

Peer Review Cover Note

Date: 10 June 2022

Subject: Preferred Programme Options Report Peer Review

Purpose

This note provides a very brief summary of the Peer Review process undertaken on the Preferred Programme Options Report (PPOR).

Peer Review Process

s 9(2)(a) from Alchimie was commissioned to provide a peer review of the Preferred Programme Option Report and appendices in April 2022. s 9(2)(a) is a very experienced practitioner and peer reviewer and has peer reviewed many previous LGWM reports.

The peer review was undertaken on behalf of the Let's Get Wellington Moving Partners. The peer review followed the Waka Kotahi requirements and included conclusions based on the information reviewed, and recommendations about further work that should be undertaken.

The peer review report was undertaken on the draft PPOR report issued on 28 April 2022. s 9(2)(a) had provided comment on an earlier draft and also attended a number of meetings between the authors, programme team and partner technical advisory group (TAG) members to help inform his knowledge of the project, process and any particular concerns from the partners.

The peer review report was issued on 5 May 2022. This is included as Appendix A.

All comments on the peer review were entered into a tracking table and a response to each individual comment was prepared by the report authors. This was shared with the peer reviewer and a meeting was held to further clarify the comments and responses. s 9(2)(a) subsequently added further responses to enable all comments to be closed out appropriately. This table is included as Appendix B.

Peer Review Outcome

In summary all comments have been closed out to the satisfaction of the programme team, the authors and the peer reviewer.

This has been done in a number of ways:

- Noting the comment without any further action being needed
- Agreeing to the comment and making changes to the PPOR or appendices
- Agreeing to the comment but noting that it will be addressed in the combined MRT/SHI Indicative Business Case later in 2022.

- Agreeing to the comment but noting that it will need to be investigated further in the Transformational Programme Detailed Business Case (DBC) which is currently being scoped.

There were no fundamental disagreements between the parties.

Key Conclusions

Overall, the peer reviewer acknowledged the conclusions of the PPOR are understandable but recommends that further work is undertaken in the DBC to confirm the approach, particularly due to the current uncertainties around the level of housing intensification that could be achieved. He also noted that further work will be required in the IBC and DBC stages on risk management to ensure that the programme can be delivered successfully.

The report authors and programme team agree with these comments and are ensuring the future phases are appropriately scoped to include these elements.

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Preferred Programme Option Report Peer Review Report

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1. Introduction

This Peer Review Report contains comments and conclusions about the LGWM Preferred Option Report (PPOR) issued on 28th April 2022, together with the updated Programme Level Carbon Considerations for Let's Get Wellington Moving and Economics Technical Report: Strategic CBA Review dated 29th April 2022.

Reference was also made to several supporting documents available as part of the public engagement process earlier this year, as noted in the reference document list in Section 6.

The Peer Review has been undertaken on behalf of the Let's Get Wellington Moving Partners, Wellington City Council, Greater Wellington Regional Council and Waka Kotahi. The format of this review has followed the Waka Kotahi requirements for peer reviews. It includes conclusions based on the information reviewed, and recommendations about further work that should be undertaken before a decision about a preferred programme option is reached.

2. Summary of Peer Review Findings

The scale of the LGWM programme is such that it will be the most significant transformational programme in Wellington for at least a generation. The critical parameters that inform the choice of preferred programme option start from the scale and location of residential development and employment opportunities within the city. **The decision around the preferred programme is, therefore, a decision about what the future urban form of Wellington will be**, all as part of bringing to fruition the vision of "a great harbour city".

The PPOR currently concludes that *"The preferred option that should be progressed to detailed business case is a High Capacity Mass Transit solution with a new tunnel through Mt Victoria and improvements at the Basin Reserve. This is consistent with Option 1 but is recognises that BRT could provide similar outcomes to LRT if designed properly."*

Based on the considerable volume of data and assessments to date, this conclusion is understandable, given the level of knowledge and confidence around several key questions, including:

- Acceptance that a significantly intensified land use scenario for Wellington City is appropriate, realistic and achievable (in terms of community acceptance, consenting, demand and funding).
- Appreciation of the risks related to the forecast patronage for the intensified land use scenario (including mode shift, integration with the regional transport network, service quality, etc))
- Understanding of the potential for BRT to adequately serve an intensified land use scenario

However, it is the conclusion of this Peer Review, that given the current uncertainty around the scale of land use intensification and relatively small differences between the performance of options in the MCA, further work will be required in the DBC to confirm a preferred programme option. This work should include identifying how the preferred option will respond to the key questions above.

Investment in transport system infrastructure should be based on desired outcomes; an omission from the current document is a clear description of the outcomes sought from the LGWM Programme, i.e.,

what outcomes are sought from the programme objectives. This omission should be rectified as quickly as possible and should be clearly shown in the comparison of programme option performance.

The report needs to include a holistic assessment of programme risk. This topic should be given careful consideration in determining a preferred programme, given the scale, complexity and potential consequences of getting it wrong. The key programme risks could be expected to include:

- Urban Development and land use scenario - is it realistic, is it viable?
- changing Government Policy over the next several years during which the programme will be implemented
- cost escalation
- patronage forecasting
- technological developments
- failing to meet programme objectives

Each of these risks should be quantified as far as possible, in terms of probability and potential consequences to schedule and cost. Each risk should also have an outline mitigation strategy, so that decision makers can be confident that key risks can be appropriately managed through the development process.

3. Detailed Comments / Observations on PPOR Sections

3.1 PPOR Structure

The structure and content of the PPOR enables the reader to gain a good appreciation of the assessments of programme options, the evidence informing the assessments and the logic behind the conclusions. **However, the report conveys a strong focus on transport solutions, without giving priority to the underpinning Urban Development narrative and the desired outcomes system interventions should achieve. This point needs to be addressed for decision makers and the wider PPOR audience.**

3.2 Introduction (Section 1)

Section 1.2, Figure 1 does not really appear to be Preferred Programme Option Assessment Criteria. A more accurate description would be “key inputs used in the programme assessment process”.

3.3 Strategic Context (Section 2)

Section 2.6, Why LGWM Matters in the Regional Context includes forecast population and employment growth data. Given the importance of land use and urban development to the LGWM programme, extracts including diagrams and tables from the Urban Development Summary could be useful, although it is understood that the latest City Council data are currently being updated.

3.4 Work Completed to Date (Section 3)

Section 3 illustrates the development of transport improvement packages since 2018 (**Figure 3**). The narrative should also highlight key steps in urban development, including progress on the Spatial Plan and updating the WCC District Plan, to demonstrate how these mutually informing workstreams have progressed. The narrative should also highlight the key factors which led to the latest programme objectives, and their respective weightings. Given the importance of understanding the trade-offs involved with selecting a preferred programme, it is important that decision makers fully understand the relative weightings for each of these objectives, their implications for the future Wellington Urban Landform and the Regional Transport System.

3.5 Development of Programme Options (Section 4)

Prior to describing programme option development in **Section 4** (which might better be described as development and assessment of programme options), the narrative should discuss the investment objectives which flow from the problem statements. Investment in transport system infrastructure should be based on desired outcomes rather than outputs, as derived from the programme objectives. There should also be a discussion about how programme options were developed in response to the outcomes sought from investment in the transport system.

The text states that the option performance against project objectives will be presented in traffic light coloured tables; **are these the tables in Section 8?** If so, that should be stated, **OR** the reader should be directed to where they can be found.

The narrative explains how a decision on a preferred programme option will be determined (**page 12**). This is a crucial part of the report and would better fit under its own heading, as it clearly goes beyond option development. Text in **Section 4 (page 12)** states that:

"The preferred option will be the one that best achieves the vision for Wellington, whilst providing value for money. It will be the option where any outstanding risks (such as uncertainties, costs, environmental effects) can be appropriately managed."

The narrative then notes that while Multi Criteria Assessments (MCAs) have been used to understand option performance, it is not proposed to use MCAs to decide on a preferred programme option because there are only a few significant differentiators. At the bottom of page 12, there is a list of questions which are relevant to the choice of a preferred programme, which have emerged from a range of sources. **Have the Board indicated these are the key questions THEY want to determine a preferred programme option?**

Section 4 should provide clear advice to decision makers about the key factors and determinants for deciding a preferred option. Urban development, consentability, funding, delivery timeframe and risk are all factors that should feature in this discussion (noting they are implied indirectly through reference to the earlier MCA assessments).

3.6 Programme Options (Section 5)

Section 5 highlights the key features of each of the shortlisted programmes, which appear to be same options from the PASLO report. It would be helpful to confirm this is correct.

The Programme Option Summary in **Figure 6** show the four shortlisted programme options. Titles for each of these options should be revised for clarity and should clearly distinguish between the key features of each programme. Also, the key defining the proposed interventions needs to be reviewed; for example, the distinction between new and existing tunnel is hard to read.

Questions or comments on each of the options shown in figure 6 are as follows:

Option 1:

- Who would be able to use the new Mt. Victoria Tunnel? The text isn't clear whether it will be available for general traffic.
- Will the current Hataitai bus tunnel remain in its current configuration?
- What is proposed for the Terrace Tunnel?
- What does "bus priority where needed", extended down to Wellington Airport, look like?

Option 2:

All relevant comments from Option 1 plus the following:

- What is the distinction between Bus Rapid Transit and Bus Priority shown on Option 1 east of Mount Victoria Tunnel?
- Why does this option have Bus Rapid Transit to the airport, but not Option 1?

Option 3:

- Is the key difference between this option and Option 1 the location of the new Mt Victoria tunnel?

Option 4:

- Is the lack of grade separation at the Basin Reserve which forces the LRT route to use Taranaki Street?

General:

- Are there opportunities to take the best elements of these four programmes and combine them into a fifth option?

3.7 Outcomes from Community Engagement (Section 6)

Section 6 describes findings from the recent community engagement process and views about the key issues about travelling in Wellington. The feedback obtained included methods and outcomes to address current deficiencies in the system; for example, reliable public transport emerged as a key theme and light rail emerged as a preference to BRT. It isn't clear from the narrative how this information was obtained, given that comparison of different modes is complex. There is an inference some of the responses may have resulted from misunderstandings about what is proposed.

For the purposes of confirming a preferred programme, it is suggested that **the focus should be on community feedback about preferred network outcomes**. This would avoid any misunderstanding which may have arisen around future passenger transport solutions.

There is mention of feedback from over 40 different stakeholders whose comments have been considered. How has this feedback influenced the assessment outcome?

Section 6.1 Online Panel Survey describes a 10 minute survey of a large group of Wellingtonians, and states that the panel had some very similar thoughts to the public. However, the responses presented in Figure 8 differ in some respects, notably easier to get to key destinations like the airport or hospital and reducing carbon emissions.

3.8 Technical Assessments (Section 7)

Section 7.1 describes the different land use scenarios which have been used in the technical assessments which follow. The narrative would benefit from some clarification, as follows:

- What is the purpose for the four different levels of “development capacity” described on **page 19**? It isn’t clear how they relate to the land use scenarios developed by LGWM and used in the subsequent assessments of programme options.
- **What land use scenario has been used for the “do minimum” scenario?** This is a crucial factor, to give decision makers an appreciation of the difference between the do minimum and programme options.
- Over what period would the projected growth across the city occur? Would there be a lag between enabling this level of development and it becoming operational (delivering patronage, etc)?
- Is the relationship between the different scenarios linear?
- Does the Core Development Scenario reflect the current Wellington City Council Spatial Plan? It is defined as “business as usual growth with the level of development distribution agreed in November 2019” but the terminology changes frequently through the document. The same terminology should be used throughout.
- **Figure 9** suggests that with the intensified forecast population (should be number of households), the absolute number of households along the MRT corridors would double. Presumably this is across both the southern and eastern corridors? Did the capacity analysis prepared by the Property Group in January 2021 confirm this is a realistic scenario (i.e., the realisable capacity (demand))?
- **Table 2** indicates growth in the Eastern Corridor will be significantly smaller than the Southern Corridor, with the difference between the Eastern Core and Intensified scenarios being 1,000 dwellings (12.5% and 20% compared to existing, respectively). Does this imply that options which go to the east are less likely to attract additional patronage?
- Is there a reason why the intensified, UDS – BRT and UDS LRT scenarios for the eastern corridor are the same?

Section 7.2.1 describes the updated mode share analysis from the updated transport modelling, which shows increased PT patronage from additional residential development, which is to be expected. **Figure 10** suggests that 2046 car mode share achieved by options one to four inclusive for are about the same, at about 15% - 20% less than the do minimum. **This would indicate that all the options (including Option 1 with the intensified land use scenario) will reduce VKT to a similar degree. Presumably this has an influence on the carbon analysis, which should be discussed given this is a key outcome sought by the programme.**

Section 7.2.2, Figure 11 shows predicted PT patronage. The distinction between the dark and light blue colours labelled on the histogram as high and low should be explained. **Figure 12** shows similar metrics for the Eastern Corridor, which also shows a significant increase above the do minimum. **This is slightly surprising given that the difference in the number of households in both scenarios are not as substantial as for the Southern Corridor.**

A key point from this analysis is that the PT network capacity to the Eastern Suburbs will need to be increased above its current capacity, sometime between 2036 and 2046, from which it is concluded that a new bus tunnel will be needed. **This is an argument in support of options which include this feature.**

Section 7.2.3 describes the latest accessibility modelling. It isn't clear why accessibility to the airport has been taken to be a key metric for this attribute, when it isn't intended to significantly enhance PT access to the airport with any option. It may be more informative to show the respective performance of the options by assessing the number of people living within a certain travel time of the City Centre.

Section 7.2.4 describes how AIMSUN modelling shows the need for grade separation at the Basin Reserve to realise the benefits of a new Mt. Victoria Tunnel. **The linkage between these two interventions should be further stressed, to highlight the significance of these components for programme performance.** It would be easier to present travel time changes in minutes and for completeness, show the change in travel time for the Station to Island Bay journey.

Section 7.3 outlines the programme option costs with a breakdown of each of the four options shown on **Table 5**. Detailed cost estimates were not provided for review, so it is not possible to comment in detail about these estimates. However, it would be expected that the difference between the smallest and largest options 4 – 1 (noting that the table heading has Option 3 listed twice) would be greater. Why are the costs for the MRT improvements to the east greater for options 2,3 and 4 compared to Option 1? **These points should be checked urgently.** Other questions about this section include:

- Will separate packages such as City Streets etc have separate funding from the main elements of the programme?
- have the benefits of City Streets and other packages been considered, or they are they all now rolled into one economic assessment?
- Are these estimates P95 level (text on page 28 suggests they are)?. How do they relate to the risk assessment? Are the risks between options different?
- **The affordability threshold is \$7.4 billion which is just above the whole of life cost (WOLC) for Option 1. What are the implications if predicted costs increase above this amount? Would it change a decision about a preferred option?**

Section 7.4 updates the Programme Economic Analysis, based on the Economics Technical Report (reviewed below). **Figure 15** shows monetised benefits for each of the four options with the core land use scenario and Option 1 (only) with the intensified land use scenario. With the intensified model the level of benefits almost doubles for Option 1 between intensified and core land use. Would other options see a similar increase, if the option had sufficient capacity (or could be modified to suit) the intensified scenario?

The information in **Figure 15** is worthy of more discussion. For example, what influences the relative option performance for private vehicle travel time savings, safety, health benefits, etc? Agglomeration is a key benefit of Option 1, but there is little information about the composition and nature of these benefits. **While some of these benefit outcomes appear to be intuitive, some aren't and need some further explanation, particularly to distinguish between options. Table 6 is easier to understand and may be a preferable way to preface the narrative, noting that the dimensions and scale of the numbers shown should be confirmed, i.e., NPV values, millions, etc.**

The discussion of the results on page 30 includes the economic performance range of options 1,2 and 4 with the intensified land use scenario. Option 1 has the greatest benefit range, although not by a large degree. A critical statement at the end of paragraph 2 is that **"Nevertheless, it does highlight the importance of high levels of intensification to achieve a BCR above one"**. This statement should inform the conclusions about the choice of a preferred option.

The first four bullet points in **Section 7.5** summarise the updated carbon analysis and states that total regional emissions would reduce by a total of 7% with the intensified (land use) scenario. It also states that the VKT production for Wellington city would change by 1.5%. It isn't immediately obvious how the statements link to what follows. The last sentence of the fourth bullet point, about a higher proportion of growth taking place in the city, needs to be explained further.

Figure 16 shows important results from updated carbon analysis, which shows that the maximum of carbon emission reduction for the programme would be around about 4.2% by 2075, with the intensified land use scenario, 2075. Contrary to the second bullet on page 30, Figure 16 also shows that greater carbon emissions would be achieved by Option 4 than Option 1, presumably because less construction is involved. Neither option shows a net reduction in carbon emissions until 2045.

Given that reducing carbon emissions is the highest weighted programme objective, an obvious question would be what other interventions would be more effective? Clearly other interventions need to be considered, if the city and the Region are to achieve their carbon reduction goals. **Also, as carbon reduction is the highest weighted objective for the programme, it would be prudent to continue to evaluate Options 3 and 4, which have better performance in this regard, before selecting a preferred option.**

3.9 Programme Options Analysis (Section 8)

Section 8 summarises the programme objectives analysis. Key observations are as follows:

- The “do minimum” option is stated to mean there would be “no changes in Wellington”. **It is important to clarify what this means in terms of land use assumptions, committed changes to the regional transport network (i.e., rail upgrade package, etc).**
- **Third bullet on page 34** states that options 1,2 and 4 received the highest scores for carbon emission reductions. However, figure 16 shows Option 4 performs better than Option 1, albeit to a minor degree. It would help to explain this decision further, and what consideration led to a lower score for Option 3.
- **Table 8 highlights the land use scenario as the key factor influencing the best performing programme option, which switches from Option 2 to Option 1 with the intensified land use scenario.**
- The text beneath **Table 8** states that the relative scores reflect the assumed characteristics of MRT in Option 1, namely the highest level of capacity and quality to the south and a significant improvement to the east. **Surely Option 2 would be considered to have better access to the east, given the distinction between bus rapid transit (Option 2) and bus priority (Option 1).**

3.10 Updated Analysis Summary (Section 9)

Section 9 brings together conclusions based on the analysis described in Section 8, which are summarised in four bullet points at the **top of page 38**. Comments in respect of each of these points are as follows:

- The analysis provides strong evidence that land use along the MRT corridors is a key part of the investment story.
- Evidence provided in this report (i.e., figure 6) appears to contradict the statement about intensification better delivering on carbon and mode share objectives.
- the range of BCRs is similar across the options. Given the range and nature of the uncertainties related to key factors in the analysis, including a preferred land use scenario, **it may be too soon to state which programme would achieve the highest BCR**
- the degree of intensification **will** influence the choice of MRT technology. However, this is a separate issue in the context of when a decision about specifications and characteristics will be made.
- Regarding the public responding positively to intensification, was the engagement process designed to obtain feedback with sufficient confidence to support this statement, which would stand scrutiny? For example, to what extent did the public appreciate the scale and intent of the intensified land use scenario, given that the public engagement process was designed around the transport programme?

3.11 Other Key Questions (Section 10)

Section 10 addresses other key questions that have arisen from a variety of sources, including the public engagement process. Observations on each of these points follows below (other than those covered previously):

Form of MRT: The distinction between rail based and road based transit systems should draw on the conclusions of the Mode Option Report. It is understood that work is continuing to assess the relative merits of these modes, but as the technology advances the distinction between these two systems is becoming blurred. Whichever option is chosen as preferred; **it is essential that the system design, development and optimisation processes determine the final form and specifications for the preferred MRT solution.**

Why does MRT not go to the airport? it would be worthwhile to amplify the point by restating what appears in earlier reports about passenger demand to the airport, as part of prioritising access to residential areas and the CBD.

Are large scale or minor improvements preferred at the Basin Reserve? The narrative would benefit from more explanation about the constraints affecting access to the east if grade separation is not provided. It should also highlight why LRT options would be constrained to Taranaki Street rather than Cambridge / Kent Terrace. The narrative should also use consistent terminology; for example, the conclusion discusses the Arras Tunnel Extension although the section heading is Basin Reserve.

Is a new Mt Victoria tunnel needed? In the description of the two alternatives under consideration the text is confusing about the new tunnel configuration, including whether lanes for general traffic will be provided or retained in the existing tunnel. The functionality of the existing Hāitaitai Bus Tunnel should be included to complete the picture. The discussion in the table at the bottom of **page 47** is based on the intensified land use scenario only. What are the implications of a less intense land use scenario?

How will the projected Urban Development be achieved? This narrative is an important component of the overall urban development story. It suggests that the current Spatial Plan anticipates 10,000 new households rather than 16,000 as stated in the text, which in turn implies that the difference between the intensified scenario and the spatial plan number is 16,000 new households. This point should be clarified in the narrative.

Section 10.4.2 notes the need for other infrastructure upgrades to accommodate the Spatial Plan and the intensified land use scenario. There is no discussion about the scale, complexity and cost implications related to these upgrades. **To what extent (if any) has this been considered in the options analysis?**

Section 10.4.4 discusses growth elsewhere in the region. It states that the intensified scenario will better deliver on the regional 2050 climate change targets. Information presented earlier in the report suggests that the timing and scale of development will struggle to meet these targets, so other interventions will be needed to achieve them. This topic requires more investigation and presumably is being considered at a regional level. At this point it would be fairer to say that all the options will contribute to those targets, but the preferred option should complement other interventions that will be required.

Integration with the wider transport system: It is surprising that this factor has received less attention in the narrative. Most trips into the city are from the north. The potential to extend an LRT network would be very limited. The extent to which access for the wider region into the city area has been considered in the option assessment is unclear but given that the actual land use scenario may change over time, flexibility in the system coverage would be beneficial. In this regard, Option 2 has advantages over Option 1. The text should include a holistic view about how the programme will integrate with the Regional Transport System, including how the options could be extended if possible or will connect to existing (or future) systems beyond the geographic limits of the programmes.

Are parking levies or congestion charging proposed? Section 10.6 indicates that a congestion charge would reduce traffic entering the city and increase PT patronage by over 2000 per hour. **If a congestion charge was introduced with any of the MRT options, what would that do in terms of performance, especially in regard of carbon emissions and economics?**

3.12 Uncertainties and Risk (Section 11)

Section 11 includes a qualitative discussion on these topics, there is no information about the scale of risk in terms of time, cost and other consequences. It does not appear to address the fundamental drivers which might affect the items highlighted, for example the factors which would influence the actual land use that will eventuate over the next decades (viability, demand, etc). Nor are there any strategic mitigation strategies to manage these key factors. While the text is helpful to identify some of the key programme risks, it is considered that there is insufficient information here to provide confidence to decision makers around the scale of the risks that may eventuate and their potential impact on the success of implementing a preferred programme. **This matter needs to be addressed urgently.**

3.13 Selecting the Preferred Programme Option (Section 12)

Section 12 summarises the key factors from the option analysis described previously and notes that the preferred programme options from the MCA analysis were Options 1 and 2. Observations and comments on the points made in this section of the report are as follows (noting only matters not previously covered):

High intensity Land Use. There are several matters that need consideration before a preferred programme option can be confirmed, including:

- The need to accept that a significantly intensified land use scenario for Wellington City is appropriate, realistic and achievable (in terms of community acceptance, consenting, demand and funding).
- That the consequential patronage forecasts for the intensified land use scenario will eventuate (including mode shift, integration with the regional transport network, service quality)
- That BRT would have insufficient capacity to service the actual patronage that will result from the LGWM programme (including infrastructure, vehicle performance, operational constraints).

Taken together, the question is whether there is sufficient information at this time to allow decision makers to form a view about these issues?

The carbon analysis for Option 4 shows that it was overall the better performing option of the four options considered. It also has the lowest cost. **Given that carbon reduction has the highest weighting for the programme, these factors suggests that Option 4 should not be discarded at this stage.**

3.14 The Preferred Programme Option (Section 13)

Section 13 states that:

“The preferred programme option that should be progressed through to detailed business case is a High Capacity Mass Transit solution with a new tunnel through Mt Victoria and improvements at the Basin Reserve. This is consistent with Option 1 but recognises that BRT could provide similar outcomes if designed properly”. **Given the previous narrative and the assessments described in the PPOR, THIS CONCLUSION APPEARS TO BE SOUND. However, a question which remains is whether Options 3 and 4 should be discarded at this stage, particularly as Option 4 scores well for carbon reduction performance and is the lowest cost to implement.**

From a superficial inspection, it may be possible for Option 3 to be developed as a first stage of either options 1 and 2, i.e., the system might be extended to either options 1 or 2 if land use reached the scale anticipated by the intensified scenario or other factors related to the implementation of the project.

Section 14 sets out how the programme will be delivered. This section has yet to be carefully investigated but a critical factor should be **providing greater certainty and confidence around the preferred land use scenario, to complement a preferred LGWM transport programme.** This report highlights the dependency of one upon another and therefore these factors need to be determined hand in hand. To that end the key questions for the DBC should be carefully considered including a time frame for implementation, recognising the constraints that will prevail with respect to the formal adoption of the WCC District Plan over the next few years.

4. PPOR Supporting Reports

This section includes comments on the supporting documents for the PPOR. This part of the review has focused on high level issues, rather than a detailed review of each document.

4.1 Preferred Option Report – Modelling Appendix

Section 2 summarises the full programme options. Terminology should be consistent with other reports, for example the reference to bus capacity as distinct from Bus Rapid Transit or Enhanced Bus. The land use scenarios used in the assessment also need to be checked for consistency between reports.

Section 3 outlines recent modifications to improve model performance. It would be helpful to clarify the basis for making these changes, for example travel time surveys, capacity measurements, etc. It would also be helpful to include reference to validation processes undertaken to demonstrate how these changes have improved model performance, to provide greater confidence in the model outputs.

In general, the text uses the future tense, which implies that these modifications have yet to be made. It is important to clarify if this is the case, or if the results presented in the PPOR have taken these changes into account. It would also be helpful to include statements clarifying the materiality of changes to travel demand made recently and the implications for each of the four programme options.

For active modes, the report states changes have been made by considering additional information about the nature of planned development along the corridors. Is it now assumed that there will be additional road space available for dedicated cycle lanes across more sections of the transport network? Has the cost of these changes (property acquisition?) been reflected in the economic assessment?

How has the different land use assumptions been used to develop the adjustments for the Active Travel Sector to Sector Mode Specific Constants **shown in Table 1?**

What is the basis for the amended car ownership rate adjustments **in Table 2?**

Table 3 illustrates changes to population and employment assumptions for the intensified land use scenario. These need to be checked for consistency with work currently underway on the urban development summary. Table 3 also suggests that population and employment growth in the eastern suburbs has significantly reduced but has increased in Island Bay and CBD / Te Aro. Does this change reflect the intensified land use anticipated with light rail (as distinct from BRT)? if not what factor or factors have influenced this change?

Section 3 concludes with a statement about PT investment which needs to be amended for clarity. MRT could stimulate faster population and economic growth on the MRT corridor but would need to be taken together with other factors that will influence the speed of intensification, including national and regional economic factors.

Section 3 would benefit from a summary about which modelling assumptions will require legislative or policy changes, so that the decision makers understand the implications arising from the modelling outputs.

The modelling approach outlined in **Section 4** needs clarification. Why does Step 2 involve the AIMSUN model again after step one? What is the feedback from the strategic model? When will step three be undertaken?

Section 5 highlights the distinction between strategic and AIMSUN (microsimulation) modelling. If the purpose of microsimulation is to make the strategic model more faithfully reflect the difference between the options, this should be expressly stated.

Table 4 summarises which of the output metrics from the models have been used in the programme option assessment. Interesting to note that pedestrian level of service is not considered a differentiator between the programme options.

Section 6 covers the key points which emerged from the most recent modelling. This is helpful as the full results presented in the appendices A and B are very long. It would be helpful to structure the discussion in the order of the attributes summarised in table 4.

The document needs a description of the do minimum and / or reference cases used in the transport modelling. **Decision makers need to understand what assumptions have been made about the do**

minimum, including other parts of the LGWM Programme, the regional rail package, travel demand interventions and other significant interventions which are committed or planned that may have a significant impact on the performance of the transport system.

The Summary Table of Key Metrics on pages 21 and 22 (table number needed) highlights the key transport differentiators between Options 1 and 4. The discussion should be expanded, if only in a qualitative sense, to highlight key differentiators between these two options AND between options 2 and 3, so that the merits of ALL FOUR programme options can be understood.

4.2 LGWM Carbon Analysis Update for May 2022

Page 4 paragraphs 2 and 3 cite regional and City Council targets for reduced emissions. Wellington City is committed to a 57% reduction in emissions by 2030. **These targets suggest that programme options that will significantly reduce emissions quickly would be preferred.**

Figure 2 shows the predicted rate of carbon emission reductions for light vehicles. It is slightly misleading in that half of the X axis relates to historic levels (pre 2022) when electric vehicles were not generally available. It may be helpful to relate this figure back to the VKT metrics in Figure 1, to get a better appreciation of the scale of the problem. It is also important to include the references for this information.

Figures 4 and 5 show the impact of programme options on carbon reduction. Option 4 is shown to reduce emissions more than Option 1 and more quickly, although the difference appears to be minor in the context of regional emissions. Table 2 confirms this summary although it isn't clear what assumptions have been used regarding the timeframe for land use intensification. **This is a critical conclusion, considering that this is the highest weighted attribute in the programme objectives.**

The Comparative Cities Analysis on **page 14** highlights the potential for change in locations with high non-car mode share. It isn't clear from the narrative how the introduction of a specific MRT intervention contributed to the overall results, although presumably it would be a significant factor.

The report conclusion on **page 15** is that the main difference between the options relates to embodied CO2 emissions from construction. Option 1 involves more construction, therefore will involve more construction emissions. However, the narrative explains that in the longer run the operational emissions from Option 1 would be less than Option 4, assuming it attracts greater patronage. **How has this statement been taken regarding the overall assessment of option performance informing the recommendation for a preferred programme option?**

4.3 LGWM Strategic CBA Review Annex – draft version 0.3 4 April 2022

The comments below are of a general nature related to how they inform the PPOR and the decision about a preferred programme.

The **final paragraph of section 3.2** discusses impacts explored by EY and where some impacts have been excluded from "core" CBA results. It isn't clear what this exclusion relates to; presumably standard Waka

Kotahi procedures for assessment of the economic performance of each programme option have been adopted?

Section 4 para 3 states that Option 3 did not have an economic evaluation because it scored lowest against the programme objectives in the MCA. Decision makers may want to understand the economic performance of this option if they want to consider alternatives to the recommendation in the PPOR. Is it possible to provide a commentary on the likely range of BCRs for this option?

Table 4.1 highlights the general parameters and assumptions in the CBA. The project opening year is stated to be 2031. **Is this assumption reasonable for all four programmes?**

In **table 4.2** Option 2 it states that for the high land use scenario an adjustment was made to reflect reduced potential for stimulating urban intensification compared to Option 1. What adjustment was made and how was it determined? There is also a comment that the outputs for the HLU scenario have been revised downwards by 20%. Specifically which outputs are referred to?

Table 4.3 outlines the economic performance of three programme options. The BCR values excluding agglomeration show the options are broadly similar to values derived in earlier programme analysis in the range of 0.46 to 0.53. Agglomeration values to add significantly to these values. **Do the BCRs quoted in the main report INCLUDE forecast land value uplifts for each option? If not, how will this factor be considered?**

The assessed safety benefits in **table 4.3** appear to be low. Given that safety is one of the five core programme objectives, this is disappointing; currently they represent less than 5% of the total benefit stream.

Tables 4.3 and 4.4 set out the preliminary CBA results for the core and high land use scenario. Do the costs include funding that would be required to service the higher land use scenario? This could be an important point, although the infrastructure costs for the higher land use scenario may come from separate funding. **The agglomeration benefits are high by comparison with other benefit streams, so it is important to understand what they represent. It may also use be useful to explain the health benefits for additional walking trips as these benefits are also high.**

Section 6.1 outlines the importance of the do minimum. It is not clear what has been agreed to be the do minimum case (also see comment related to the modelling report). Have the do minimum and the reference case previously defined (2020) been amended for the latest analysis?

Section 6.2 covers high population growth in New Zealand and how historic forecasts underestimated the rate of population growth. It isn't clear what the purpose of this text is other than to highlight to decision's makers something which may underpin population growth and by extension, patronage forecasts.

Section 6.4 discusses wider economic benefits (WEBS), but the narrative is unclear about what assessment was made for the programme options. Where uplifted land values included in the assessment? **These points need to be clarified for the decision makers.**

Section 6.4.1 argues in favour of adopting dynamic land use analysis to assess the benefits of the LGWM Programme. In principle, this is a good approach, given the scale and potential impact of a transport intervention of this scale in the region. However as noted in the report, this would take time to

complete. For an IBC the approach adopted is pragmatic and gives a reasonable forecast of the land use and transport interactions to allow a comparison of the relative performance of each of the four programme options.

Sections 7 and 8 outline how the economic assessment could be improved. These ideas could be useful, but they are unlikely to provide additional information to help distinguish between the four options presented in the PPPOR within a short timeframe. **Therefore, it is concluded that subsequent stages of the business case development should carefully consider these and other potential enhancements to the economic assessment methodology, which would need to be agreed with potential investors, Programme Partners and key stakeholders before progressing, given the complexity and effort required.**

Section 9 discusses the completed sensitivity analysis in the economic assessment and concludes that, the mode specific preferences, inflation forecasts and population projections are reasonably sound for the purposes of comparing the programme options. **Section 9.4** discusses some of the technicalities related to the transport modelling system, but it isn't quite clear what is critical with respect to the difference between the Wellington and Auckland models. A separate response about this point should be sought from the transport modelling team as to whether (or not) this issue is material to the results of this evaluation.

5. Conclusions and Recommendations

The critical parameters that inform the choice of preferred programme option start from the scale and location of residential development and employment opportunities within the city. The decision around the preferred programme is, therefore, a decision about what the future urban form of Wellington will be, all as part of bringing to fruition the vision of “a great harbour city”.

The PPOR currently concludes that *“The preferred option that should be progressed to detailed business case is a High-Capacity Mass Transit solution with a new tunnel through Mt Victoria and improvements at the Basin Reserve. This is consistent with Option 1 but is recognises that BRT could provide similar outcomes to LRT if designed properly.”*

Based on the considerable volume of data and assessments to date, this conclusion is understandable, given the level of knowledge and confidence around several key questions, including:

- Acceptance that a significantly intensified land use scenario for Wellington City is appropriate, realistic and achievable (in terms of community acceptance, consenting, demand and funding).
- Appreciation of the risks related to the forecast patronage for the intensified land use scenario (including mode shift, integration with the regional transport network, service quality, etc))
- Understanding of the potential for BRT to adequately serve an intensified land use scenario

However, it is the conclusion of this Peer Review, that given the current uncertainty around the scale of land use intensification and relatively small differences between the performance of options in the MCA, further work will be required in the DBC to confirm a preferred programme option. This work should include identifying how the preferred option will respond to the key questions above.

As the main reference document, **the PPOR needs to provide clear advice** about the key factors and determinants for deciding a preferred option. Urban development, consentability, funding, delivery timeframe and risk are all factors that should feature in this report, alongside the comprehensive assessment of transport system performance for each of the options.

The narrative should discuss the **investment objectives** which flow from the problem statements described early in the report. Investment in transport system infrastructure should be based on desired outcomes; a key omission from the document is a description of the outcomes sought from the LGWM Programme. This omission should be rectified as quickly as possible and should be included in the comparison of programme option performance.

Carbon reduction is the highest weighted objective of the LGWM Programme and the narrative states that any of the options would achieve a small reduction in total transport carbon emissions in Wellington. Therefore, other interventions should be considered, which may have more impact than the programme options presented here, either alone or working in combination with the options presented here. This will be an important point for decision makers.

The report needs to include a holistic assessment of programme risk. This topic should be given careful consideration in determining a preferred programme, given the scale, complexity and potential consequences of getting it wrong. The key programme risks could be expected to include:

- Urban Development and land use scenario - is it realistic, is it viable?
- changing Government Policy over the next several years during which the programme will be implemented
- cost escalation
- patronage forecasting
- technological developments
- failing to meet programme objectives

Each of these risks should be quantified as far as possible, in terms of probability and potential consequences to schedule and cost. Each risk should also have an outline mitigation strategy, so that decision makers can be confident that key risks can be appropriately managed through the development process.

s 9(2)(a)

5th May 2022

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
Summary of Peer Review Findings			
<p>However, it is the conclusion of this Peer Review, that given the current uncertainty around the scale of land use intensification and relatively small differences between the performance of options in the MCA, further work will be required in the DBC to confirm a preferred programme option. This work should include identifying how the preferred option will respond to the key questions above.</p>	<p>Agreed – more work will be required at the DBC stage to confirm the specifics of the preferred option. However, the work undertaken to date has identified an indicative preferred option which will form the basis for the DBC</p>	<p>Noted. An observation would be that the indicative preferred option in the PPOR is based upon the assessment related to the intensified land use scenario. On the assumption that the Programme Partners agree that this is the basis upon which the DBC should proceed, the report team response is appropriate, noting that the further work required at the DBC stage should include updating the key performance parameters of other options, to confirm that the conclusion about a preferred option for the LGWM Programme remains sound. If, for any reason, it is subsequently determined that an alternative land use scenario is more appropriate, then the preferred option recommendation may need to be reassessed.</p>	<p>To be done in DBC (once the Proposed Land Use Scenario is agreed during the DBC, options will be retested).</p>
<p>Investment in transport system infrastructure should be based on desired outcomes; an omission from the current document is a clear description of the outcomes sought from the LGWM Programme, i.e., what outcomes are sought from the programme objectives. This omission should be rectified as quickly as possible and should be clearly shown in the comparison of programme option performance.</p>	<p>This is indicating that targets should be specified – the project made a decision not to specify targets at an earlier stage. Achievement of IOs, as much as possible is provided in Section 10 – Key Questions. Can look to provide more discussion on this in IBC.</p>	<p>Targets are not essential, but outcomes are important. In the final IBC the outcomes could be presented as metrics in respect of the key factors related to each of the investment objectives (without necessarily declaring targets).</p>	<p>To be done in IBC</p>

Released under the Official Information Act 1982

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<p>The report needs to include a holistic assessment of programme risk. This topic should be given careful consideration in determining a preferred programme, given the scale, complexity and potential consequences of getting it wrong. The key programme risks could be expected to include:</p> <ul style="list-style-type: none"> Urban Development and land use scenario - is it realistic, is it viable? changing Government Policy over the next several years during which the programme will be implemented cost escalation patronage forecasting technological developments failing to meet programme objectives <p>Each of these risks should be quantified as far as possible, in terms of probability and potential consequences to schedule and cost. Each risk should also have an outline mitigation strategy, so that decision makers can be confident that key risks can be appropriately managed through the development process.</p>	<p>Already a risk section. Of these noted by peer reviewer, only patronage forecasting and failing to meet project objectives are the two that are not discussed. Failing to meet programme objectives would be due to one or more other risks anyway. Peer review comments also indicate concern about cumulative effect of risks. This will be discussed in the PPOR narrative.</p> <p>We can add more on patronage forecasting risk as well.</p> <p>High priority</p> <p>However, full quantification of these risks is too detailed for this report and may not be possible with existing information.</p> <p>Can add to PPOR that a more in depth discussion on risks will be in IBC and DBC. PPOR to present the risk management strategy going forward and who owns the risk.</p>	<p>Agree with the proposed approach to include a full discussion of the risk issues in the final IBC (as described in the Peer Review Comment).</p>	<p>To be done in IBC</p>
Detailed Comments / Observations on PPOR Sections			
<p>PPOR Structure</p> <p>The structure and content of the PPOR enables the reader to gain a good appreciation of the assessments of programme options, the evidence informing the assessments and the logic behind the conclusions.</p> <p>However, the report conveys a strong focus on transport solutions, without giving priority to the underpinning Urban Development narrative and the desired outcomes system interventions should achieve. This point needs to be addressed for decision makers and the wider PPOR audience.</p>	<p>Yes this is a report primarily focused on the transport outcomes as this is the focus of the majority of the KPIs.</p> <p>If additional focus was needed on how to best achieve urban development outcomes, significant additional work would be needed on land use scenario modelling on a regional basis, which is currently outside the scope of LGWM. However, we are proposing additional work at the start of the DBC to help reinforce these outcomes.</p> <p>The peer review has commented that the report should start and end with urban development. The report will be updated to acknowledge this gap, and it will be covered in the risk section and that gap will be filled in DBC.</p>	<p>Agree with the proposed approach. The timeline for the urban development workstream of the DBC will need to take account of the external inputs, including development of the WCC District Plan, Stakeholder inputs, etc.</p>	<p>Report updated</p>
<p>Introduction (Section 1)</p> <p>Section 1.2, Figure 1 does not really appear to be Preferred Programme Option Assessment Criteria. A more accurate description would be “key inputs used in the programme assessment process”.</p>	<p>Will change figure title</p>	<p>Noted.</p>	<p>Action closed</p>

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
Strategic Context (Section 2) Section 2.6, Why LGWM Matters in the Regional Context includes forecast population and employment growth data. Given the importance of land use and urban development to the LGWM programme, extracts including diagrams and tables from the Urban Development Summary could be useful, although it is understood that the latest City Council data are currently being updated.	Would be useful but doesn't change the outcome. Low priority	Noted.	No change to report.
Work Completed to Date (Section 3) Section 3 illustrates the development of transport improvement packages since 2018 (Figure 3). The narrative should also highlight key steps in urban development, including progress on the Spatial Plan and updating the WCC District Plan, to demonstrate how these mutually informing workstreams have progressed. The narrative should also highlight the key factors which led to the latest programme objectives, and their respective weightings. Given the importance of understanding the trade-offs involved with selecting a preferred programme, it is important that decision makers fully understand the relative weightings for each of these objectives, their implications for the future Wellington Urban Landform and the Regional Transport System.	Can add: <ul style="list-style-type: none"> Progress on spatial plan and WCC district plan More info on objective development and weightings Low priority	Agree with the proposed approach.	Report updated
Development of Programme Options (Section 4) Prior to describing programme option development in Section 4 (which might better be described as development and assessment of programme options), the narrative should discuss the investment objectives which flow from the problem statements. Investment in transport system infrastructure should be based on desired outcomes rather than outputs, as derived from the programme objectives. There should also be a discussion about how programme options were developed in response to the outcomes sought from investment in the transport system.	Can add: <ul style="list-style-type: none"> "and assessment" to the title (Done) Investment objectives (but these are the programme objectives) How options were developed (but this needs to come from LGWM direct) Low priority	If it is impractical to include information into the PPOR, the proposed approach may be acceptable if the Programme Partners are comfortable. However, the narrative in the final IBC should clearly set out the investment logic (noting that programme objective is the adopted terminology) AND the option development process that flows from the objectives.	To be done in IBC
The text states that the option performance against project objectives will be presented in traffic light coloured tables; are these the tables in Section 8? If so, that should be stated, OR the reader should be directed to where they can be found.	This paragraph no longer exists.	Noted.	Action closed

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
The narrative explains how a decision on a preferred programme option will be determined (page 12). This is a crucial part of the report and would better fit under its own heading, as it clearly goes beyond option development.	Title of section changed	Noted.	Action closed
Text in Section 4 (page 12) states that: <i>"The preferred option will be the one that best achieves the vision for Wellington, whilst providing value for money. It will be the option where any outstanding risks (such as uncertainties, costs, environmental effects) can be appropriately managed."</i> The narrative then notes that while Multi Criteria Assessments (MCAs) have been used to understand option performance, it is not proposed to use MCAs to decide on a preferred programme option because there are only a few significant differentiators. At the bottom of page 12, there is a list of questions which are relevant to the choice of a preferred programme, which have emerged from a range of sources. Have the Board indicated these are the key questions THEY want to determine a preferred programme option?	As written, "These questions have come from within the LGWM team, the programme partners, stakeholders and the public" No changes proposed	Noted.	No change to report
Section 4 should provide clear advice to decision makers about the key factors and determinants for deciding a preferred option. Urban development, consentability, funding, delivery timeframe and risk are all factors that should feature in this discussion (noting they are implied indirectly through reference to the earlier MCA assessments).	Can add a paragraph on MCA criteria in this section. Medium priority	Agree with proposed approach.	Report updated
Programme Options (Section 5) Section 5 highlights the key features of each of the shortlisted programmes, which appear to be same options from the PASLO report. It would be helpful to confirm this is correct.	Will add.	Noted.	Action closed
The Programme Option Summary in Figure 6 show the four shortlisted programme options. Titles for each of these options should be revised for clarity and should clearly distinguish between the key features of each programme. Also, the key defining the proposed interventions needs to be reviewed; for example, the distinction between new and existing tunnel is hard to read.	Can alter, but will need graphics support Low priority	Noted.	Agreed not to alter as image was for public consultation

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<p>Questions or comments on each of the options shown in figure 6 are as follows:</p> <p>Option 1:</p> <ul style="list-style-type: none"> Who would be able to use the new Mt. Victoria Tunnel? The text isn't clear whether it will be available for general traffic. Will the current Hataitai bus tunnel remain in its current configuration? What is proposed for the Terrace Tunnel? What does "bus priority where needed", extended down to Wellington Airport, look like? 	<ul style="list-style-type: none"> Table 1 outlines assumption Yes, but with fewer services due to MRT Nothing See footnote to Table 1 <p>More detail available in PASLO report. Add clarification/graphic</p>	Noted. PPOR should be edited to cover these points.	Report updated
<p>Option 2:</p> <p>All relevant comments from Option 1 plus the following:</p> <ul style="list-style-type: none"> What is the distinction between Bus Rapid Transit and Bus Priority shown on Option 1 east of Mount Victoria Tunnel? Why does this option have Bus Rapid Transit to the airport, but not Option 1? 	<ul style="list-style-type: none"> See footnote to Table 1 Because it is affordable with BRT to do two routes, but not with LRT <p>No changes proposed</p>	Noted.	No changes to report
<p>Option 3:</p> <ul style="list-style-type: none"> Is the key difference between this option and Option 1 the location of the new Mt Victoria tunnel? 	<p>There is no new tunnel in this option</p> <p>Check terminology</p>	A new tunnel is shown on Figure 6, Option 3 – see the black dotted line across Mt Victoria Tunnel. Is this meant to be a duplication of the existing tunnel? If not, the black dotted line should be deleted.	Black dotted line is actually a grey dotted line for "existing tunnel. Agreed not to alter as image was for public consultation
<p>Option 4:</p> <ul style="list-style-type: none"> Is the lack of grade separation at the Basin Reserve which forces the LRT route to use Taranaki Street? 	<p>Yes</p> <p>Add clarification</p>	Noted.	Report updated
<p>General:</p> <ul style="list-style-type: none"> Are there opportunities to take the best elements of these four programmes and combine them into a fifth option? 	<p>The best elements are already in and out of the four options. Not sure what other opportunities are available. No significant desire for this was evident from partner, stakeholder or public feedback.</p> <p>No changes proposed</p>	Noted.	No changes to report

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
Outcomes from Community Engagement (Section 6) Section 6 describes findings from the recent community engagement process and views about the key issues about travelling in Wellington. The feedback obtained included methods and outcomes to address current deficiencies in the system; for example, reliable public transport emerged as a key theme and light rail emerged as a preference to BRT. It isn't clear from the narrative how this information was obtained, given that comparison of different modes is complex. There is an inference some of the responses may have resulted from misunderstandings about what is proposed.	More detail is available in the Engagement Report. No changes proposed	Noted that more information is contained in the Engagement Report (not reviewed). It would be helpful to expand the narrative in the final IBC to cover this point.	To be done in IBC
For the purposes of confirming a preferred programme, it is suggested that the focus should be on community feedback about preferred network outcomes . This would avoid any misunderstanding which may have arisen around future passenger transport solutions.	A table could be prepared to outline how well each of the options contributes to the outcomes presented in Figure 7. But this would need to be qualitative at this stage. Medium priority	Noted.	Report updated with how the important considerations translate to our programme objectives
There is mention of feedback from over 40 different stakeholders whose comments have been considered. How has this feedback influenced the assessment outcome?	It has been summarised in engagement report and considered by decision makers. No specific weighting was given to it. No changes proposed	Noted.	No changes to report
Section 6.1 Online Panel Survey describes a 10 minute survey of a large group of Wellingtonians, and states that the panel had some very similar thoughts to the public. However, the responses presented in Figure 8 differ in some respects, notably easier to get to key destinations like the airport or hospital and reducing carbon emissions.	No changes proposed	Noted. It would be helpful to expand the narrative in the final IBC to comment on the differences between responses in the two surveys.	To be done in IBC
Technical Assessments (Section 7) Section 7.1 describes the different land use scenarios which have been used in the technical assessments which follow. The narrative would benefit from some clarification, as follows:			N/A
<ul style="list-style-type: none"> What is the purpose for the four different levels of "development capacity" described on page 19? It isn't clear how they relate to the land use scenarios developed by LGWM and used in the subsequent assessments of programme options. 	Agreed that the narrative is relatively complicated – Amy to clarify (or remove if it doesn't add anything) Low priority	Noted.	Bullet points removed
<ul style="list-style-type: none"> What land use scenario has been used for the "do minimum" scenario? This is a crucial factor, to give decision makers an appreciation of the difference between the do minimum and programme options. 	Clarified in report	Noted.	Action closed

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<ul style="list-style-type: none"> Over what period would the projected growth across the city occur? Would there be a lag between enabling this level of development and it becoming operational (delivering patronage, etc)? 	<p>Not possible to answer at this stage. Further work will be required</p> <p>Medium priority</p> <p>No change required</p>	<p>For now, the PPOR should clarify the assumption used in the assessment, i.e., development would proceed in tandem with delivery of the preferred option. This factor should be explained in the final IBC and should be the subject of further assessment for the DBC.</p>	<p>Report updated.</p> <p>To be done in IBC</p> <p>To be done in DBC</p>
<ul style="list-style-type: none"> Is the relationship between the different scenarios linear? 	<p>No inference can be made about the relationship between the scenarios. They are not intended to be detailed forecasts and more work will be required at the next stage.</p> <p>Medium priority</p> <p>No change required</p>	<p>Noted.</p>	<p>No changes required</p>
<ul style="list-style-type: none"> Does the Core Development Scenario reflect the current Wellington City Council Spatial Plan? It is defined as “business as usual growth with the level of development distribution agreed in November 2019” but the terminology changes frequently through the document. The same terminology should be used throughout. 	<p>Agreed that clarity should be provided – Amy/Alan to clarify</p> <p>Medium priority</p>	<p>Clarification awaited.</p>	<p>Report updated</p> <p>The core scenario “is reflective of the level and distribution of growth indicated in the WCC Spatial Plan.”</p>
<ul style="list-style-type: none"> Figure 9 suggests that with the intensified forecast population (should be number of households), the absolute number of households along the MRT corridors would double. Presumably this is across both the southern and eastern corridors? Did the capacity analysis prepared by the Property Group in January 2021 confirm this is a realistic scenario (i.e., the realisable capacity (demand))? 	<p>Yes although reference to the TPG report has now been removed. Amy to consider how this is described</p> <p>Low priority</p>	<p>Assuming the Programme Partners want to proceed based on the intensified land use scenario, deleting reference to the TPG report in the PPOR is a reasonable approach.</p>	<p>Reference deleted</p>
<ul style="list-style-type: none"> Table 2 indicates growth in the Eastern Corridor will be significantly smaller than the Southern Corridor, with the difference between the Eastern Core and Intensified scenarios being 1,000 dwellings (12.5% and 20% compared to existing, respectively). Does this imply that options which go to the east are less likely to attract additional patronage? 	<p>Correct and this has been discussed in the urban development report</p> <p>Low priority</p> <p>No change required</p>	<p>Noted.</p>	<p>No changes required</p>
<ul style="list-style-type: none"> Is there a reason why the intensified, UDS – BRT and UDS LRT scenarios for the eastern corridor are the same? 	<p>Further work will be required to determine the extent to which BRT will stimulate further growth to the east compared to enhanced bus.</p> <p>Low priority</p> <p>No change required</p>	<p>Noted. Clarification about this point will be needed for the final IBC.</p>	<p>To be done in DBC</p>

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
Section 7.2.1 describes the updated mode share analysis from the updated transport modelling, which shows increased PT patronage from additional residential development, which is to be expected. Figure 10 suggests that 2046 car mode share achieved by options one to four inclusive for are about the same, at about 15% - 20% less than the do minimum. This would indicate that all the options (including Option 1 with the intensified land use scenario) will reduce VKT to a similar degree. Presumably this has an influence on the carbon analysis, which should be discussed given this is a key outcome sought by the programme.	Partially correct. The graph only shows mode share from the S+E suburbs. It's worth noting that the intensified scenario reduces VKT from the north and the west (due to lower levels of growth in these locations) and this results in carbon benefits. Medium priority to be clarified in report	Noted.	Report updated
Section 7.2.2, Figure 11 shows predicted PT patronage. The distinction between the dark and light blue colours labelled on the histogram as high and low should be explained. Figure 12 shows similar metrics for the Eastern Corridor, which also shows a significant increase above the do minimum. This is slightly surprising given that the difference in the number of households in both scenarios are not as substantial as for the Southern Corridor.	Clarification already provided	Noted.	Action closed
A key point from this analysis is that the PT network capacity to the Eastern Suburbs will need to be increased above its current capacity, sometime between 2036 and 2046, from which it is concluded that a new bus tunnel will be needed. This is an argument in support of options which include this feature.	Agreed No change required	Noted.	No change to report
Section 7.2.3 describes the latest accessibility modelling. It isn't clear why accessibility to the airport has been taken to be a key metric for this attribute, when it isn't intended to significantly enhance PT access to the airport with any option. It may be more informative to show the respective performance of the options by assessing the number of people living within a certain travel time of the City Centre.	It is intended to improve PT access to the airport under all options. The airport is a significant regional destination and access is improved by the Mt Vic Tunnel and Basin (which this graphic demonstrates). Clarification has already been provided	Noted.	Action closed
Section 7.2.4 describes how AIMSUN modelling shows the need for grade separation at the Basin Reserve to realise the benefits of a new Mt. Victoria Tunnel. The linkage between these two interventions should be further stressed, to highlight the significance of these components for programme performance. It would be easier to present travel time changes in minutes and for completeness, show the change in travel time for the Station to Island Bay journey.	Agreed – clarifications should be made with reference to previous work on this Medium priority – further work will be required	Noted. Clarification about these points will be needed for the final IBC.	To be done in IBC

<p>Section 7.3 outlines the programme option costs with a breakdown of each of the four options shown on Table 5. Detailed cost estimates were not provided for review, so it is not possible to comment in detail about these estimates. However, it would be expected that the difference between the smallest and largest options 4 – 1 (noting that the table heading has Option 3 listed twice) would be greater. Why are the costs for the MRT improvements to the east greater for options 2,3 and 4 compared to Option 1? These points should be checked urgently. Other questions about this section include:</p> <ul style="list-style-type: none"> • Will separate packages such as City Streets etc have separate funding from the main elements of the programme? • have the benefits of City Streets and other packages been considered, or they are they all now rolled into one economic assessment? • Are these estimates P95 level (text on page 28 suggests they are)?. How do they relate to the risk assessment? Are the risks between options different? • The affordability threshold is \$7.4 billion which is just above the whole of life cost (WOLC) for Option 1. What are the implications if predicted costs increase above this amount? Would it change a decision about a preferred option? 	<p>The differences in the east should be explainable as follows:</p> <ul style="list-style-type: none"> • Option 1, the Enhanced Bus investment physically starts at the Hamilton Rd / Kilbirnie Cres intersection, then heads east. The bus lanes in the new tunnel are considered part of the tunnel costing, and any treatment between the Basin and the Golden Mile are considered as part of the MRT costs. • Option 2, the geographic extents are the same as Option 1, but the intensity of investment is higher per km. Plus there's more scope to the airport (Calabar Rd), plus depot costs. • Options 3 and 4, are the same as Option 1 east of the Kilbirnie Cres intersection, but also includes works between Kent Tce and Wellington Rd. <p>This will be clarified in the report "Will separate packages such as City Streets etc have separate funding from the main elements of the programme?"</p> <p>Each project and phase of the individual project is subject to individual funding partner approval processes.</p> <p>"Are these estimates P95 level (text on page 28 suggests they are)?. How do they relate to the risk assessment? Are the risks between options different?"</p> <p>P95 cost estimates were used. MRT and SHI cost estimates followed Waka Kotahi cost estimate processes (SMO 14) and were priced by quantity surveyors using available design detail.</p> <p>Parallel cost estimates were sought for most project capital cost estimates. Therefore, from a cost estimate perspective, they have similar cost certainty risk.</p> <p>Programme costs are more than just cost estimates provided by the Work Package consultants. Programme costs are on a whole of life basis (30 years from 2020/21). The following sets out the process used and implicit QA of the model:</p> <ul style="list-style-type: none"> • the financial model built by PwC to provide arithmetic and logical rigour. • it was populated using the capital cost estimates developed by professional cost estimators and these estimates have been peer reviewed. Forecasts have been developed using the upper range cost estimate (P95) with inflation applied. • Benchmarks have been applied to build up whole of life costs to capture, both the up-front capital investment and, the longer-term impact on funding partner budgets. 	<p>For option 1 the terminology used on Figure 6 is bus priority rather than enhanced bus investment. For option 2 the intensity of investment appears to be three times higher than option 1. Is that correct?</p> <p>The question about benefits of other packages doesn't appear to be addressed. The point was to gain clarity about whether costs AND benefits are assessed at package level OR programme level.</p> <p>This response suggests that at this stage all options have a similar risk profile. Is this correct? The risk differential between options would be expected to be greater for the larger, more complex options; for example, risks related to consenting, land purchase, tunnelling, track bed construction, etc will be different between options.</p> <p>Has the PwC Model (unsighted) been peer reviewed by others?</p> <p>These points highlight the need for a comprehensive risk assessment and narrative. If it is impractical to include further information into the PPOR, this should be included in the final IBC.</p> <p>Noted.</p>	<p>Yes, enhanced bus = <i>continuous</i> bus priority. Enhanced Bus has lower ride quality and customer experience without pavement upgrades, level boarding stations and other associated infrastructure. Have changes terminology to be consistent through report as "Continuous Bus Priority"</p> <p>The benefits of other packages have been considered but only at a high level, more specific benefits for each packaged are included in their business cases. This report has assessed everything top down rather than bottom up.</p> <p>The larger options do have larger risk, but all options have very large risk due to the nature of the overall programme, these are reflected in the P95 cost estimate for known risks.</p> <p>To be done in IBC.</p>
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Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
	<ul style="list-style-type: none"> The use of the model has then been through a further PwC review. <p>“The affordability threshold is \$7.4 billion which is just above the whole of life cost (WOLC) for Option 1. What are the implications if predicted costs increase above this amount?”</p> <p>At this point our position is as set out on page 29.</p> <p>There is different affordability threshold “headroom” between programme options. That is the difference between programme cost and the affordability threshold (\$7.4b). No decision has been made if this affordability threshold (\$7.4b) could be increased.</p> <p>If this threshold represents a cap for funders, then the lower cost programmes will have an additional buffer. Funders have a range of choices to address breaching the affordability threshold, including providing more funding or reducing the scope of delivery.</p>		
Section 7.4 updates the Programme Economic Analysis, based on the Economics Technical Report (reviewed below). Figure 15 shows monetised benefits for each of the four options with the core land use scenario and Option 1 (only) with the intensified land use scenario. With the intensified model the level of benefits almost doubles for Option 1 between intensified and core land use. Would other options see a similar increase, if the option had sufficient capacity (or could be modified to suit) the intensified scenario?	<p>Model runs for other options under the intensified scenario have not been produced although further text has been provided based on some sensitivity test analysis.</p> <p>No further changes required</p>	Noted.	No changes to report
The information in Figure 15 is worthy of more discussion. For example, what influences the relative option performance for private vehicle travel time savings, safety, health benefits, etc? Agglomeration is a key benefit of Option 1, but there is little information about the composition and nature of these benefits. While some of these benefit outcomes appear to be intuitive, some aren’t and need some further explanation, particularly to distinguish between options. Table 6 is easier to understand and may be a preferable way to preface the narrative, noting that the dimensions and scale of the numbers shown should be confirmed, i.e., NPV values, millions, etc.	<p>Andrew to review in the context of the economics report – medium priority</p> <p>Some changes already incorporated re description of table 6</p>	Noted.	No changes to report

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
The discussion of the results on page 30 includes the economic performance range of options 1,2 and 4 with the intensified land use scenario. Option 1 has the greatest benefit range, although not by a large degree. A critical statement at the end of paragraph 2 is that “Nevertheless, it does highlight the importance of high levels of intensification to achieve a BCR above one” . This statement should inform the conclusions about the choice of a preferred option.	Agree. Clarification to be provided in the PPOR The intention here is that we reinforce our conclusions along these lines – or at least ensure that we’re happy that the conclusions are sufficiently clear in this regard.	Noted.	This is re-enforced in 11.2
The first four bullet points in Section 7.5 summarise the updated carbon analysis and states that total regional emissions would reduce by a total of 7% with the intensified (land use) scenario. It also states that the VKT production for Wellington city would change by 1.5%. It isn't immediately obvious how the statements link to what follows. The last sentence of the fourth bullet point, about a higher proportion of growth taking place in the city, needs to be explained further.	Agree. Clarification to be provided in PPOR Intensification is the most important contributor to carbon emissions savings compared to the do minimum. More growth occurring along the MRT route concentrates people and trips around infrastructure supporting non-car modes, and consequently makes car-based transport less attractive. This is seen from the significant drop in VKT in the region compared to the VKT drop in Wellington City: more people living in Wellington City compared to the Do Minimum concentrates trips in Wellington City; the corollary is that there will be less people living further out of Wellington city compared to the Do Minimum (footnote: the total population is the same under the do minimum, core and intensified land use scenarios – the difference comes from where we assume those people live)	Noted. Important to highlight in the clarification what the “significant drop in VKT in the region compared to the VKT drop in Wellington City” is predicted to be, and how it influences the overall outcome.	Report updated
Figure 16 shows important results from updated carbon analysis, which shows that the maximum of carbon emission reduction for the programme would be around about 4.2% by 2075, with the intensified land use scenario, 2075. Contrary to the second bullet on page 30, Figure 16 also shows that greater carbon emissions would be achieved by Option 4 than Option 1, presumably because less construction is involved. Neither option shows a net reduction in carbon emissions until 2045.	Agree. No action required.	Noted.	No changes to report

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Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<p>Given that reducing carbon emissions is the highest weighted programme objective, an obvious question would be what other interventions would be more effective? Clearly other interventions need to be considered, if the city and the Region are to achieve their carbon reduction goals. Also, as carbon reduction is the highest weighted objective for the programme, it would be prudent to continue to evaluate Options 3 and 4, which have better performance in this regard, before selecting a preferred option.</p>	<p>Disagree.</p> <p>The scope of the programme is not to reduce carbon emissions – that is just one, albeit the highest weighted, objective, along with increasing mode shift away from private vehicles. It is not within the scope of this programme to advocate for other carbon reduction options – like banning fossil-fuel powered vehicles, or improving methane capture at Wellington City landfill.</p> <p>If desired, we could emphasise that LGWM will not be sufficient for the City or the Region to meet its carbon reduction objectives. The carbon technical report does this.</p> <p>Carbon reduction isn't the highest weighted objective: carbon reduction <i>and increasing mode shift away from private vehicles</i> is. The sub criteria weighting as agreed with the TAG means that enabled emissions contribute to 45% of the score and embodied emissions contribute to 15% of the score. The remaining score is attributable to mode shift</p> <p>With that in mind, we don't agree that we should continue to evaluate Options 3 and 4 rather than resolve to a preferred option. If we also look at mode shift, Options 3 and 4 do not perform in the same way as 1 and 2, which have substantially superior PT performance to the East.</p>	<p>Interventions such as banning fossil fuel powered vehicles from parts of the city, congestion charging, or other travel demand strategies could achieve some (not all) of the desired outcomes. The point behind the comment was to highlight that the narrative should explain why they would not be sufficient to meet ALL the objectives, in isolation from other interventions.</p> <p>For the final IBC it will be important to explain the distinction in the programme objective between the carbon emissions factor and the mode shift factor, and the evidence related to each aspect.</p> <p>Noting the Project Team's response about not continuing to evaluate Options 3 and 4, it will be important to continue to evaluate the indicative programme option through the final IBC and DBC, to confirm that it remains the option which best meets all the LGWM Programme Objectives.</p>	To be done in IBC
<p>Programme Options Analysis (Section 8)</p> <p>Section 8 summarises the programme objectives analysis. Key observations are as follows:</p> <ul style="list-style-type: none"> The “do minimum” option is stated to mean there would be “no changes in Wellington”. It is important to clarify what this means in terms of land use assumptions, committed changes to the regional transport network (i.e., rail upgrade package, etc). 	<p>Agreed, although this is described further in some of the more technical reports. Minor clarification incorporated in document</p>	Noted.	Action closed
<ul style="list-style-type: none"> Third bullet on page 34 states that options 1,2 and 4 received the highest scores for carbon emission reductions. However, figure 16 shows Option 4 performs better than Option 1, albeit to a minor degree. It would help to explain this decision further, and what consideration led to a lower score for Option 3. 	<p>Further commentary can be provided Low priority</p>	Noted.	Action closed

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<ul style="list-style-type: none"> Table 8 highlights the land use scenario as the key factor influencing the best performing programme option, which switches from Option 2 to Option 1 with the intensified land use scenario. 	Noted – no change required	Noted.	No changes to report
<ul style="list-style-type: none"> The text beneath Table 8 states that the relative scores reflect the assumed characteristics of MRT in Option 1, namely the highest level of capacity and quality to the south and a significant improvement to the east. Surely Option 2 would be considered to have better access to the east, given the distinction between bus rapid transit (Option 2) and bus priority (Option 1). 	Option 1 has “enhanced bus” which is the same level of bus priority as the BRT option. Very little difference between the two in terms of access to the east for PT No change required	Figure 6 clearly shows Option 1 has bus priority to the east, not enhanced bus. Terminology should be clarified in the PPOR.	Replaced all reference of Enhanced Bus and replaced with Continuous Bus Priority.
<p>Updated Analysis Summary (Section 9) Section 9 brings together conclusions based on the analysis described in Section 8, which are summarised in four bullet points at the top of page 38. Comments in respect of each of these points are as follows:</p> <ul style="list-style-type: none"> The analysis provides strong evidence that land use along the MRT corridors is a key part of the investment story. 	Agreed No change required	Noted.	Action closed
<ul style="list-style-type: none"> Evidence provided in this report (i.e., figure 6) appears to contradict the statement about intensification better delivering on carbon and mode share objectives. 	The over-riding conclusion is that intensification delivers on the carbon and mode share objectives so it would be good to understand where this is contradicted	Understood. However, it is suggested that the narrative includes a statement about the relative carbon emission performance of options in Figure 6 (currently the figure only shows a greyed area, which does not distinguish between options).	We don’t have enough outputs to be able to comment on different options under the intensified land use scenario. Further text provided on sub-categories in report.
<ul style="list-style-type: none"> the range of BCRs is similar across the options. Given the range and nature of the uncertainties related to key factors in the analysis, including a preferred land use scenario, it may be too soon to state which programme would achieve the highest BCR 	Noted – will soften the statement in the report Medium priority	Noted.	Currently says intensification is required to maximise BCR, doesn’t comment on particular options.
<ul style="list-style-type: none"> the degree of intensification will influence the choice of MRT technology. However, this is a separate issue in the context of when a decision about specifications and characteristics will be made. 	Noted No change required	Noted.	No change to report
<ul style="list-style-type: none"> Regarding the public responding positively to intensification, was the engagement process designed to obtain feedback with sufficient confidence to support this statement, which would stand scrutiny? For example, to what extent did the public appreciate the scale and intent of the intensified land use scenario, given that the public engagement process was designed around the transport programme? 	Sarah R to comment on this	Comment awaited.	Comment softened in report.

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<p>Other Key Questions (Section 10)</p> <p>Section 10 addresses other key questions that have arisen from a variety of sources, including the public engagement process. Observations on each of these points follows below (other than those covered previously):</p> <p>Form of MRT: The distinction between rail based and road based transit systems should draw on the conclusions of the Mode Option Report. It is understood that work is continuing to assess the relative merits of these modes, but as the technology advances the distinction between these two systems is becoming blurred. Whichever option is chosen as preferred; it is essential that the system design, development and optimisation processes determine the final form and specifications for the preferred MRT solution.</p>	<p>Agreed No changes proposed</p>	<p>Noted.</p>	<p>No changes to report</p>
<p>Why does MRT not go to the airport? it would be worthwhile to amplify the point by restating what appears in earlier reports about passenger demand to the airport, as part of prioritising access to residential areas and the CBD.</p>	<p>Agreed Medium priority</p>	<p>Noted.</p>	<p>Report updated</p>
<p>Are large scale or minor improvements preferred at the Basin Reserve? The narrative would benefit from more explanation about the constraints affecting access to the east if grade separation is not provided. It should also highlight why LRT options would be constrained to Taranaki Street rather than Cambridge / Kent Terrace. The narrative should also use consistent terminology; for example, the conclusion discusses the Arras Tunnel Extension although the section heading is Basin Reserve.</p>	<p>Agreed Medium priority</p>	<p>Noted.</p>	<p>Report updated</p>
<p>Is a new Mt Victoria tunnel needed? In the description of the two alternatives under consideration the text is confusing about the new tunnel configuration, including whether lanes for general traffic will be provided or retained in the existing tunnel. The functionality of the existing Hāitaitai Bus Tunnel should be included to complete the picture. The discussion in the table at the bottom of page 47 is based on the intensified land use scenario only. What are the implications of a less intense land use scenario?</p>	<p>Agreed Medium priority</p>	<p>Noted.</p>	<p>Report updated</p>

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
How will the projected Urban Development be achieved? This narrative is an important component of the overall urban development story. It suggests that the current Spatial Plan anticipates 10,000 new households rather than 16,000 as stated in the text, which in turn implies that the difference between the intensified scenario and the spatial plan number is 16,000 new households. This point should be clarified in the narrative.	Agreed need to clarify Medium priority	Noted.	Report updated
Section 10.4.2 notes the need for other infrastructure upgrades to accommodate the Spatial Plan and the intensified land use scenario. There is no discussion about the scale, complexity and cost implications related to these upgrades. To what extent (if any) has this been considered in the options analysis?	It hasn't as these would be costs and benefits of land use intensification not transport system development. No changes proposed	This approach implies that a decision to invest in a programme which relies on the intense land use scenario requires funding that may not be realised. While it may be sufficient for the PPOR to cover this point as written, it will be an issue that will need to be addressed in the final IBC.	To be done in IBC
Section 10.4.4 discusses growth elsewhere in the region. It states that the intensified scenario will better deliver on the regional 2050 climate change targets. Information presented earlier in the report suggests that the timing and scale of development will struggle to meet these targets, so other interventions will be needed to achieve them. This topic requires more investigation and presumably is being considered at a regional level. At this point it would be fairer to say that all the options will contribute to those targets, but the preferred option should complement other interventions that will be required.	Agreed Low priority	Noted.	Commentary discussed intensification in general rather than a specific option. No change to report.
Integration with the wider transport system: It is surprising that this factor has received less attention in the narrative. Most trips into the city are from the north. The potential to extend an LRT network would be very limited. The extent to which access for the wider region into the city area has been considered in the option assessment is unclear but given that the actual land use scenario may change over time, flexibility in the system coverage would be beneficial. In this regard, Option 2 has advantages over Option 1. The text should include a holistic view about how the programme will integrate with the Regional Transport System, including how the options could be extended if possible or will connect to existing (or future) systems beyond the geographic limits of the programmes.	Agreed, but will need direction on this from programme team. Medium priority	Clarification about this point will be needed for the final IBC.	To be done in IBC

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<p>Are parking levies or congestion charging proposed?</p> <p>Section 10.6 indicates that a congestion charge would reduce traffic entering the city and increase PT patronage by over 2000 per hour. If a congestion charge was introduced with any of the MRT options, what would that do in terms of performance, especially in regard of carbon emissions and economics?</p>	<p>This hasn't been modelled so can't include at this stage. Can provide more analysis in the IBC.</p> <p>No changes proposed.</p>	<p>Clarification about this point should be included in the final IBC</p>	<p>To be done in IBC</p>
<p>Uncertainties and Risk (Section 11)</p> <p>Section 11 includes a qualitative discussion on these topics; there is no information about the scale of risk in terms of time, cost and other consequences. It does not appear to address the fundamental drivers which might affect the items highlighted, for example the factors which would influence the actual land use that will eventuate over the next decades (viability, demand, etc). Nor are there any strategic mitigation strategies to manage these key factors. While the text is helpful to identify some of the key programme risks, it is considered that there is insufficient information here to provide confidence to decision makers around the scale of the risks that may eventuate and their potential impact on the success of implementing a preferred programme. This matter needs to be addressed urgently.</p>	<p>This document has focussed on the impact on choosing the 'wrong' option rather than time, cost etc. Quantifying each risk for each option is a large amount of work. It is suggested that this form of risk assessment be present in the IBC rather than here.</p> <p>No changes proposed.</p>	<p>Noted. Also see previous comment related to risk assessment required for the final IBC.</p>	<p>To be done in IBC</p>

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Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<p>Selecting the Preferred Programme Option (Section 12)</p> <p>Section 12 summarises the key factors from the option analysis described previously and notes that the preferred programme options from the MCA analysis were Options 1 and 2. Observations and comments on the points made in this section of the report are as follows (noting only matters not previously covered):</p> <p>High intensity Land Use. There are several matters that need consideration before a preferred programme option can be confirmed, including:</p> <ul style="list-style-type: none"> • The need to accept that a significantly intensified land use scenario for Wellington City is appropriate, realistic and achievable (in terms of community acceptance, consenting, demand and funding). • That the consequential patronage forecasts for the intensified land use scenario will eventuate (including mode shift, integration with the regional transport network, service quality) • That BRT would have insufficient capacity to service the actual patronage that will result from the LGWM programme (including infrastructure, vehicle performance, operational constraints). <p>Taken together, the question is whether there is sufficient information at this time to allow decision makers to form a view about these issues?</p>	<p>Agreed that that is the question. Our way of addressing that is to provide bookend land use scenario outcomes and showing decision makers that, if they want the best outcomes, then the high intensity land use is needed. We believe the information is clear that high capacity MRT is needed if high intensity land use is desired. Not sure what the peer reviewer wants us to do with this. Ensure that this is covered by updated risk approach.</p>	<p>Noted. These points will need to be addressed in either the final IBC or DBC.</p>	<p>To be done in IBC or DBC</p>
<p>The carbon analysis for Option 4 shows that it was overall the better performing option of the four options considered. It also has the lowest cost. Given that carbon reduction has the highest weighting for the programme, these factors suggests that Option 4 should not be discarded at this stage.</p>	<p>But it is only because it has lower embedded carbon. It does not provide the same level of annual carbon decreases. We are also looking at very small changes here ~0.5% of Do Minimum as the difference between the options. More text will be provided.</p>	<p>Noted. The final IBC should include discussion about this point, including the materiality of this attribute in the choice of preferred option.</p>	<p>To be done in IBC</p>

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
<p>The Preferred Programme Option (Section 13)</p> <p>Section 13 states that:</p> <p><i>“The preferred programme option that should be progressed through to detailed business case is a High Capacity Mass Transit solution with a new tunnel through Mt Victoria and improvements at the Basin Reserve. This is consistent with Option 1 but recognises that BRT could provide similar outcomes if designed properly”.</i> Given the previous narrative and the assessments described in the PPOR, THIS CONCLUSION APPEARS TO BE SOUND. However, a question which remains is whether Options 3 and 4 should be discarded at this stage, particularly as Option 4 scores well for carbon reduction performance and is the lowest cost to implement.</p>	<p>12.3 attempts to answer this question. The only positives for option 4 are carbon and cost. It just doesn't meet the other objectives particularly if there is high land use. If there is low land use then we shouldn't be progressing MRT. Will review 12.3 and strengthen if appropriate</p>	<p>The key point in section 12.3.7 is that Options 3 and 4 have been discarded as they would have insufficient capacity for intensification (i.e., intense land use scenario). However, if a less intense land use eventuates, all of the options would perform to a similar degree. Therefore, to emphasise the point, it would be helpful to add to the section 12.3.7 about these options being “<i>fall back positions if, at the end of the DBC, circumstances have changed</i>”, to note that a different future land use scenario could be one of those circumstances.</p>	<p>PPOR updated, action closed.</p>
<p>From a superficial inspection, it may be possible for Option 3 to be developed as a first stage of either options 1 and 2, i.e., the system might be extended to either options 1 or 2 if land use reached the scale anticipated by the intensified scenario or other factors related to the implementation of the project.</p>	<p>Agreed, there is nothing to prevent Option 3 to be implemented after the DBC. This is stated in 12.3.7. No change</p>	<p>Noted.</p>	<p>No change to report</p>
<p>Section 14 sets out how the programme will be delivered. This section has yet to be carefully investigated but a critical factor should be providing greater certainty and confidence around the preferred land use scenario, to complement a preferred LGWM transport programme. This report highlights the dependency of one upon another and therefore these factors need to be determined hand in hand. To that end the key questions for the DBC should be carefully considered including a time frame for implementation, recognising the constraints that will prevail with respect to the formal adoption of the WCC District Plan over the next few years.</p>	<p>Agreed. Land use is one of the key questions for the DBC stated in 14.3 No change</p>	<p>Noted.</p>	<p>No change to report</p>
<p>PPOR Supporting Reports</p> <p>This section includes comments on the supporting documents for the PPOR. This part of the review has focused on high level issues, rather than a detailed review of each document.</p>	<p>Noted</p>	<p>Noted.</p>	<p>No change to report</p>

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
Preferred Option Report – Modelling Appendix			
Section 2 summarises the full programme options. Terminology should be consistent with other reports, for example the reference to bus capacity as distinct from Bus Rapid Transit or Enhanced Bus. The land use scenarios used in the assessment also need to be checked for consistency between reports.	<p>Clarification provided in modelling appendix Agreed, text to be updated and reviewed to ensure alignment with PPOR and other documents.</p> <p>Land use scenario assumptions will be clearly documented in modelling appendix – 26,000 dwellings vs 10,000 for core - with review to confirm consistency with PPOR, and reference to core and high land use being “bookend” scenarios</p>	Updated Modelling Appendix unsighted. Comments below are based only on team response provided in this spreadsheet.	Appendix updated
Section 3 outlines recent modifications to improve model performance. It would be helpful to clarify the basis for making these changes, for example travel time surveys, capacity measurements, etc. It would also be helpful to include reference to validation processes undertaken to demonstrate how these changes have improved model performance, to provide greater confidence in the model outputs.	<p>Clarification provided in modelling appendix Clarification is provided in the report but will be reviewed:</p> <ul style="list-style-type: none"> MVT capacity adjustment – based on AIMSUN and SIDRA modelling of Wellington Rd / Kilbirnie Crescent intersection Hataitai / Bus Tunnel – based on benchmarking against current and future spreadsheet modelling <p>Second spine – adjustment to ensure consistency with spreadsheet models</p>	Noted. Assumed that the clarification includes details of the validation processes adopted for changes to the models.	Appendix updated
In general, the text uses the future tense, which implies that these modifications have yet to be made. It is important to clarify if this is the case, or if the results presented in the PPOR have taken these changes into account. It would also be helpful to include statements clarifying the materiality of changes to travel demand made recently and the implications for each of the four programme options.	<p>Clarification provided in modelling appendix</p> <p>Changes have been made to the report.</p> <p>Materiality of changes have been noted - in general they are small changes in the context of a transformational programme</p>	Noted.	Appendix updated
For active modes, the report states changes have been made by considering additional information about the nature of planned development along the corridors. Is it now assumed that there will be additional road space available for dedicated cycle lanes across more sections of the transport network? Has the cost of these changes (property acquisition?) been reflected in the economic assessment?	<p>Clarification provided in modelling appendix</p> <p>Active mode assumptions have been developed at a very high level, reflecting uncertainty around the scale of potential increases in walking / cycling</p> <p>Cost of changes associated with additional road space for cycling will be captured as part of the City Streets and Transformational programme costing</p>	Noted. For consistency, the cost of changes for additional road space (and any other changes) should be reflected in the programme cost estimates for the PPOR, which sets out total programme costs (including City Streets).	Appendix updated

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How has the different land use assumptions been used to develop the adjustments for the Active Travel Sector to Sector Mode Specific Constants shown in Table 1?	<p>Clarification provided in modelling appendix</p> <p>The active mode adjustments have been developed at a high level and are common across the different options.</p> <p>The latest version of the modelling report outlines the scenario based approach that has been taken – with three scenarios corresponding to different assumptions around working from home and active mode uptake – reflecting future uncertainty.</p> <p>The modelling assumes a higher uptake for active modes under an intensified scenarios as more people would live and work within work / cycling distance, and it is assumed that the active mode infrastructure improvements would be of a higher standard and more comprehensive under an intensified land use scenario</p>	Noted.	Appendix updated
What is the basis for the amended car ownership rate adjustments in Table 2?	<p>Clarification provided in modelling appendix</p> <p>HTS analysis and benchmarking against current car ownership in areas of the CBD – this is now clarified in the report</p>	Noted.	Appendix updated
Table 3 illustrates changes to population and employment assumptions for the intensified land use scenario. These need to be checked for consistency with work currently underway on the urban development summary. Table 3 also suggests that population and employment growth in the eastern suburbs has significantly reduced but has increased in Island Bay and CBD / Te Aro. Does this change reflect the intensified land use anticipated with light rail (as distinct from BRT)? if not what factor or factors have influenced this change?	<p>Clarification provided in modelling appendix</p> <p>Yes, the revised assumptions reflect a scenario that assumes LRT to the south and enhanced bus to the east.</p> <p>Options 2, 3 or 4 would likely deliver different UD outcomes – commentary has been added in the report to provide words to this effect, however more detailed work is required for the DBC to develop more robust scenarios for the preferred option and any other options that might be tested.</p>	Noted. Agree with proposed approach, noting that scoping of UD work for the DBC will need to be carefully developed to ensure it captures the key factors (and necessary decisions) related to how it would be delivered.	Appendix updated
Section 3 concludes with a statement about PT investment which needs to be amended for clarity. MRT could stimulate faster population and economic growth on the MRT corridor but would need to be taken together with other factors that will influence the speed of intensification, including national and regional economic factors.	<p>Clarification provided in modelling appendix</p> <p>Agreed and re-worded</p>	Noted.	Appendix updated
Section 3 would benefit from a summary about which modelling assumptions will require legislative or policy changes, so that the decision makers understand the implications arising from the modelling outputs.	None of the assumptions require legislative change per se (but I am not an expert on what change might be required to enable UD)	Not a key issue for the PPOR but will be an important point for the management case in the final IBC.	To be done in IBC

Peer Review comment	Report team response	Peer Reviewer response 24 May 2022	Status
The modelling approach outlined in Section 4 needs clarification. Why does Step 2 involve the AIMSUN model again after step one? What is the feedback from the strategic model? When will step three be undertaken?	Clarification provided in modelling appendix We have really focussed on Step 2 (AIMSUN using WTSM demand derived from PPOR model runs) – Step 1 was a stop-gap measure, all reporting has been done on Step 2 so have removed reference to Step 1 to make things clearer	Noted.	Appendix updated
Section 5 highlights the distinction between strategic and AIMSUN (microsimulation) modelling. If the purpose of microsimulation is to make the strategic model more faithfully reflect the difference between the options, this should be expressly stated.	Clarification provided in modelling appendix Section 4 updated accordingly	Noted.	Appendix updated
Table 4 summarises which of the output metrics from the models have been used in the programme option assessment. Interesting to note that pedestrian level of service is not considered a differentiator between the programme options.	Noted – pedestrian provision was considered to be sufficiently similar across all options – therefore there are no differences in scoring	Noted.	No change to appendix
Section 6 covers the key points which emerged from the most recent modelling. This is helpful as the full results presented in the appendices A and B are very long. It would be helpful to structure the discussion in the order of the attributes summarised in table 4.	Clarification provided in modelling appendix Have re-ordered accordingly	Noted.	Appendix updated
The document needs a description of the do minimum and / or reference cases used in the transport modelling. Decision makers need to understand what assumptions have been made about the do minimum, including other parts of the LGWM Programme, the regional rail package, travel demand interventions and other significant interventions which are committed or planned that may have a significant impact on the performance of the transport system.	Clarification provided in modelling appendix This detail is provided in the IBC; however a summary is provided in Section 3. In brief, the DM does not assume any significant transport investment over and above what is currently funded. It does not assume any rail improvements to the north	Noted. Section 3 of the draft modelling appendix sets out modifications to the modelling approach but does not summarise the do minimum.	Appendix updated
The Summary Table of Key Metrics on pages 21 and 22 (table number needed) highlights the key transport differentiators between Options 1 and 4. The discussion should be expanded, if only in a qualitative sense, to highlight key differentiators between these two options AND between options 2 and 3, so that the merits of ALL FOUR programme options can be understood.	Clarification provided in modelling appendix	Noted.	Appendix updated

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LGWM Carbon Analysis Update for May 2022			
Page 4 paragraphs 2 and 3 cite regional and City Council targets for reduced emissions. Wellington City is committed to a 57% reduction in emissions by 2030. These targets suggest that programme options that will significantly reduce emissions quickly would be preferred.	Agree in part This is true for WCC – no evidence it is for Waka Kotahi. No change proposed.	Noted.	No change in Technical Report
Figure 2 shows the predicted rate of carbon emission reductions for light vehicles. It is slightly misleading in that half of the X axis relates to historic levels (pre 2022) when electric vehicles were not generally available. It may be helpful to relate this figure back to the VKT metrics in Figure 1, to get a better appreciation of the scale of the problem. It is also important to include the references for this information.	Agree in part. The figure is intended to show that technological change – both EVs and improving efficiency of ICEs – has flattened our emissions per km, but that on its own, its not enough. I think that makes the earlier years important. Agree on references - noted	Noted.	No change in Technical Report
Figures 4 and 5 show the impact of programme options on carbon reduction. Option 4 is shown to reduce emissions more than Option 1 and more quickly, although the difference appears to be minor in the context of regional emissions. Table 2 confirms this summary although it isn't clear what assumptions have been used regarding the timeframe for land use intensification. This is a critical conclusion, considering that this is the highest weighted attribute in the programme objectives.	Agree in part Option 4 is better under the core land use assumptions – but not under the intensified assumptions. Should we be more explicit that at the rolled up 'carbon reduction and mode shift' level that option 4 does not perform as well as Options 1 and 2? This is not a conclusion I necessarily expected to be discussed at the "carbon" level, but at the overall level. The assumptions for the urban intensification are very clear in the modelling report (and the urban development sections) but we can cross-reference these.	Figures 4 and 5 don't differentiate between options with regard to performance under the intensified land use scenario (option performance for the intensified land use scenario is "greyed" out). The statement that Option 4 does NOT perform better than other options under this scenario is important. The narrative should highlight this point.	Technical Report updated, as per my comment above on page 13.
The Comparative Cities Analysis on page 14 highlights the potential for change in locations with high non-car mode share. It isn't clear from the narrative how the introduction of a specific MRT intervention contributed to the overall results, although presumably it would be a significant factor.	No action required While I don't disagree with this point, the Comparative Cities work has not sought to attribute cause and effect. I'm happy for people to come to this conclusion themselves – I don't think we can baldly state it though.	Noted.	No change in Technical Report
The report conclusion on page 15 is that the main difference between the options relates to embodied CO2 emissions from construction. Option 1 involves more construction, therefore will involve more construction emissions. However, the narrative explains that in the longer run the operational emissions from Option 1 would be less than Option 4, assuming it attracts greater patronage. How has this statement been taken regarding the overall assessment of option performance informing the recommendation for a preferred programme option?	Agree. I'm not sure I can answer the question. My answer would be that this work shows that under the core land use assumptions, none of the options deliver much more than the other, but that options 1 / 2 have substantially more embodied carbon. I think that this statement then flows into the wider assessment that balances between all the objectives – not just carbon and mode shift – and has resulted in Option 1 being preferred.	The earlier response about how the carbon emissions and mode share objective was scored answers this point.	No change in Technical Report

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LGWM Strategic CBA Review Annex – draft version 0.3 4 April 2022			
The comments below are of a general nature related to how they inform the PPOR and the decision about a preferred programme.			
The final paragraph of section 3.2 discusses impacts explored by EY and where some impacts have been excluded from “core” CBA results. It isn’t clear what this exclusion relates to; presumably standard Waka Kotahi procedures for assessment of the economic performance of each programme option have been adopted?	<p>Clarification to be provided in Technical Report</p> <p>“Their exclusion...” is perhaps not the correct terminology – they haven’t been identified, calculated and then not included. They’re benefits or classes of benefits that are bespoke / complex, and so wouldn’t normally be calculated at the IBC stage. The intention is to forecast their consideration at DBC.</p> <p>Draft text: “They have not been calculated at the IBC stage because their calculation requires bespoke analysis that is of a scope and magnitude that it is best quantified once detailed design at the DBC stage has decreased programme uncertainty and risk. The identification of these benefits at IBC stage is intended to provide confidence that a range of benefits commensurate with the scale of the programme have been identified conceptually, those able to be calculated at IBC stage have been considered, and those most appropriately considered at DBC stage will be assessed if the programme advances.”</p>	The peer review comment was directed towards understanding WHAT impacts have been excluded at this stage. A simple statement of what “they” are would suffice.	Change made in Technical Report
Section 4 para 3 states that Option 3 did not have an economic evaluation because it scored lowest against the programme objectives in the MCA. Decision makers may want to understand the economic performance of this option if they want to consider alternatives to the recommendation in the PPOR. Is it possible to provide a commentary on the likely range of BCRs for this option?	<p>Clarification to be provided in Technical Report</p> <p>I’m unkeen to be forced into this kind of speculation. Can we respond to this the other way round:</p> <p>“Option 3 was not progressed to formal economic evaluation through CBA. As Programme transport modelling results have, in general, been aligned with the findings of MCA assessment, we have no reason to believe that an economic evaluation of Option 3 would identify material benefits over Options 1, 2 and 4. Similarly, as the cost of Option 3 is not significantly lower, it is unlikely to exceed the BCR range for Option 1.”</p>	Noted. The final IBC will need to address this point.	Change made in Technical Report To be done in IBC
Table 4.1 highlights the general parameters and assumptions in the CBA. The project opening year is stated to be 2031. Is this assumption reasonable for all four programmes?	<p>I think this is an averaged timeframe assumption that recognises that the various components of the programme will open across the entire construction period.</p> <p>Further explanation to be provided</p>	Noted.	No change made in Technical Report

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In table 4.2 Option 2 it states that for the high land use scenario an adjustment was made to reflect reduced potential for stimulating urban intensification compared to Option 1. What adjustment was made and how was it determined? There is also a comment that the outputs for the HLU scenario have been revised downwards by 20%. Specifically which outputs are referred to?	Further clarification to be provided. Option 1 was the only scenario that was fully tested with the high land use scenario. Option 2 was tested using a sensitivity test assumption that BRT would only be able to achieve 80% of the urban development of LRT (hence the 20% reduction). Option 4 was tested using a sensitivity test assumption that the eastern elements in option 1 contribute 7% of the benefits (on the basis that they contribute to 7% of the uplift) This is likely to be a conservative assumption as option 4 does not provide the level of PT Capacity to accommodate 93% of the full demand	Noted. This narrative should be included in the final IBC.	To be done in IBC
Table 4.3 outlines the economic performance of three programme options. The BCR values excluding agglomeration show the options are broadly similar to values derived in earlier programme analysis in the range of 0.46 to 0.53. Agglomeration values to add significantly to these values. Do the BCRs quoted in the main report INCLUDE forecast land value uplifts for each option? If not, how will this factor be considered?	Table 4.3 does not include forecast land value uplift. Advice from Deloitte economists during the development of economic analysis to August 2021 ("Programme Report") identifies the risk of double-counting economic benefits if both agglomeration and land value uplift are factored into the economic analysis.	Noted.	Clarification provided in Technical Report
The assessed safety benefits in table 4.3 appear to be low. Given that safety is one of the five core programme objectives, this is disappointing: currently they represent less than 5% of the total benefit stream.	No action required although further safety analysis will be undertaken as part of the DBC	Noted.	To be done in DBC
Tables 4.3 and 4.4 set out the preliminary CBA results for the core and high land use scenario. Do the costs include funding that would be required to service the higher land use scenario? This could be an important point, although the infrastructure costs for the higher land use scenario may come from separate funding. The agglomeration benefits are high by comparison with other benefit streams, so it is important to understand what they represent. It may also use be useful to explain the health benefits for additional walking trips as these benefits are also high.	<p>Clarification to be provided in Technical Report</p> <p>No attempt has been made to quantify costs associated with enhancements to other infrastructure or to ensuring the delivery of additional housing. This could be noted in the report as something that will be examined in more detail in the DBC.</p> <p>Proposed text: Examining the detail of the CBA reveals a substantial increase in health benefits for users of active modes of transport. Walking and cycling benefits are distributed across the city but concentrate in and around the CBD where pedestrians and cyclists gain significantly improved infrastructure, leading to greater demand. The high land use scenario also introduces a noticeable additional increase in health benefits for pedestrians and cyclists from the core land use scenario.</p>	Noted. This point will need to be highlighted in the final IBC, as the investment story could be deemed deficient if the recommendation is contingent on an uncommitted / unfunded separate UD programme.	Change made in Technical Report.

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Section 6.1 outlines the importance of the do minimum. It is not clear what has been agreed to be the do minimum case (also see comment related to the modelling report). Have the do minimum and the reference case previously defined (2020) been amended for the latest analysis?	No action required The do minimum remains as previously defined - Section 6.1 identifies additional work in the DBC to account for the limitations of the Do Min in such a long programme of projects as contained in LGWM.	Noted. Peer reviewer has not had access to a recent document which defines the do minimum case.	Minor clarification made in Technical Report
Section 6.2 covers high population growth in New Zealand and how historic forecasts underestimated the rate of population growth. It isn't clear what the purpose of this text is other than to highlight to decision's makers something which may underpin population growth and by extension, patronage forecasts.	No action required That's the point.	Noted.	Minor clarification made in Technical Report
Section 6.4 discusses wider economic benefits (WEBS), but the narrative is unclear about what assessment was made for the programme options. Where uplifted land values included in the assessment? These points need to be clarified for the decision makers.	Clarification to be provided in PPOR	Noted.	Noted
Section 6.4.1 argues in favour of adopting dynamic land use analysis to assess the benefits of the LGWM Programme. In principle, this is a good approach, given the scale and potential impact of a transport intervention of this scale in the region. However as noted in the report, this would take time to complete. For an IBC the approach adopted is pragmatic and gives a reasonable forecast of the land use and transport interactions to allow a comparison of the relative performance of each of the four programme options.	Noted.	Noted.	Noted.
Sections 7 and 8 outline how the economic assessment could be improved. These ideas could be useful, but they are unlikely to provide additional information to help distinguish between the four options presented in the PPPOR within a short timeframe. Therefore, it is concluded that subsequent stages of the business case development should carefully consider these and other potential enhancements to the economic assessment methodology, which would need to be agreed with potential investors, Programme Partners and key stakeholders before progressing, given the complexity and effort required.	Agreed.	Noted.	Noted

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Section 9 discusses the completed sensitivity analysis in the economic assessment and concludes that, the mode specific preferences, inflation forecasts and population projections are reasonably sound for the purposes of comparing the programme options. Section 9.4 discusses some of the technicalities related to the transport modelling system, but it isn't quite clear what is critical with respect to the difference between the Wellington and Auckland models. A separate response about this point should be sought from the transport modelling team as to whether (or not) this issue is material to the results of this evaluation.	Clarification to be provided in appendix	Noted.	Clarification made in Technical Report

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Conclusions and Recommendations			
<p>The critical parameters that inform the choice of preferred programme option start from the scale and location of residential development and employment opportunities within the city. The decision around the preferred programme is, therefore, a decision about what the future urban form of Wellington will be, all as part of bringing to fruition the vision of “a great harbour city”.</p> <p>The PPOR currently concludes that “<i>The preferred option that should be progressed to detailed business case is a High-Capacity Mass Transit solution with a new tunnel through Mt Victoria and improvements at the Basin Reserve. This is consistent with Option 1 but is recognises that BRT could provide similar outcomes to LRT if designed properly.</i>”</p> <p>Based on the considerable volume of data and assessments to date, this conclusion is understandable, given the level of knowledge and confidence around several key questions, including:</p> <ul style="list-style-type: none"> • Acceptance that a significantly intensified land use scenario for Wellington City is appropriate, realistic and achievable (in terms of community acceptance, consenting, demand and funding). • Appreciation of the risks related to the forecast patronage for the intensified land use scenario (including mode shift, integration with the regional transport network, service quality, etc)) • Understanding of the potential for BRT to adequately serve an intensified land use scenario <p>However, it is the conclusion of this Peer Review, that given the current uncertainty around the scale of land use intensification and relatively small differences between the performance of options in the MCA, further work will be required in the DBC to confirm a preferred programme option. This work should include identifying how the preferred option will respond to the key questions above.</p>	<p>Agreed.</p> <p>All programme options should be tested again during the DBC once some of the key questions are answered.</p> <p>We can add this proposal into the PPOR</p> <p>High priority</p>	<p>Noted.</p>	<p>Report updated</p>

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As the main reference document, the PPOR needs to provide clear advice about the key factors and determinants for deciding a preferred option. Urban development, consentability, funding, delivery timeframe and risk are all factors that should feature in this report, alongside the comprehensive assessment of transport system performance for each of the options.	The report provides clear advice about the factors that were determined to be important to decision makers. Quantification of outcomes for all options was not possible due to time, land use assumptions and modelling constraints. No change High priority	As noted above, these points highlight the need for a comprehensive risk assessment and narrative in the final IBC.	To be done in IBC
The narrative should discuss the investment objectives which flow from the problem statements described early in the report. Investment in transport system infrastructure should be based on desired outcomes; a key omission from the document is a description of the outcomes sought from the LGWM Programme. This omission should be rectified as quickly as possible and should be included in the comparison of programme option performance.	Can add more discussion around Programme Objectives and how they were addressed through the MCA High priority.	Noted.	Report updated
Carbon reduction is the highest weighted objective of the LGWM Programme and the narrative states that any of the options would achieve a small reduction in total transport carbon emissions in Wellington. Therefore, other interventions should be considered, which may have more impact than the programme options presented here, either alone or working in combination with the options presented here. This will be an important point for decision makers.	Agreed, but outside the scope of this report. No change High priority.	Should be included in the final IBC.	To be done in IBC
The report needs to include a holistic assessment of programme risk. This topic should be given careful consideration in determining a preferred programme, given the scale, complexity and potential consequences of getting it wrong. The key programme risks could be expected to include: <ul style="list-style-type: none"> Urban Development and land use scenario - is it realistic, is it viable? changing Government Policy over the next several years during which the programme will be implemented cost escalation patronage forecasting technological developments failing to meet programme objectives 	Already a risk section. Of these noted by peer reviewer, only patronage forecasting and failing to meet project objectives are the two that are not discussed. Failing to meet programme objectives would be due to one or more other risks anyway. Can add more on patronage forecasting risk. High priority	See previous comments about risk assessment.	To be done in IBC

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Each of these risks should be quantified as far as possible, in terms of probability and potential consequences to schedule and cost. Each risk should also have an outline mitigation strategy, so that decision makers can be confident that key risks can be appropriately managed through the development process.	Quantification of these risks is too detailed for this report and may not be possible with existing information. Would better be in the IBC or DBC. No change High priority	See previous comments about risk assessment.	To be done in IBC

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