to provide for an expansion of the Quarry to meet forecast regional aggregate demand.

As part of the Plan Change evaluation process, an assessment of alternative options for site development is required to be undertaken to which the workshop process serves to address. The purpose of the workshop was to review the analysis of alternative options carried out to date, identify any additional viable options and to then assess the identified range of alternative options within the RMA framework. Following completion of the workshop, information was consolidated to review specialist scoring and assessments, apply sensitivity testing and assess each of the identified options against the Project Objectives.

Four options were developed as short list options to be assessed as part of the alternatives workshop process. A key assumption for all options is that the site will be rehabilitated following the completion of quarry activity in the respective areas.

- **Option 1 - Do Nothing**
  This option is to cease quarry activity in the South Face area. This option forms as the baseline option against which all other options will be assessed.
- **Option 2 - Permitted Activity Development**
  This option is to develop the quarry as provided for as a permitted activity under the current District Plan framework within the Business 2 Area to the south of the site access road.
- **Option 3 - Five Stage Development**
  The option extends into an Open Space B zone to incorporate a series of benches to the 190m contour of the hillside peak. The option provides for an approximate 100m buffer between the maximum extent of the quarry activity and the closest residential site boundary in Gurkha Crescent.
- **Option 4 - Maximum Expansion**
  This option further extends into an Open Space B zone to maximise the western expansion to the boundary of the quarry site. The option provides for an approximate 70m buffer between the maximum extent of the quarry activity and the closest residential site boundary in Gurkha Crescent.

Results were assessed to identify the best performing option relative to aggregated raw and weighted specialist score scenarios as well as against the Project Objectives.

Option 4 (Maximum Expansion) ranks first and Option 3 (Five Stage Development) ranks second when assessed against nearly all combined specialist score weighting scenarios and the combined Project Objectives (both options rank first equal under aggregate specialist raw scores). Option 1 (Do Nothing) and Option 2 (Permitted Activity Development) rank equal last when assessed against the combined Project Objectives. Option 2 ranks third and Option 1 ranks fourth when assessed against specialist aggregate raw and weighted scenarios (except for weighted scenarios where landscape and ecology is elevated to 10, resulting in Option 1 scoring slightly higher than Option 2, and reduced quarry operations weighting scenarios).

There is a clear separation between Options 1 and 2 when compared to Options 3 and 4. Options 1 and 2 fail to achieve the fundamental objective of providing for aggregate to meet demand (in a cost efficient manner, as is the case with Option 2). Options 3 and 4 present viable options from a quarry operations perspective but would have adverse environmental effects ranging from minor through to significant (although Option 2 would also have moderate adverse environmental effects).

The key impacts of the expansion options (Options 2, 3 and 4) relate to landscape, visual amenity and ecology effects, with key features being the gorge landscape and regenerating vegetation. None of the key features are identified as outstanding or significant within the current plan framework (i.e., outstanding natural features and landscapes or as areas of significant indigenous vegetation and significant habitats of indigenous fauna in accordance with section 6 matters of national importance). None of the expansion options were fatally flawed under specialist assessments. The effects of the expansion options are not considered to be detrimental to the point that they should not be considered further. Option 1 Do Nothing is not the only viable option under the RMA framework.

In summary, key considerations for each option are as follows:

- **Option 1 - Do Nothing:**

  Does not contribute to meeting aggregate demand and will require the development of an alternative quarry site or sourcing from a more distant location. Retains valued existing site characteristics (landscape and ecology) - these characteristics are not matters of national importance.

- **Option 2 - Permitted Activity Development:**

  Not financially viable.

- **Option 3 - Five Stage Development:**

  Provides for aggregate demand and future land use options. Moderate to significant adverse ecology and landscape effects.

- **Option 4 - Maximum Expansion:**

  Provides for the highest amount of aggregate demand and land available for future land use options. Moderate to significant adverse ecology and landscape effects similar to those under Option 3.

Overall, in the context of the RMA framework, Option 4 is identified as the preferred option. There is a risk that public perception (as well as iwi) may prefer Option 3 to Option 4, particularly in terms of landscape and visual amenity effects (as well as safety and general amenity effects in relation to quarry operations for residents in the immediate surrounding area and potentially cultural values - particularly through the removal of the spur under Option 4).

This report and assessment process has not considered further development options beyond the existing site boundary. There does appear to be potential for boundary adjustment development options (between existing quarry site, reserve land, residential and Tyers Road commercial boundaries) that could improve quarry operation outcomes as well as open space outcomes (i.e., provide for increased aggregate yield; improved symmetry in landscape impacts; restoration, protection and expansion of reserve land; and, additional site access from Tyers Road). While these options are considered to be outside of the scope of the current Project (noting temporal constraints), it is our recommendation that further consideration within the Council be given to potential options for boundary adjustments to maximise the long-term potential use of the site and surrounding area (from

not only a quarrying perspective, but also in terms of open space reserve and potentially residential and commercial development objectives).

1. Introduction

The purpose of this report is to outline the process and results from a workshop assessment of potential options for the expansion of the Kiwi Point Quarry (the Project). The Project seeks to potentially enable a change to the District Plan provisions to provide for an expansion of the Quarry to meet forecast regional aggregate demand.

As part of the Plan Change evaluation process, an assessment of alternative options for site development is required to be undertaken to which this workshop process serves to address. The purpose of this workshop is to review the analysis of alternatives carried out to date, identify any additional viable options and to then assess the identified range of alternative options within the RMA framework.

After the initial identification of possible options, a workshop was undertaken to inform the assessment process and held as follows:

- **MCA Specialists Assessment Workshop**
  3 November 2016 (1.00pm– 4:40pm)
  Attendees: Core Project Team and specialists

  Workshop purpose: specialists to consider each of the options from their own area of expertise and provide a score based upon a standardised set of scoring and to assign a weighting to each specialist area. Additional feedback and assessment of options against draft Project objectives.

Following completion of the workshop the Core Project Team reviewed specialist scoring, applied sensitivity testing and assessed each of the identified options against the Project Objectives.

Section 2 of this report sets out the background to the Project. Section 3 describes each of the short list options as well as the assessment of alternative options undertaken prior to the workshop. Section 4 sets out the workshop participants and assessment methodologies. Assessment results (specialist assessment, sensitivity analysis and Project Objective assessment) are presented in Sections 5-7. Section 8 identifies the best performing options when assessed against the overall workshop results project objectives with summary conclusions presented in Section 9.

2. Background

2.1 Project Purpose

The purpose of the Project is to consider the enablement of a possible expansion of the existing Kiwi Point Quarry (the Quarry) in Ngauranga Gorge, Wellington. The Quarry currently operates as a permitted activity under the Business Areas provisions in the Wellington City District Plan. The rock resource in the Quarry site currently available for quarrying under the District Plan framework is reaching its limit due to site constraints. A Plan Change, if sought, would enable an expansion of quarry activity in order to prolong the life of the Quarry.

2.2 Site Background

By way of general background, the Ngauranga Gorge area has been extensively quarried over a number of years to provide aggregate material to the Wellington Region. Recognition of the benefits of the proposal need to be balanced with the potential for short, medium and long term adverse impacts on the environment. The Ngauranga Gorge is a highly modified environment but retains landscape qualities and characteristics notable to a number of parts of the wider community. Further quarry development must be carefully evaluated and undertaken in a managed way that includes rehabilitation of quarried areas.

A detailed description of the site background, including relevant previous plan changes, is contained within the *Issues and Options Report*[1] as prepared by Incite, dated April 2016. A second report, titled *Status Report*[2] as prepared by Incite and dated September 2016, provides an update to the Project following on from the Issues and Options Report. These two reports should be read in conjunction with this workshop report to provide relevant site background and an overall understanding of the Project within the RMA framework.

2.3 Project Objectives

At the outset of the study Project Objectives for RMA purposes need to be developed. The following represents a second draft of objectives, as modified by the Core Project Team following feedback from workshop participants:

1. To enable extraction activity in a cost efficient manner to assist in meeting future regional aggregate demand

2. To plan and co-ordinate effective rehabilitation of the site post-quarry activity to enable viable long-term land use options

3. To manage the immediate and long-term cultural, social, land use and other environmental impacts of the Project by so far as practicable avoiding, remedying or mitigating any such effects

[1] Incite (2016) Kiwi Point Quarry Expansion Issues and Options Report, prepared for City Networks Business Unit Wellington City Council, pp60.

[2] Incite (2016) Kiwi Point Quarry Expansion Status Report, prepared for City Networks Business Unit Wellington City Council, pp27.

4. To minimise landscape impacts as far as practicable, recognising landscape values in the context of the gateway experience.

Each of the short listed options assessed through the workshop process have in turn been assessed against the revised Project Objectives.

2.4 RMA Framework

As part of the process for a proposed plan change under the RMA framework, there is a statutory requirement under Section 32 of the Act to undertake an evaluation process to:

(a) examine the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of this Act; and

(b) examine whether the provisions in the proposal are the most appropriate way to achieve the objectives by—
(i) identifying other reasonably practicable options for achieving the objectives; and
(ii) assessing the efficiency and effectiveness of the provisions in achieving the objectives; and
(iii) summarising the reasons for deciding on the provisions; and

(c) contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal.

The workshop process seeks to satisfy requirements for identifying and assessing other reasonably practicable options for the development of the site.

3. Options

3.1 Alternative Sites

The focus of the workshop was on alternative options within the existing Quarry site. Alternative site options were discussed briefly in a background context as part of the workshop. There was general acknowledgement from workshop participants of the challenges in developing a new quarry site, noting in particular the potential for difficulties around logistical considerations and site selection (accessibility, infrastructure, location, limited number of potential sites), environmental effects, community support and consenting matters.

Alternative site options within the Wellington Region have been separately considered in a draft report titled *Regional Demand Forecasts for Aggregates in Wellington*[3] as prepared by Spire Consulting Ltd. The report identifies increasing aggregate demand in the region and extends to include consideration of the following locations as alternative sites for aggregate extraction (in addition to the existing quarries in operation at Belmont and Horokiwi):

- the Makara area (centred around Quartz Hill);
- Owhiro Bay Quarry; and
- the Northern Ngauranga Gorge.

The report comments that there would be considerable difficulties in accessing these resources and notes that in the wider region there are limited other possibilities. The report also notes that Greater Wellington Regional Council holds resource consent for the extraction of aggregate from the Hutt River for river management purposes, noting that this is not a reliable source for supply.

It is generally considered by the Project team that the report adequately addresses requirements under the RMA framework for identifying and assessing other reasonably practicable sites within the Wellington Region.

3.2 Alternative Site Development Options

There are a number of potential development options and sub options for the Quarry site that can be refined and if necessary discarded. In the first instance a 'preferred option' (from the Quarry operator's perspective) was developed for a five-stage development of the South Face area. This option centres on the southern portion of the site (referred to generally as the South Face area), expanding from the current Business 2 area (where quarry activity is provided for as a permitted activity under the current District Plan framework) into the adjoining Open Space B area. While this option may be deemed a preferred option from the Quarry operator's perspective, the RMA framework requires that other reasonably practicable alternative options are considered.

The approach to assessing alternative development options for the site was to firstly identify remaining areas within the existing Quarry site boundaries to consider the potential for quarry development as part of a long-list assessment of options. A short list of options within those areas deemed potentially suitable for further quarry development was then developed to be assessed by specialists and against the Project Objectives.

[3] Spire Consulting Ltd (no date) Regional Demand Forecasts for Aggregates in Wellington, prepared for Wellington City Council, pp.15.

3.3 Long List Options

In considering development options for the Quarry site, three general areas were identified as follows:

- Area 1 - area zoned Open Space B located to the west of the site. Two general areas were identified as Area 1A and Area 1B.
- Area 2 - area zoned Open Space B to the south of the site. Three general areas were identified beyond the Business Area as Area 2A, Area 2B and Area 2C.
- Area 3 - the existing Taylor Preston site.

Figure 1 below annotates the location of each of the three areas. The identified boundaries for each of the areas were intended solely to provide a general location as to the area of interest. Those areas in which quarry activity is already permitted (i.e. the North Face and South Face areas within the Business Area) were not identified.

Prior to the workshop events, the viability of each of the areas was assessed by Logen Logeswaran, Project Manager and Incite based on knowledge of the site, quarry operational requirements and the relevant planning framework. This process served as the assessment of long-list development options. Further feedback was provided prior to the workshops by Ormiston Associates in relation to the development of options in Areas 2A, 2B and 2C. A description of each of the areas and a high level assessment of the viability of quarrying each of these areas is attached as Appendix A to this report.

In summary, Areas 1A and 1B were discounted on the basis that quarrying in these areas would be uneconomical, require the relocation of water infrastructure at significant cost, reduce the quarry buffer area between adjoining residential development and potentially result in significant environmental effects.

Similarly Areas 2A and 2C (and any sub-options involving significant expansion into these areas) were discounted on the basis that they would be uneconomical, with the potential for significant environmental effects. For Area 2B, expansion into the Open Space B area was identified as economically viable from a quarry operations perspective. While environmental constraints were identified, it was considered more appropriate to assess any such effects as part of a more detailed assessment with specialist input, to which the workshop process served to address.

For the Area 3 Taylor Preston site, the area is considered a suitable development option in the medium-term with an existing lease (to expire in 2033 with no right of renewal clause) identified as a key constraint. Delaying quarry development in this area until the expiry of the lease, in combination with the development of an alternate quarry location in the interim, will enable the Quarry to continue to provide for forecast regional aggregate demand and provide for the staged development of the wider site.

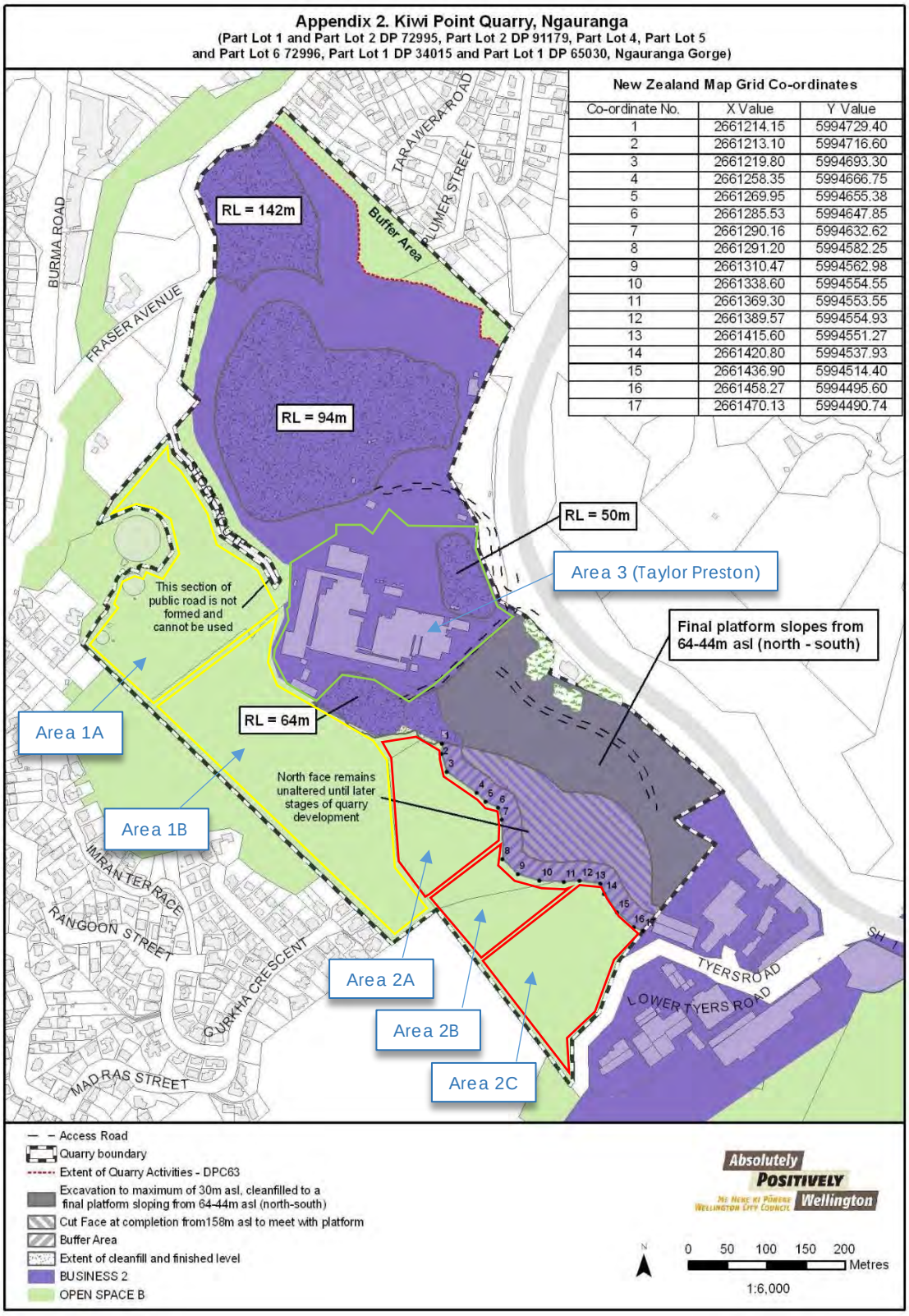

Figure 1: *Kiwi Point Quarry site showing location of potential expansion areas. Base image is Appendix 2 of the Business Areas Chapter in the District Plan (source: WCC ePlan).*

3.4 Short List Options

The following options were developed as short list options to be assessed as part of the alternatives workshop process. A key assumption for all options is that the site will be rehabilitated following the completion of quarry activity in the respective areas.

An indicative plan view diagram for each option is attached as Appendix B. The diagrams are based on the developed designs for Option 3 (as the preferred option developed by the Quarry operator). The diagram for Option 4 is intended solely for indicative purposes as the accuracy of the benching location has not been verified from a geotechnical or quarry operations perspective.

Option 1 - Do Nothing

This option is to cease quarry activity on the site once the resource in the North Face area is exhausted. This option forms as the baseline option against which all other options will be assessed.

Option 2 - Permitted Activity Development

This option is to develop the quarry as provided for as a permitted activity under the current District Plan framework within the Business 2 Area to the south of the site access road.

Option 3 - Five Stage Development

This option is a staged development option prepared by Ormiston Associates Ltd on behalf of Holcim as the Quarry operator. The option extends to incorporate a series of benches to the 190m contour of the hillside peak. The option provides for an approximate 100m buffer between the maximum extent of the quarry activity and the closest residential site boundary in Gurkha Crescent.

Option 4 - Area 2B Maximum Expansion

This option maximises the western expansion to the boundary of the Quarry site. The option provides for an approximate 70m buffer between the maximum extent of the quarry activity and the closest residential site boundary in Gurkha Crescent.

3.5 Rehabilitation Plan - Alternatives

Separate rehabilitation plans for each of the identified short list options have not been developed at this stage. As part of the development plans for Option 3 a Rehabilitated Quarry Plan has been prepared by Ormiston Associates Ltd as attached in Appendix C of this report. The final form of any rehabilitation plan would be similar to that of Option 3, with a series of benches and a final formed platform at the base.

Assessing options for rehabilitation plans is considered to be more suited to the detailed design phase of the Project once a preferred option is identified. For this reason rehabilitation plans for each of the options were not specifically assessed as part of the workshop process, other than to acknowledge that each of the options would result in a final landscape form of benching with a final platform. To this end, rehabilitation matters were discussed in the workshop in a general background capacity, to include discussion around long term land use options post quarry activity on the site. The likely suitability of commercial/industrial activity was generally noted by workshop participants. A separate long-term land use report is to be prepared by Incite to further inform the Project process.

It is noted that in accordance with Appendix 2 of the District Plan Business Area provisions the final platform for the currently permitted quarry development in the South Face area is to slope from RL 64m to 44m (north to south). The Option 3 Rehabilitation Plan proposes backfilling of the pit area to an approximate RL 67m. Providing for flat land would maximise development opportunity for future land use options for the site with an RL 67m contour maintaining a 3m high buffer between the Quarry site and SH1 (noting an existing formed bund rising to the 70m contour running parallel to the site boundary).

4. Assessment Methodology

4.1 Specialists Assessment Workshop

The Specialists Assessment Workshop took place on **Thursday 3 November 2016**. The primary purpose of this workshop was to review the analysis of alternatives carried out to date, assess a range of identified alternative options and to identify and assess any other viable options.

Background documents

The following documents were pre-circulated to participants prior to the workshop event:

1. Workshop Briefing Paper as prepared by Incite
2. Issues and Options Report as prepared by Incite
3. Status Report as prepared by Incite
4. Five Stage Development Designs as prepared by Ormiston Associates.

Participants

There were two distinct groups of participants.

1. **Specialists:** tasked with considering the options from their own area of expertise and provide a score based upon a standardised set of scoring i.e. 7 point going from +3 to -3 with the a 0 representing neutral, *de minimus* or not applicable.
2. **Core Project Team:** tasked with managing the design and co-ordination of the alternatives review. Upon the completion of the assessment the Core Project Team are to write up the assessment, apply sensitivity testing and circulate for wider comment.

Specialists:

Name	Specialist Role	Organisation
David Cameron	Water Quality	MWH
Doug Boddy	Air Quality/Wind	MWH
Gavin Lister/Lisa Rimmer	Landscape and Visual Effects	Isthmus
Sandy Ormiston	Geotech/Quarry Operations	Ormiston Associates Ltd
Andy Campbell/Nicky Hogarth	Quarry Operations	Holcim
Myfanwy Emeny	Terrestrial Ecology	WCC

Core Project Team:

Name	Role	Organisation
Logen Logeswaran	Project Manager	WCC

Name	Role	Organisation
Lindsay Daysh	Lead Planning Advisor	Incite
Aaron Edwards	Planning Advisor	Incite

Additional Attendees:

Name	Role	Organisation
Geoff Swainson	Manager Transport and Waste Operations	WCC
Warren Ulusele	Manager, Urban Development	WCC
Michael Oates	Open Space & Rec Planning Manager	WCC
Darcy Maddern	Quarry Operator	Holcim

It is noted that Doug Boddy was unable to attend the workshop, instead providing specialist scoring in relation to air quality matters through the submission of his specialist report. The report was subsequently reviewed by the Core Project Team to inform scoring and provide opportunity for specific feedback.

Participants were tasked with using reasoned judgement to make assessments based on:-

- Experience in options assessment and evaluation processes;
- Local knowledge of land use and topography;
- Knowledge of engineering constraints and opportunities; and
- Knowledge of previous reports and decisions made.

It should be noted that a number of other stakeholders have been identified to date including iwi, Greater Wellington Regional Council and the New Zealand Transport Agency. Identified stakeholders are to be engaged as part of future consultation on a preferred option. Consultation matters are discussed further in section 8 Consultation of the Issues and Options Report as prepared by Incite.

4.2 Stage 1 Review of Identified Options

The first task for specialists was to review that the process to date is satisfactory, and that within their area of expertise appropriate options had been identified. If there were any options discounted that should have been taken forward or an option had not been identified at all, these were to be identified and carried through to the options to be assessed in Stage 2.

There was general agreement from participants that there were no discounted long-list options that should have been carried through to the short-list assessment and that the range of short list options identified was appropriate. Of note, for the Taylor Prestons area, there was general acknowledgement from workshop participants as to the lease constraint and the likely suitability for medium-term quarry development in the area.

4.3 Boundary Adjustments

Discussion was raised during the workshop whether there was the potential for boundary adjustments to be made to enable alternative development options beyond the current site boundaries. Suggestions centred around the potential viability of 'land swaps' with the adjoining Council owned reserves as well as the potential for property acquisition in the adjacent residential area in Gurkha Crescent (to facilitate further quarry expansion) and/or the commercial Tyers Road area (to facilitate further quarry expansion as well as provide an additional site access).

It was noted at the workshop that expansion into the Council owned reserve land may be a difficult process in terms of getting approval. Also noted was the potential timeframes to undertake the required process and the sense of urgency for the quarry operator in advancing the Project, noting in addition that:

- the existing available resource in the North Face is estimated to be exhausted within four years;
- a Plan Change process to facilitate any South Face expansion option could be anticipated to take up to two years; and
- the lead in time required to prepare the quarry face and remove overburden to access quality rock would be approximately two years (for Option 3 as an example).

Further discussion between Michael Oates, Open Space & Rec Planning Manager and Logen Logeswaran, Project Manager was held following completion of the workshop with Mr Oates commenting as follows:

> *Further to our discussion yesterday about a possible proposal where the pasture land below the current Council reserve is protected as part of the overall proposal to rezone some land for quarrying. It make sense to have an integrated proposal for both the Council and the public to understand the long term deal around loss of some land but protection of other land as reserve. If part of the grass is not suitable for quarrying then making it reserve as part of this process would give it long term protection. That is on the basis that there would need to be a long term restoration project to restore this to native forest. It's not really swopping like for like.*
>
> *There are two processes that need to be worked though:*
>
> 1. *Regulatory change through the DP. This could involve rezoning of both the area for quarrying at the same time as you rezone the grass to open space B. You will need to take advice from Warren* (Ulusele - WCC Manager, Urban Development) *but in DP terms this would be seen as two distinct proposals.*
>
> 2. *Vesting the land as reserve. This process would require WCC approval to vest the area probably as Scenic (B) reserve under the Reserves Act. This process would probably best follow the DP change but the Council could agree in principle to vest it as reserve subject to the DP plan change. Note that if this occurs as part of the DP change, the Reserves Act enables vesting to happen without separate consultation, so the one consultation process will suffice. The area will need to be surveyed for vesting and a scheme plan prepared as the land will require separate title. That can happen after approval is given.*

This report and assessment process has not considered further development options beyond the existing site boundary. There does appear to be potential for development options that could improve quarry operation outcomes as well as open space outcomes (i.e., provide for increased aggregate yield;

improved symmetry in landscape impacts; restoration, protection and expansion of reserve land; and, additional access from Tyers Road). While these options are considered to be outside of the scope of the current Project (noting temporal constraints), it is our recommendation that further consideration within the Council be given to potential options for boundary adjustments to maximise the long-term potential use of the site and surrounding area (from not only a quarrying perspective, but also in terms of open space reserve and potentially residential and commercial development objectives).

4.4 Stage 2 Assessment of Options

Relying on baseline knowledge of the site, specialists collectively considered each option and scored it within their area of expertise. Specialists were asked to adopt an 'open' approach to information sharing as part of the workshop process so as to enable rapid and accurate dissemination of information to the wider team. The approach was intended to ensure an as informed and integrated alternatives assessment process as practicable.

In terms of scoring directives, it should be noted that:

- Scoring was to be based in terms of the impact each option has on the discipline i.e. landscape or ecology also taking into account the existing context.
- Assessments were to consider the existing or receiving environment as the current layout of the site and the surrounding landscape within which the site and identified options sit.
- Scoring was to consider implementation of the best acceptable mitigation for effects. The nature and extent of mitigation options were to be discussed with any uncertainty to be raised at the workshop.
- Where relevant specialists were also directed to take into account the provisions of Part 2 of the RMA[4].
- Specialists were to provide a reason or rationale for the scoring of each option (based upon the effects with best practicable mitigation).

Each specialist was required to complete a brief report following completion of the workshop outlining the scoring methodology and reasoning. Specialist reports are attached as Appendix D to this report.

Scoring was based on a 7 point scoring system (i.e., how the option ranks against the relevant interests of the specialist area and against the context of the Do Nothing option (Option 1, forming as the existing situation and scored as 0)). A 7 point system allows identifiable, but not necessarily large, differences to be more readily reflected in the scores.

+3 - Significant positive

+2 - Moderate positive

+1 - Minor positive

0 - Neutral or *de minimus*

-1 - Minor negative

-2 - Moderate negative

[4] http://www.legislation.govt.nz/act/public/1991/0069/latest/whole.html#DLM231904

-3 - Significant negative

F – Fatal Flaw is also to be added to indicate largely on RMA grounds that an option should not proceed.

In determining the overall impact the specialists were asked to consider, among other things:

- The importance of the feature (landscape, ecology) in terms of local, regional, national or international significance;
- The severity of the effect that the proposed option has on that feature;
- How the effects vary with time including whether the impacts are temporary or permanent;
- How the effect varies spatially; and
- Any cumulative effects.

Results and further discussion around the specialist assessments are detailed in Section 5 of this report.

4.5 Workshop Weighting

At the workshop upon hearing from the specialists as to scores and rationale participants discussed a workshop weighting to be applied (i.e. on a 10 point scale) in terms of the ability to meet Part 2 of the Act for each specialist area.

The application of specialist area weightings enabled further analysis of the options by the Core Project Team as part of the workshop report process. Results and further discussion around the weighting process is detailed in Section 6 of this report.

4.6 Stage 3 Project Objectives Assessment

Following completion of the workshop the Core Project Team assessed each of the options against the Project Objectives being:

1. To enable extraction activity in a cost efficient manner to assist in meeting future regional aggregate demand
2. To plan and co-ordinate effective rehabilitation of the site post-quarry activity to enable viable long-term land use options
3. To manage the immediate and long-term cultural, social, land use and other environmental impacts of the Project by so far as practicable avoiding, remedying or mitigating any such effects
4. To minimise landscape impacts as far as practicable, recognising landscape values in the context of the gateway experience.

The above Project Objectives represent a second draft following further consideration by the Core Project Team of feedback on the objective drafting from workshop participants. Each of the options assessed through the workshop process have in turn been assessed against the revised Project

Objectives. It is noted here that all Project Objectives are considered to be equally important with no weighting applied.

Base information on estimated volumes of aggregate extraction and economic viability has also been taken into account as it may be that there is a good option from an environmental perspective that is uneconomical as financial viability would need to be taken into account.

Results and further discussion around the Project Objectives are detailed in Section 7 of this report.

5. Specialist Option Assessment Summary

The following provides a summary of the scoring carried out by the specialists taking into account the inputs provided by the workshop participants. Specialist assessment reports are attached in Appendix D.

It is noted that following completion of the workshop process key stakeholders - notably local iwi, the NZ Transport Agency and Greater Wellington Regional Council - are yet to provide direct input as to their respective views of the Project and the alternative options. Key stakeholders are to be directly engaged as part of consultation initiatives to be undertaken as a key next stage of the Project following the identification of a preferred option through this option assessment process. The absence of iwi input in particular was highlighted at the workshop. The workshop process to date therefore does not consider cultural values.

5.1 Baseline Assessments - Existing site characteristics

Specialists were tasked with assessing each of the short list options when compared to the existing site characteristics, with Option 1 Do Nothing (forming as the existing site) assigned a value of 0. A summation of the existing site characteristics is provided in Table 5.1 below.

There are two notable exceptions for the scoring of the Do Nothing option in regard to quarry operations and air quality.

- *Quarry operations* - it was considered appropriate to assign an individual value for each option (including the Do Nothing option) based on the overall ability to enable the quarry to operate as a viable entity. Assessment of quarry operations extended to include consideration (but not limited to);
    - Cost of removing overburden verses the recoverable rock
    - Life of resource verses predicted sales
    - Operational logistics (i.e. location of overburden placement and aggregate washing).

  A relative score was assigned to the Do Nothing option rather than a base score of 0.
- *Air quality* - raw scores for air quality have been adjusted from the scoring as set out in the specialist report prepared by Doug Boddy at MWH. The report scored a -1 (minor negative) for the Do Nothing option on the basis that the existing quarry operation results in slight adverse air quality effects in the surrounding area. Air quality scoring has been adjusted to assign a score of 0 (neutral or *de minimus*) for Option 1. Options 2-4 are to be assessed against the baseline Do Nothing option, noting that there are slight adverse air quality effects under the existing site characteristics.

Table 5.1: *Existing site characteristics relative to each specialist area*

Specialist Area	Existing Site Characteristics
Quarry Operations	Quarry resources to be exhausted after 4 years. Quarry activities must be undertaken in accordance with the current Quarry Management Plan.
Geo-technical	Considerable geotechnical risks. Existing natural slopes rise very steeply - exhibits evidence of previous slope failures and includes overhangs. No rockfall protection

Specialist Area	Existing Site Characteristics
	measures currently installed. Risk to both SH1 and Tyers Road Business Park. Increased risk during earthquake events.
Landscape	Area important as part of the "gateway experience" for Wellington City. Rugged, strong topography with urban wilderness characteristics (including regenerating vegetation). Distinct spatial qualities, sense of enclosure, steep descent and dramatic emergence out to the harbor and city; contributing to the City sense of place. Recognisable elements, including the spur, forming part of the viewshaft /western skyline. High visibility to SH1 but relatively limited views of the existing quarry and short list option final quarry face from existing residential areas.
Terrestrial Ecology	Area of contiguous regenerating indigenous coastal forest from Tyers Stream Reserve, covering the southern faces on Tyers Road through to the end of the ridgeline leading down towards SH1 - extends to include part of the South Face area. Limited forest type remaining within Wellington. Range of avifauna detected within area - species with threat classification or locally significant. Suspected lizard species to include national threat status, regionally threatened or locally significant. Gradual rehabilitation of this area will have a positive effect on the terrestrial ecology.
Air Quality	All existing extraction, processing and associated activities undertaken at the quarry (and therefore the potential for adverse air quality effects generated by quarry activity) will cease in three to four years. Existing quarry activity likely to result in only slight adverse air quality effects in the local community. Unlikely that the Ministry for the Environment's 24-hour mean trigger value for dust nuisance or the National Environmental Standard for particles less than 10 microns in diameter (PM_{10}) would be exceeded beyond the site or at any sensitive receptor locations. Mitigation measures are in place to minimise air quality effects from quarry operations.
Water Quality	Urbanisation of the catchment throughout Khandallah, Johnsonville and Newlands as well as construction of the SH1 motorway through Ngauranga Gorge have resulted in widespread loss of aquatic habitat and reduced ecological function of Ngauranga Stream (loss of natural flow regime, loss of connection to its floodplain, loss of connectivity to groundwater, barriers to fish migrations, loss of riparian vegetation). Ecological value of Ngauranga Stream is assessed as low, except within parts of the

Specialist Area	Existing Site Characteristics
	Tyers Stream tributary which have retained moderate to high ecological values. Status quo; continuation of the existing (northern) quarry face until the rock resource is exhausted, estimated to be in 3 to 4 years: 1. Water is taken from the Ngauranga stream at one location at a rate of up to 55 m^3/day. 2. There are very few discharges of stormwater or process water to the stream because excess water is stored in the pit and later recycled. 3. All wet weather discharges to the stream are treated and are required to contain total suspended solid concentration of <120 g/m3.

5.2 Option 1: Do Nothing

Aggregate Raw Score: -3.0

The Do Nothing option was assigned a value of 0 for all specialist areas, except for quarry operations as noted above. The Do Nothing option effectively forms as the baseline against which other options were assessed (quarry operations aside).

The Do Nothing option was scored as -3 (significant negative) for quarry operations. Under Option 1 quarry resources would be exhausted after 4 years. Without developing an alternative site, Option 1 creates the potential to have a significant negative effect on future regional aggregate supply and to increase aggregate costs in the Wellington Region due to the need to source aggregate material from increasingly distant locations.

5.3 Option 2: Permitted Activity Development

Aggregate Raw Score: -1.8

Geotechnical matters scored 2.5 (moderate-significant positive), providing for a significant improvement in terms of reduced risk to SH1 and a moderate improvement for the Tyers Road area. Improvements include a reduction in height of existing slopes and the movement of the quarry batter slope away from SH1 providing a buffer zone and rockfall catch area.

Air quality matters were assessed as neutral (0) when compared to the existing site characteristics. Option 2 is anticipated to result in only slight adverse air quality effects in the local community (the same as for the existing site characteristics). It is considered unlikely that the Ministry for the Environment's 24-hour mean trigger value for dust nuisance or the National Environmental Standard for particles less than 10 microns in diameter (PM_{10}) would be exceeded beyond the site or at any sensitive receptor locations. Mitigation measures will be in place to minimise air quality effects from quarry operations.

Option 2 scored a minor negative (-1) for quarry operations, water quality and terrestrial ecology.

From a quarry operations perspective, Option 2 is not economically viable as the time required to remove overburden to access high quality rock is too great. Storage of overburden is also constrained as there is only limited space in the southern area to place this material, and it is anticipated that some may need to be transported to the north adding to development costs. Once the development is

completed the area available for future flat land for potential alternate land uses is limited as most of the area would be taken up with a rock fall exclusion zone.

For terrestrial ecology matters, Option 2 would result in the removal of established coastal forest within gullies on the north-eastern face although should not affect the wind throw into the remnant forest on the north-eastern side of Ngauranga Gorge and should not affect the regenerating vegetation within the grassland at the top of the ridge. Given the scarcity of this forest type remaining in Wellington, the option would have moderate effects on the terrestrial ecological values. The potential for onsite mitigation options is limited due to challenging environmental conditions. Any onsite mitigation is unlikely to improve the option score of -2 with regard to terrestrial ecology. Based on best practice (off-site) mitigation options[5], Option 2 would be scored as -1 as it would still have minor effects due to the difficulties of recreating this type of coastal forest in another location.

With regard to water quality matters, in the short term the amount of water required to be taken from Ngauranga Stream would increase from 55m^3/day to 140 m^3/day (as both the south and north face areas would be in operation at the same time). In the medium and longer term as the north face quarry is complete and the storage is developed in the new southern pit the water demand is expected to decrease. During the initial stages of this development, stormwater discharges to the stream (treated so as to achieve a discharge standard of <120 g TSS per m^3) would occur frequently, after every significant rainfall event, because of the lack of storage at the southern expansion area. That situation would improve gradually as the southern pit is excavated. Option 2 would not cause any loss of existing stream channel or riparian habitat compared to the status quo. Hence a minor negative score (-1) was considered appropriate.

Landscape matters scored a moderate negative (-2). Visual amenity and landscape effects are significant but reduced compared to Option 3 and 4. Option 2 has limited long term mitigation options, with limited flat land and opportunity to establish alternate land uses post-quarry activity.

5.4 Option 3 - Five Stage Development

Aggregate Raw Score: -1.0

Geotechnical matters scored a significant positive (3.0), providing for a significant improvement in terms of reduced risk to SH1 and the Tyers Road area. Improvements include a reduction in height of existing slopes and the movement of the quarry batter slope away from SH1 providing a buffer zone and rockfall catch area. Although the western batter slope crest is closer to Gurkha Crescent properties, an approximate 100m separation distance between the batter crest and the closest site boundary is provided for.

Quarry operations were scored as moderate positive (2.0) under Option 3. This option is considered viable as it extends the life of the quarry considerably, providing for an estimated additional 15 years of resource. Approximately 4 hectares of flat land would be created for future land uses, although there would still need to be a rock fall exclusion zone against the quarry batters. There is no possibility to link to Tyers road without moving the existing buildings in the Tyers Road industrial park.

As with Option 2, air quality matters were assessed as neutral (0) when compared to the existing site characteristics. Option 3 is anticipated to result in only slight adverse air quality effects in the local community (the same as for the existing site characteristics). It is considered unlikely that the Ministry for the Environment's 24-hour mean trigger value for dust nuisance or the National Environmental

[5] In accordance with the Guidance on Good Practice Biodiversity Offsetting in New Zealand 2014 - Section 4.4

Standard for particles less than 10 microns in diameter (PM_{10}) would be exceeded beyond the site or at any sensitive receptor locations. Mitigation measures will be in place to minimise air quality effects from quarry operations.

In terms of water quality matters, Option 3 was scored as a minor negative (-1). Option 3 would expand the southern expansion development by a further 4 hectares compared to Option 2. However, by the time Option 3 could be implemented the northern quarry will be complete, with the possible exception of rehabilitation works. Option 3 would divert stormwater runoff from an area of approximately 2.5 hectares, which currently drains into the lower reaches of the Tyers Road tributary, into the main stem of the Ngauranga Stream. This area amounts to approximately 1% of the Tyers Stream catchment and would therefore have negligible impact on the hydrology of either stream reach.

Terrestrial ecology was scored as moderate negative (-2.0) based on best practice (off-site) mitigation options. This option would remove the coastal forest on the front faces as well as remove part of the contiguous forest on the north-eastern side of Ngauranga Gorge. This option would also compromise the regenerating grassland habitat on the western side of the ridgeline. The proposed quarry extension (with required benches for stabilising the area) will leave only a 20m setback to the Tyers Stream Reserve boundary on the top ridge line. This could have an effect on wind patterns into this area. If this area is opened up to stronger winds it is highly likely to have detrimental consequences for the vegetation in Tyers Reserve. This vegetation is currently sheltered from the drying northerly wind.

Landscape and visual amenity effects were scored as significant negative (-3.0). The option does provide for increased benefits for future development, planting and recreation links. Increased resource yield also means that alternative sites can be avoided for at least 15 years. Option 3 has a logical relationship to the existing contours –removes the Rangoon Heights spur- and the cut faces are turned away from the suburb of Khandallah (but will be visible from a limited number of future properties in Newlands). Effects are increased by vegetation removal and, in particular, by works over the skyline ridge (190m peak) to within approximately 100m from existing residential site boundaries.

5.5 Option 4: Area 2B Maximum Expansion

Aggregate Raw Score: -1.0

Option 4 scored a significant positive (3.0) for quarry operations as it would likely maximise extraction of premium quality blue rock and increases available flat land for future development. This option could also potentially provide for a link to Tyers Road.

Geotechnical matters score a moderate positive (2.0), with a mix of positive and negative outcomes when compared to Option 3. Option 4 moves the western batter slope to within approximately 70m of the closest residential site on Gurkha Crescent. Option 4 reduces the batter height when compared to Option 3 (105m compared to 120m) and reduces natural slope heights in the Tyers Road area, with both aspects beneficial in respect to geotechnical considerations.

As with Options 2 and 3, air quality matters were assessed as neutral (0) when compared to the existing site characteristics. Option 4 is anticipated to result in only slight adverse air quality effects in the local community (the same as for the existing site characteristics). Mitigation measures will be in place to minimise air quality effects from quarry operations.

Water quality matters scored a minor negative (-1.0), the same as for Option 3. This option would maximise the southern expansion but this would be partially balanced by the completion and rehabilitation of the northern quarry. Option 4 would divert stormwater runoff from an area of approximately 4 hectares into the main stem of the Ngauranga Stream, instead of the lower reaches of

Tyers Stream. This area amounts to less than 2% of the Tyers Stream catchment and would therefore have negligible impact on the hydrology of either stream reach.

Terrestrial ecology was scored as a moderate negative (-2.0) overall. This option increases the issues noted for Option 3. The operation extends to the boundary of Tyers Stream reserve and exacerbates impacts on the existing bush remnant, coastal forest and regenerating grassland habitat. This option also further encroaches into the gully system where the more significant vegetation is typically found. This option is also scored as -3.0, having significant negative effects on the vegetation being removed and the fauna found in this area, in addition to the vegetation left on site and the existing bush remnant within Tyers Stream reserve. As with Option 3 the effects could be reduced to moderate (-2.0) if best practice offsite mitigation was implemented.

Landscape and visual effects were scored as significant negative (-3.0). Option 4 has additional impact on both ridgeline and existing regenerating vegetation when compared to Option 3.

5.6 Aggregate Raw Scores and Rankings

Table 5.2 below presents aggregate raw scores and rankings for all assessed route options. Options 3 and 4 rank highest, both with an aggregate raw score total of -1.0. Option 1 ranks lowest, scoring -3.0 on the basis of not being viable from a quarry operations perspective.

Table 5.2: *Specialist raw scores for each option*

Specialist Area	Option 1 Do Nothing	Option 2 Permitted Activity Development	Option 3 Five Stage Development	Option 4 Area 2B Maximum Expansion
Quarry Operations	-3.0	-1.0	2.0	3.0
Geo-technical	0.0	2.5	3.0	2.0
Landscape	0.0	-2.0	-3.0	-3.0
Terrestrial Ecology	0.0	-1.0	-2.0	-2.0
Air Quality	0.0	0.0	0.0	0.0
Water Quality	0.0	-0.3	-1.0	-1.0
Aggregate Raw Scores	-3.0	-1.8	-1.0	-1.0
Raw Score Rank	4	3	1	1

5.6 Wind Effects

The proposed expansion options create the potential to impact on wind flow across the site and surrounding area. Specialist wind assessment was initially sought from Doug Boddy, providing specialist air quality and wind advice. Mr Boddy concluded that without site specific monitoring and data, valid conclusions as to the wind effects of each of the options could not be drawn.

The proposed southern extension (Option 2), the proposed five stage development (Option 3) and the proposed maximum expansion into Area 2B (Option 4) have the potential to affect the wind microclimate within the project site and beyond the site boundary.

Based on the Kelburn AWS data for 2008 to 2012, winds from the SE, SSE and S occur approximately 41% of the time. As a result of the proposed removal of the southern ridge (Option 2) and the proposed extension towards Gurkha Crescent (Options 3 and 4), there is the potential for the existing sheltering effect experienced onsite during winds from the SE, SSE and S to cease. Given the high frequency of winds from these directions, there is the potential for a noticeable change in the wind microclimate both onsite and beyond the site boundary. Furthermore, the frequency of moderate to high wind speeds from these directions is 19.8%, and there is the potential for adverse wind effects (e.g. comfort and safety effects and/or vegetation damage) across certain parts of the site (e.g. proposed access road to the southern extension area) in the absence of mitigation. However, it is unlikely that there will be any significant adverse effects within the more sheltered parts of the site (e.g. below the ridgeline from Shastri Terrace and Maldive Street) or beyond the site boundary, as a result of Options 2 to 4. MWH recommends undertaking a more detailed assessment of the potential wind microclimate effects based on the preferred option, following the completion of the alternatives assessment by Incite and WCC.

As it stands, Mr Boddy's advice is considered sufficient for the purposes of this alternatives assessment process. While wind impacts have not been specifically assessed relative to each option, the above assessment suggests that effects beyond the site boundary would likely be limited. It is also noted that in assessing terrestrial ecology impacts Myfanwy Emeny commented on the potential wind impact on vegetation, factoring this into her overall assessment of each of the options.

6. Weightings – Sensitivity Testing

The following provides an overview of the specialist area weighting exercise and subsequent sensitivity testing. At the Specialist Workshop a weighting was applied to each specialist area (i.e. on a 10 point scale) in terms of the ability to meet Part 2 of the Act for each discipline. Sensitivity testing was then undertaken following the workshop to consider alternative weighting scenarios.

6.1 Specialist Area Weighting

Upon hearing from the specialists at the specialist assessment workshop, participants were asked to agree to a weighting for each specialist area. Weightings were assigned on the basis of the scores and rationale presented at the workshop in terms of the ability to meet Part 2 of the Act for each discipline. Workshop participants then used reasoned professional judgement to make the assessments. Table 6.1 below sets out assigned weightings for each of the specialist areas and summarises reasoning for weightings.

Table 6.1: *Specialist area weightings*

Specialist Area	Workshop weighting	Reasoning for weighting
Quarry Operations	10	Providing for quarry operations is central to the reasoning for the Project. A weighting of 10 is considered necessary.
Geotechnical	3	A lower weighting of 3 was considered appropriate as an engineered response to geotechnical matters could be achieved. Any geotechnical constraints are not considered to be significant.
Landscape	9	The general site and surrounding area landscapes is not considered a matter of national importance under section 6 of the RMA (providing for the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development) as it is not an identified outstanding natural feature or landscape. Protection of landscape features is however a relevant consideration under section 7 other matters of the RMA, noting sections 7(c) and 7(f) as particularly relevant (i.e. the maintenance and enhancement of amenity values and the quality of the environment). Minimising landscape impacts is consistent with a specific Project objective. Overall a weighting of 9 was considered appropriate in recognition of the value of the gateway experience under

Specialist Area	Workshop weighting	Reasoning for weighting
		relevant considerations in Part 2 of the RMA.
Terrestrial Ecology	8	The area features important areas of regenerating coastal forest, with limited remaining examples in a regional context. Although areas of vegetation in the South Face area have been identified as significant in a preliminary assessment report prepared by Wildlands Consulting Limited[6], the areas are not specifically included within the current regional or district planning framework as areas of significant indigenous vegetation or significant habitats of indigenous fauna. Therefore the area is not considered to be a matter of national importance under section 6 of the RMA (specifically (c), providing for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna). A number of section 7 matters are considered to be of relevance: (c) the maintenance and enhancement of amenity values: (d) intrinsic values of ecosystems: (f) maintenance and enhancement of the quality of the environment: (g) any finite characteristics of natural and physical resources Overall a weighting of 8 was considered appropriate in recognition of the value of the regenerating vegetation and associated habitat under relevant considerations in Part 2 of the RMA.
Air Quality	3	A weighting of 4 was considered appropriate as there are unlikely to be any health effects (e.g. exceedances of the 24-hour mean NES for PM_{10}) at any location beyond the quarry boundary as a result of dust and particulate emissions at the quarry under the four different options. Any potential air quality effects would likely be limited to dust nuisance effects as opposed to health effects. Effects are able to be mitigated with recommended measures in place.

[6] See Terrestrial Ecology Report

Specialist Area	Workshop weighting	Reasoning for weighting
Water Quality	3	The ecological value of Ngauranga Stream is assessed as low, except within parts of the Tyers Stream tributary which have retained moderate to high ecological values. The effects of quarry activities as they relate to water quality and aquatic ecology are all reversible and the need to take water for use on site or to discharge treated process water would cease on completion of the quarry. All four options will be supported by a rehabilitation plan to facilitate recovery of the Quarry site in the long term. Generally water quality matters are not considered to be significant in the context of the site and surrounding area. A lower weighting of 3 was considered appropriate in the circumstances.

6.2 Sensitivity Testing

Sensitivity testing was carried out to observe how changes to the weighting scheme could affect the relative option rankings. Weightings agreed to as part of the workshop process were applied to each option with summarised results shown in Table 6.2 below. Consolidated spreadsheets are attached in Appendix E which include individual weighted scores for all options against each of the specialist areas.

Applying workshop weightings results in similar scores for Options 1 and 2 at -3.0 and -2.9 respectively. The weightings provide a clearer degree of separation between Options 3 and 4 than when compared to raw scoring. Option 4 ranks highest at -1.0 whereas Option 3 scores -1.7.

Table 6.2: *Aggregate weighted and raw score rankings for each option*

Development Option	Raw Score	Raw Score Rank	Weighted Score[7]	Weighted Score Rank
Option 1: Do Nothing	-3.0	4	-3.0	4
Option 2: Permitted Development Option	-1.8	3	-2.9	3
Option 3: Five Stage Development	-1.0	1	-1.7	2
Option 4: Maximum Expansion	-1.0	1	-1.0	1

[7] Weighting Method: To obtain aggregate weighted scores, individual raw scores have been multiplied by the workshop weighting value (with a workshop weighting value of 10 being multiplied by a factor of 1, a workshop weighting value of 9 being multiplied by a factor of 0.9 and so on). Individual weighted scores for each option have then been aggregated to produce final aggregate weighted scores. Note: All scores have been rounded to a single decimal place.

6.3 Alternate weighting scenarios

A number of different potential weighting scenarios have been considered. The following alternative weightings scenarios have been assessed, with reasoning as follows:

- **Scenario 1: Air and water quality weighting of 6**

  Air and water quality contribute directly to other matters under section 7 of the RMA, notably in terms of the maintenance and enhancement of the quality of the environment. A lower weighting of 3 was applied in the workshop weighting as these matters were generally not considered significant in the context of the site and surrounding area, with effects able to be mitigated. A higher weighting of 6 recognises the importance of these matters within the general context of the RMA framework.

- **Scenario 2: Landscape weighting of 10**
  While not a recognised significant landscape within the relevant plan framework, the Ngauranga Gorge landscape is considered to be an important feature in the gateway experience to Wellington. A higher weighting of 10 provides additional recognition of the feature.

- **Scenario 3: Landscape and Terrestrial Ecology weighting of 10**
  As with Scenario 2, this scenario provides additional recognition to the value of the gateway experience. The terrestrial ecology weighting is further increased to 10 in recognition of the value of the regenerating habitat and initial work undertaken to date by Wlidlands Consultants in identifying parts of the South Face quarry area as a Significant Natural Area[8].

- **Scenario 4: Geotechnical weighting of 8**
  The resilience of the state highway network is an important consideration to the functioning of the Wellington Region, particularly with regard to natural hazard events. A lower weighting of 3 was primarily applied on the basis that a geotechnical solution to development options could be engineered. Given the proposed options create the potential to significantly improve geotechnical risk when compared to the existing environment a higher weighting of 8 acknowledges the added benefits of improved resilience for the site and surrounding environment (including both SH1 and Tyers Road area).

- **Scenario 5: Maximum weightings**
  This scenario considers all of the above scenarios to maximise weightings as follows:
    - Quarry Operations: 10
    - Landscape and Terrestrial Ecology: 10
    - Geo-technical: 8
    - Water and Air Quality: 6.

- **Scenario 6: Quarry Operations 5**
  This scenario reduces quarry operations to a mid-scale value, placing greater emphasis on the environmental effects of each option.

[8] The terrestrial ecology report notes that the site was identified through a preliminary assessment by Wildlands Consultants as part of a review of Significant Natural Areas in Wellington. The assessment was carried out in accordance with the significance criteria in Our Natural Capital – Wellington's Biodiversity Strategy and Action Plan (2015) and Policy 23 of the Regional Policy Statement for the Wellington region.

- **Scenario 7: Quarry Operations 0**
  This scenario takes away quarry operations from the specialist assessment process, focusing solely on environmental effects of each option.

As above, Scenarios 6 and 7 are intended to provide a greater understanding of the environmental effects of each of the options. These scenarios (and the relevant conclusions that can be drawn from the scenario results) are discussed in further detail in the weightings conclusion and discussion in section 6.4 below.

Table 6.3 below presents option scores under each weighting scenario. Option 4 scored the least negative under all weighting scenarios where quarry operations were weighted 10 (i.e., scenarios 1 to 5 and the workshop weighting). Similarly Option 3 scored second to Option 4 under all 'quarry operation 10' scenarios. Reducing quarry operations (thereby focusing on environmental effects) results in Option 1 ranking above all other options, with the adverse environmental effects of Option 3 and 4 greater than that of Option 2.

Option 2 generally scored less negative than Option 1, except for increased landscape and ecology weighting and reduced quarry operation scenarios. Increasing the geotechnical weighting separates Option 1 from Option 2 by a score of 1.3 and reduces the separation between Option 3 and 4 to 0.2 (compared to a difference of 0.1 and 0.7 respectively under the workshop weighting scenario). Options 3 and 4 ranked second and first respectively under the average weighting scores.

Table 6.3: *Comparison of option scores under alternative weighting scenarios*

Weighting Scenario	**Option 1:** Do Nothing	**Option 2:** Permitted Development	**Option 3:** Five Stage Development	**Option 4:** Maximum Expansion
Workshop Weighting Score	-3.0	-2.9	-1.7	-1.0
Scenario 1: Air/ Water 6	-3.0	-3.0	-2.0	-1.3
Scenario 2: Landscape 10	-3.0	-3.1	-2.0	-1.3
Scenario 3: Landscape/ Ecology 10	-3.0	-3.3	-2.4	-1.7
Scenario 4: Geotech 8	-3.0	-1.7	-0.2	0.0
Scenario 5: Maximum Weightings	-3.0	-2.2	-1.2	-1.0
Scenario 6: Quarry Operations 5	-1.5	-2.4	-2.7	-2.5
Scenario 7: Quarry Operations 0	0	-1.9	-3.7	-4.0

Weighting Scenario	**Option 1:** Do Nothing	**Option 2:** Permitted Development	**Option 3:** Five Stage Development	**Option 4:** Maximum Expansion
Average	-2.4	-2.6	-2.0	-1.6

6.4 Weightings conclusion and discussion

Option 4 performs best under all of the weighting scenarios where quarry operations are weighted 10, including the workshop weighting agreed to by workshop participants. Option 3 is separated from Option 4 by an average of 0.4, whereas Options 1 and 2 are separated from Option 4 by an average score of 0.8 and 1.0 respectively.

One of the most notable differentiations between the scenarios is Scenario 4, providing for a geotechnical weighting of 8. This is perhaps not unsurprising as the weighting value is changed by 5, compared to smaller changes to weightings under the majority of other scenarios (i.e., a change of 3 for water and air quality under Scenario 1 and a change of 1 or 2 for landscape and ecology under Scenarios 2 and 3). Scenario 4 is however considered a to be a useful comparison noting that key stakeholders include Greater Wellington Regional Council and the NZ Transport Agency, both of whom are yet to be consulted and would likely place a high level of emphasis on geotechnical matters in the context of resilience (and in particular the Transport Agency).

Changes to the quarry operations weighting under scenarios 6 and 7 provide useful comparison between options in terms of environmental effects. A key assumption of the workshop weighting scenario is that providing for quarry operations is central to the reasoning for the Project and therefore a weighting of 10 is considered necessary. Reducing the weighting to 0 and 5 increases the performance of Option 1. This is not unsurprising as these two scenarios focus on the environmental effects of the options, with Option 1 retaining the existing environment and thereby avoiding any adverse effects. Under scenario 6 (quarry operations 5) Options 2 to 4 score similarly at -2.4, -2.7 and -2.5 respectively. Under scenario 7, Option 4 ranks lowest, scoring -4.0 compared to -1.9 and -3.7 for Options 2 and 3 respectively. The results show that Option 4 would have the greatest level of adverse effects when quarry operations are removed from weighting scenarios, although Option 3 performs similarly. Increased environmental effects under Options 3 and 4 is not unexpected given the increased footprint for quarry activity.

While scenario 6 and 7 provide useful comparison relative to environmental effects, the overall purpose of sustainable management in accordance with Part II of the Act is to *manage the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—*

> *(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
>
> *(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
>
> *(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

Scenario 7 in particular does not account for the inherent balance in the purpose of the Act of managing the use of resources while avoiding environmental effects. Unless fundamentally flawed (with environmental effects deemed to be unacceptable), options should not be discounted solely on the basis of environmental effects alone.

Weightings are considered further in the overall discussion of option performance in Section 8 of this report.

7. Assessments against Objectives

Following completion of the Specialist Workshop the Core Project Team finalised assessment of each of the options against the Project Objectives. The following presents results and discussion from the objectives assessment process. Similar to the specialist assessment process, each of the options have been assigned an individual score based on a 7 point scale. As previously noted, all objectives are of equal value with no weighting applied.

7.1 Objective 1: Extraction

Objective 1 reads as follows:

1. To enable extraction activity in a cost efficient manner to assist in meeting future regional aggregate demand

Table 7.1 sets out scoring and ranking of each option against Objective 1. Scores were based on the specialist report for quarry operations.

Table 7.1: *Assessment of options against Objective 1: Extraction*

Development Option	Score	Score Rank
Option 1: Do Nothing	-3.0	4
Option 2: Permitted Development	-1.0	3
Option 3: Five Stage Development	2.0	2
Option 4: Maximum Expansion	3.0	1

7.2 Objective 2: Rehabilitation

Objective 2 concerns rehabilitation of the site post-quarry activity and reads as follows:

2. To plan and co-ordinate effective rehabilitation of the site post-quarry activity to enable viable long-term land use options

Table 7.2 sets out scoring and ranking of each option against Objective 2. Scores were based on workshop discussions in which participants concluded that the key determinant in assessing options relative to Objective 2 should be the area of land available to future land uses. On that basis, Option 4 ranks highest, providing for the largest area of formed platform at the base of the quarry batters.

Table 7.2: *Assessment of options against Objective 2: Rehabilitation*

Development Option	Score	Score Rank
Option 1: Do Nothing	0	4
Option 2: Permitted Development	1.0	3
Option 3: Five Stage Development	2.0	2
Option 4: Maximum Expansion	3.0	1

7.3 Objective 3: Effects

Objective 3 relates to adverse effects and reads as follows:

3. To manage the immediate and long-term cultural, social, land use and other environmental impacts of the Project by so far as practicable avoiding, remedying or mitigating any such effects

Table 7.3 presents scoring and ranking of each option against Objective 3. Raw scores were first assigned based on aggregate weighted scores (workshop weighted scenario) for specialist areas excluding quarry operations. Scores were then adjusted relative to the 7 point scale on the basis of the following conversion:

Aggregate Weighted Score Range	Adjusted Score
4.1 or greater	+3 - Significant positive
2.1 to 4.0	+2 - Moderate positive
0.1 to 2.0	+1 - Minor positive
0	0 - Neutral or *de minimus*
-0.1 to -2.0	-1 - Minor negative
-2.1 to -4.0	-2 - Moderate negative
-4.1 or less	-3 - Significant negative
F	F – Fatal Flaw

Table 7.3: *Assessment of options against Objective 3: Effects*

Development Option	Aggregate Weighted Score	Adjusted Score	Adjusted Score Rank
Option 1: Do Nothing	0	0	1
Option 2: Permitted Development	-2.0	-1	2
Option 3: Five Stage Development	-4.0	-2	3
Option 4: Maximum Expansion	-4.3	-3	4

7.4 Objective 4: Landscape

Objective 4 concerns landscape values and reads as follows:

4. To minimise landscape impacts as far as practicable, recognising landscape values in the context of the gateway experience.

Table 7.4 presents scoring and ranking of each option against Objective 4. It was agreed at the workshop that specialist landscape scores should be directly applied to each option.

Table 7.4: *Assessment of options against Objective 4: Landscape*

Development Option	Raw Score	Raw Score Rank
Option 1: Do Nothing	0	1
Option 2: Permitted Development	-2.0	2
Option 3: Five Stage Development	-3.0	3
Option 4: Maximum Expansion	-3.0	3

7.5 Objective Assessment Rankings

Table 7.5 presents overall rankings for each option when assessed against the combined Project Objectives. Option 4 ranks highest at 0 followed by Option 3 at -1.0. Options 1 and 2 both rank lowest, scoring -3.0.

Table 7.5: Combined scoring and ranking of options against objectives

Development Option	Objective 1: Extraction	Objective 2: Rehabilitation	Objective 3: Effects	Objective 4: Landscape	Total	Rank
Option 1: Do Nothing	-3.0	0	0	0	**-3.0**	**3**
Option 2: Permitted Development	-1.0	1.0	-1.0	-2.0	**-3.0**	**3**
Option 3: Five Stage Development	2.0	2.0	-2.0	-3.0	**-1.0**	**2**
Option 4: Maximum Expansion	3.0	3.0	-3.0	-3.0	**0.0**	**1**

8. Option Performance

Drawing on results from specialist raw score assessments, sensitivity analysis, assessment against the Project Objectives and further consideration of land values, each of the options is able to be compared for relative performance. The following summarises the performance of each of the options and discusses a preferred option based on the workshop process.

8.1 Option 1: Do Nothing

The Do Nothing option ranks equal last (along with Option 2) when assessed against the Project Objectives and last when assessed against specialist aggregate raw and weighted scenarios (except for weighted scenarios where landscape and ecology is elevated to 10, resulting in a slightly higher score than Option 2).

Option 1 fails to meet the fundamental Project objective to increase aggregate supply to meet demand. Without expanding the quarry, the current available resource on the site (i.e. the North Face area) will be exhausted in approximately 4 years. In order to meet future long-term aggregate demand an alternative site will likely be required (noting that the existing Horokiwi and Belmont quarries have an estimated 20 and 40 years of resource remaining respectively[9]) or aggregate will be required to be sourced from increasingly distant locations with associated higher logistical costs.

From an effects perspective, the Do Nothing option does provide for the retention of the existing landscape and notably the South Face spur, contributing to a sense of enclosure associated with the Ngauranga Gorge gateway experience. The gradual rehabilitation of this area and its surrounds (based on the current site rehabilitation plan) will have a positive effect on terrestrial ecology and ensure that the current remnant forest would remain intact. Air quality impacts would obviously be reduced following the cessation of quarry activity on the site, although with site management measures currently in place quarry activity only has a slight adverse effect on air quality in the surrounding area. Similarly with water quality considerations, the rehabilitation of the site (as with all four options) would likely improve aquatic ecology, with the specialist water quality report commenting as follows:

> *Extensive urban development in the Ngauranga catchment over the last 50 to 100 years has modified the character of the area to a considerable degree. While the proposed activities at Kiwi Point Quarry will contribute to that modification, it is notable that the effects of these activities as they relate to water quality and aquatic ecology are all reversible; the need to take water for use on site or to discharge treated process water would cease on completion of the quarry. All four options will be supported by a rehabilitation plan to facilitate recovery of the Quarry site in the long term. Rehabilitation of finished areas and wasteland can be conducted so as to incrementally re-vegetate steeper parts of the site, which will have benefits for the aquatic ecology of Ngauranga Stream.*

The Do Nothing option does not improve geotechnical risk in the South Face area, with the existing natural slopes rising very steeply and exhibiting evidence of previous slope failures. With no rock fall protection measures currently installed there remains risk to both SH1 and Tyers Road Business Park.

In assessing the Do Nothing option, further consideration is given to the future supply of land as part of the rehabilitation of the site, with Objective 2 seeking to enable viable long-term land use options. A

[9] Spire Consulting Ltd (no date) Regional Demand Forecasts for Aggregates in Wellington, prepared for Wellington City Council, pp.15.

report prepared by CBRE[10] provides an indicative valuation of the Quarry land on the basis that it is remediated to an identified standard. The report extends to consider the types of business and commercial land uses that would likely generate demand for remediated land (post-quarry activity) and a high level overview of the market for business and industrial zoned land in the Wellington Region. A key assumption of the report is that the land will be remediated for future commercial land use. As part of the Project a separate land use report is to be prepared that considers the suitability of future land use options in more detail. For the time being, it is considered appropriate to identify commercial activity as a likely (but not yet determined) future land use and to draw general conclusions on the ability of each option to meet Objective 2 (in terms of enabling long-term land use options) informed by the report findings.

The report identifies three developable site areas with approximate available area as follows:

- Area 1 - Current Quarry Operations (North Face): 10 ha
- Area 2 - Proposed Southern Extension (South Face): 12 ha
- Area 3 - Taylor Preston Site: 4.8 ha.

The combined land value (approx. 26.8 ha) as at June 2016 is estimated to be $42.1m. Estimates for total land values (with Area 1 becoming available in 2026, Area 2 in 2045 and Area 3 in 2050) range from $53.2m to $76.6m. For the 12 ha South Face area the indicative current value as at June 2016 is $18.0m, with estimates for land values in 2045 (when the land would become available) ranging from $24.0m to $36.8m. The Do Nothing option precludes future development of the South Face area for commercial activity (or other potentially viable land use options - e.g., residential or open space development) and therefore limits land values due to the reduction in development potential.

Overall, the Do Nothing option has benefits in terms of environmental effects, providing for the retention of the existing landscape (and notably the South Face contribution to the gateway experience) and gradual rehabilitation of the site. In this respect the option is generally consistent with Objectives 3 and 4 by avoiding adverse effects, although the option does not mitigate existing geotechnical risk. The option does not provide for aggregate to meet future demand and is therefore inconsistent with Objective 1. While the option would provide for the gradual rehabilitation of the site, it would not enable viable long-term land use options (other than providing for reserve land) and is therefore not entirely consistent with Objective 2.

8.2 Option 2: Permitted Development Option

The permitted development option (as a 'middle' option in terms of scale) provides a useful comparison between effects associated with the Do Nothing option and the expansion options under Options 3 and 4.

When assessed against the Project Objectives, Option 2 ranks equal last with Option 1. When assessed against specialist aggregate raw and weighted scenarios, Option 2 generally scores slightly above Option 1 (except as noted above, ranking last under elevated landscape and ecology scenarios).

From an effects perspective, Option 2 has a reduced impact in terms of landscape, ecology and water quality matters when compared to Options 3 and 4. Option 2 also improves resilience, providing for a

[10] CBRE (June 2016) Indicative Value Impact Report, pp.14.

significant improvement in terms of reduced risk to SH1 and a moderate improvement for the Tyers Road area.

With regard to the Project Objectives, Option 2 provides limited benefit in terms of meeting aggregate demand. Importantly, from a quarry operations perspective, Option 2 simply is not financially viable. The time taken to remove overburden in order to access high quality rock versus the estimated volume of available resource means it would not be worthwhile given the likely financial returns. Option 2 therefore fails enable extraction activity in a cost efficient manner as per Objective 1. The rehabilitation of the site under Option 2 would provide limited flat land following completion of quarry activity further compromising the financial viability of the option. For Objectives 3 and 4, while effects would generally be reduced compared to Options 3 and 4, Option 2 would still have minor to moderate adverse effects and notably removes a large portion of the South Face hillside and the sense of enclosure it contributes to in the context of the gateway experience.

8.3 Option 3: Five Stage Development

Option 3 ranks second to Option 4 when assessed against the Project Objectives and for all specialist scoring weighted scenarios, except for scenario 7 (quarry operations 0) (noting that both options score -1.0 for aggregate raw scores).

In terms of effects, Option 3 would have a significant adverse effect on landscape and terrestrial ecology matters, although off-site mitigation options could mitigate ecology effects to a level of moderate negative effects. Water quality effects are scored as a minor negative, noting that all impacts are able to be reversed, and similarly air quality matters are able to be managed on-site such that any adverse effects would be negligible when compared to the existing site characteristics. Notably geotechnical matters are scored as a significant positive (3.0), significantly improving the resilience of SH1 and Tyers Road Business Park area.

When assessed against the Project Objectives, Option 3 is consistent with Objective 1 in providing for the extraction of aggregate in a cost effective manner and consistent with Objective 2 in rehabilitating the site to enable future long-term land use options (at least to a greater extent than Option 2 given the increased land area that would become available under this option). With regard to Objectives 3 and 4, adverse landscape and ecology impacts are unavoidable, although Option 3 does provide for the retention of the South Face spur and in doing so mitigates to a limited extent landscape impacts, at least for residents to the west of the site along Gurkha Crescent with the retention of the spur likely to screen to an extent direct views of quarry activity and modified landforms. In terms of the gateway experience however, Option 3 would have a significant impact on the sense of enclosure within the gorge landscape regardless of the retention of the spur or otherwise.

8.4 Option 4: Maximum Expansion

Option 4 ranks first when assessed against the Project Objectives and first for all specialist scoring weighted scenarios, except for the reduced quarry operations weighting scenarios. Option 4 essentially increases (by a small margin) the relative positives and negatives associated with Option 3 by:

- increasing the area of land available to future land uses, the total amount of aggregate available and the overall life of the quarry;
- expanding further into areas of regenerating forest (with associated habitat impacts) and removing a greater area of the hillside.

Considering other factors, geotechnical matters under Option 4 scored slightly lower when compared to Option 3 (moderate positive (2.0) compared to a significant positive (3.0) for Option 3) primarily due to the movement of the western batter slope closer to residential development along Gurkha Crescent. Also noted there is essentially no change between Options 3 and 4 in relation to water and air quality matters.

With regard to achieving the Project Objectives, Option 4 is highly consistent with Objective 1 in providing for the extraction of aggregate in a cost effective manner and highly consistent with Objective 2 in rehabilitating the site to enable future long-term land use options (providing for more aggregate and flat land than Option 3). As with Option 3, adverse landscape and ecology impacts are unavoidable. Option 4 would have an additional impact when compared to Option 3 of removing the South Face spur.

8.5 Option Performance Conclusion

There is a clear separation between Options 1 and 2 when compared to Options 3 and 4. Options 1 and 2 fail to achieve the fundamental objective of providing for aggregate to meet demand (in a cost efficient manner, as is the case with Option 2). Options 3 and 4 present viable options from a quarry operations perspective but would have adverse environmental effects ranging from minor through to significant (although Option 2 would also have moderate adverse environmental effects).

In the long-term, Option 1 would necessitate the development of an alternate site within the Wellington Region or require aggregate material to be sourced from distant locations with associated costs (although this would be the case regardless as quarrying by its very nature is a limited resource). Option 1 would however provide for the retention of the existing landscape characteristics and the gradual rehabilitation of the site, particularly noting the existing vegetation values.

The first consideration in comparing the Do Nothing option to the expansion options is whether the effects of an expansion would be detrimental to the point that it should not be pursued (in the context of the RMA framework). To this end it is noted that none of the expansion options were fatally flawed under any of the specialist assessments (such that an option should not proceed under the RMA). Were the adverse effects of the expansion options fundamentally flawed then Option 1 would be the obvious preferred (and potentially only) option.

The key impacts of the expansion options (Options 2, 3 and 4) relate to landscape, visual amenity and ecology effects, with key features being the gorge landscape and regenerating vegetation. None of these features are identified as outstanding or significant within the current plan framework (i.e., outstanding natural features and landscapes or as areas of significant indigenous vegetation and significant habitats of indigenous fauna that must be recognised and provided for in accordance with section 6 matters of national importance).

Relevant section 7 matters, other matters to have particular regard to, include the following:

> *(b) the efficient use and development of natural and physical resources:*
>
> *(c) the maintenance and enhancement of amenity values:*
>
> *(f) maintenance and enhancement of the quality of the environment:*
>
> *(g) any finite characteristics of natural and physical resources.*

These key matters provide for consideration of the expansion options within the context of the efficient use and development of the site resource (noting the existing and historical quarry operations on the site and in the surrounding area) balancing impacts on amenity values and the quality of the

environment. We conclude that under the RMA framework that the proposed expansion options are able to be considered (such that a potential plan change could be approved) with regard to section 7 matters and the overall purpose of the Act in Part II of the Act to promote the sustainable management of natural and physical resources.

With regard to the overall performance of the expansion options, Option 2 simply is not viable from a quarry operations perspective. In terms of overall environmental effects, Option 2 does provide some benefits when compared to Options 3 and 4. The bottom line for Option 2, however, is that it is not financially viable. A quarry operator (unless subsidised) would not undertake the work.

Option 4 outperforms Option 3 in nearly all assessment scenarios. It is our conclusion that, on the basis of specialist assessments and performance against the Project Objectives, Option 4 should be considered as a preferred option over Option 3. Option 4 provides for greater aggregate returns and increased flat land for future land uses. Environmental effects between the two options will be similar with both having moderate to significant adverse ecology and landscape effects while providing for significant improvement in resilience to the state highway and Tyers Road Business Park area.

In our opinion, the biggest risk to Option 4 comparative to Option 3 is public perception and in particular the perceived actual and potential safety and amenity impacts for residents in the Gurkha Crescent area. Option 3 provides for an approximate 100m buffer compared to 70m for Option 4. In terms of actual quarry operation effects (i.e. noise, dust, vibration) it is unlikely that reducing the buffer area from 100m to 70m would have a significant impact on residential amenity values in the Gurkha Crescent area. It is noted that a 25m buffer is required (in accordance with the current District Plan provisions) between the maximum extent of the North Face and adjoining residential properties along the quarry site northern boundary. Maintaining a 70m buffer would likely adequately separate the proposed South Face activity area under Option 4 from properties in the Gurkha Crescent area.

For residents in the wider surrounding area, and for the general public, landscape and visual amenity impacts may be considered greater under Option 4 when compared to Option 3 (and obviously more so than with Option 2). As previously noted, Option 4 would result in the removal of the South Face spur whereas Option 3 retains this feature. Removal of the spur may be deemed to have a significant adverse landscape effect when compared to Option 3 (notably for some residents in the Gurkha Crescent area - as the spur limits visual connection to the South Face quarry area - but also for residents in the surrounding area and general public (and potentially iwi) who value the landscape feature). Alternatively (as noted in the landscape assessment report) there are some potential benefits under Option 4 in terms of symmetry from removal of the spur and improved alignment of quarry batters with natural contours. Refinement of design under Option 4 may mitigate landscape impacts to a limited extent.

In summary, key considerations for each option are as follows:

- **Option 1 - Do Nothing:**

  Does not contribute to meeting aggregate demand and will require the development of an alternative quarry site or sourcing from distant location. Retains valued existing site characteristics (landscape and ecology) - these characteristics are not matters of national importance.

- **Option 2 - Permitted Activity Development:**

  Not financially viable.

- **Option 3 - Five Stage Development:**

Provides for aggregate demand and future land use options. Moderate to significant adverse ecology and landscape effects.

- **Option 4 - Maximum Expansion:**

  Provides for the highest amount of aggregate demand and land available for future land use options. Moderate to significant adverse ecology and landscape effects similar to those under Option 3.

Overall, in the context of the RMA framework, Option 4 is identified as the preferred option.

9. Conclusion

Option 4 (Maximum Expansion) ranks first and Option 3 (Five Stage Development) ranks second when assessed against all combined specialist score weighting scenarios (except for reduced quarry operations weighting scenarios) and the combined Project Objectives (both options rank first equal under aggregate specialist raw scores). Option 1 (Do Nothing) and Option 2 (Permitted Activity Development) rank equal last when assessed against the combined Project Objectives. Option 2 ranks third and Option 1 ranks fourth when assessed against specialist aggregate raw and weighted scenarios, except for weighted scenarios where landscape and ecology is elevated to 10 (resulting in Option 1 scoring slightly higher than Option 2) and reduced quarry operation weighting scenarios (with an increased focus on environmental effects and hence improved score for the Do Nothing option).

There is a clear separation between Options 1 and 2 when compared to Options 3 and 4. Options 1 and 2 fail to achieve the fundamental objective of providing for aggregate to meet demand (in a cost efficient manner, as is the case with Option 2). Options 3 and 4 present viable options from a quarry operations perspective but would have adverse environmental effects ranging from minor through to significant (although Option 2 would also have moderate adverse environmental effects).

The key impacts of the expansion options (Options 2, 3 and 4) relate to landscape, visual amenity and ecology effects, with key features being the gorge landscape and regenerating vegetation. None of the key features are identified as outstanding or significant within the current plan framework (i.e., outstanding natural features and landscapes or as areas of significant indigenous vegetation and significant habitats of indigenous fauna in accordance with section 6 matters of national importance). None of the expansion options were fatally flawed under specialist assessments. The effects of the expansion options are not considered to be detrimental to the point that they should not be considered further. Option 1 Do Nothing is not the only viable option under the RMA framework.

In summary, key considerations for each option are as follows:

- **Option 1 - Do Nothing:**

  Does not contribute to meeting aggregate demand and will require the development of an alternative quarry site or sourcing from distant location. Retains valued existing site characteristics (landscape and ecology) - these characteristics are not matters of national importance.

- **Option 2 - Permitted Activity Development:**

  Not financially viable.

- **Option 3 - Five Stage Development:**

  Provides for aggregate demand and future land use options. Moderate to significant adverse ecology and landscape effects.

- **Option 4 - Maximum Expansion:**

  Provides for the highest amount of aggregate demand and land available for future land use options. Moderate to significant adverse ecology y and landscape effects similar to those under Option 3.

Overall, in the context of the RMA framework, Option 4 is identified as the preferred option. There is a risk that public perception (as well as iwi) may prefer Option 3 to Option 4, particularly in terms of landscape and visual amenity effects (as well as safety and general amenity effects in relation to quarry

operations for residents in the immediate surrounding area and potentially cultural values - particularly through the removal of the spur under Option 4).

This report and assessment process has not considered further development options beyond the existing site boundary. There does appear to be potential for boundary adjustment development options (between existing quarry site, reserve land, residential and Tyers Road commercial boundaries) that could improve quarry operation outcomes as well as open space outcomes (i.e., provide for increased aggregate yield; improved symmetry in landscape impacts; restoration, protection and expansion of reserve land; and, additional site access from Tyers Road). While these options are considered to be outside of the scope of the current Project (noting temporal constraints), it is our recommendation that further consideration within the Council be given to potential options for boundary adjustments to maximise the long-term potential use of the site and surrounding area (from not only a quarrying perspective, but also in terms of open space reserve and potentially residential and commercial development objectives).