Before the Independent Hearings Panel

At Waimakariri District Council

Under	Part 6 of Schedule 1 of the Resource Management Act
In the matter of	Variation 1 to the Proposed Waimakariri District Plan
Between	Various submitters
And	**Waimakariri District Council**
	Respondent

Council Officer's Final Right of Reply on Variation 1

INTRODUCTION

1. My full name is Peter Gordon Wilson. I am employed as a Principal Policy Planner for the Waimakariri District Council.

2. The purpose of this document is to provide a Final Right of Reply on Variation 1 matters.

3. I have had the benefit of hearing evidence presented at hearing stream 7B on Variation 1, in previous hearings that had a Variation 1 component, and in the context of my recommendations on medium density residential zone matters received in the context of the PDP (hearing 7A). Where I have relied on or referred to this evidence in my response to questions, I have recorded this in my response.

4. I am responding to Minute 41 which set out questions for myself (pg 5 of this memorandum).

5. The primary change from my s42A recommendations is in response to additional sunlight and shading modelling undertaken by myself, and reviewed by Mr Graeme McIndoe to amend the proposed qualifying matter for winter sunlight access to retain the MDRS building height of 11m+1m – i.e. three storeys.

6. However I also recommend, in response to the shading modelling, that instead of a two-storey height limit, that the operative district plan recession plane and height in relation to boundary provisions apply, as this envelope will minimise additional shading on adjacent properties to the smallest possible extent, whilst enabling the maximum maximum possible extent of the MDRS.

7. This also retains consistency with other Councils who are intending to keep the 11m height aspect of the MDRS.

APPENDIX B

8. I have provided an Appendix B which outlines my response to submissions that were analysed, but not recorded in my s42A on Variation 1. I consider that the Panel would benefit from a combined Appendix B showing the 's42A version' and the 'missing version', however there was no time with the 29 November 2024 deadline to produce this. I can provide it by Friday 6 December.

9. I am authorised to provide this evidence on behalf of the District Council.

Date:

28/11/2024

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1. I set out the questions asked of myself as reporting officer in the format as they were asked of me below.

Question	Comments
In respect to the matters traversed in Appendix E to the section 42A report, please provide quantitative data and a summary of that data which clearly demonstrates the loss of sunlight (measured in hours) that would occur to properties, as well as to nominal height living room windows	This is provided in Appendix C, based on the following scenarios: • BASELINE - The operative district plan envelope (two storeys, with a 2.5m height in relation to boundary and compass angle based recession planes, and a 8m height limit) • SCENARIO A – the MDRS, at two storeys (8m+1m) • SCENARIO B – the operative district plan height in relation to boundary and recession planes, but at three stories or 11m+1m. • SCENARIO C – the Christchurch City PC14 envelope (11m+1m, with 3m height in relation to boundary and 55 degree recession planes) • SCENARIO D – the full MDRS, at 11m+1m with no adjustment to recession planes.

Summary of Appendix C	a) The additional analysis shows that that the full MDRS provisions, consisting of 11m+1m height, 4m height in relation to boundary, and 60 degree recession planes result in a substantial loss of sunlight to adjacent properties on ground and first floors, even when these properties may also be built to an MDRS typology. b) I consider that the additional analysis confirms my recommendations in my s42A report to apply a qualifying matter to ensure winter sunlight access to neighbouring properties. c) I consider my additional analysis has enabled a further consideration of the nature of such a qualifying matter, and I now consider it is not necessary to impose a blanket restriction on height. Instead, the application of the operative district plan recession plan (of 2.5m height in relation to boundary, and compass orientation based recession plane angles) is a more appropriate response to ensuring winter sunlight access for neighbouring properties, whilst still retaining the most enabling components of the MDRS. Three storeys (or more) can still be achieved using the operative district plan recession planes, whilst minimising the loss of sunlight to adjacent properties. d) I note the examples as set out in my updated Appendix 1 whereby all scenarios of development on neighbouring properties result in a loss of sunlight access in winter. Given that the sun is low and days are short in winter, all forms of development next door result in some loss of sun. The magnitude of sunlight loss increases with the typology modelled, for instance, the highest loss of sunlight occurs with Scenario D (a full three storey MDRS of 11m+1m), on the northern and eastern aspects of an adjacent building. Under a full MDRS scenario, any parts of a site that still receive sunlight (noting that southern aspects don't get any sun anyway), will only receive between 1.7 to 2.2 hours of direct sunlight, which is well below what Mr McIndoe and Kainga Ora recommend as a standard. e) I note that whilst the effect is greatest for ground floor rooms, with aspects dropping to less than 1.5 hours of direct sunlight it still occurs on first floor rooms, with these dropping to between 2.4 and 2.9 hours of direct sunlight for northern

	and western aspects. Only the northern aspect gets over 3 hours of sunlight (3.4 hours).
Having provided this data, please provide a qualitative evaluation, in the form of an updated assessment of the need for the qualifying matter, taking into particular consideration the expert evidence of Mr McIndoe and Ms Rennie of what is considered to be an acceptable amount of sunlight and the Kainga Ora policy of a minimum of three hours between 9am and 3pm in winter months, and objective 4 and policy 6 of the NPSUD in respect to amenity values changing over time, etc.	a) In responding to this, I note the discussion that occurred at hearing stream 7B on the matter, and the broad agreement between Mr McIndoe and Kainga Ora appear on a standard for sunlight access of being at least three hours in winter months. b) I also note what I consider to be an important distinction in how a developer, such as Kainga Ora, may design and build dwellings on a site to achieve sufficient winter sunlight access, and what another developer may choose to do on an adjacent site. Under the MDRS permitted activity rules, Kainga Ora, or any other developer, have no control on what might occur next door. c) Kainga Ora (or any other developer) may design and build dwellings that are sited to achieve adequate winter sunlight access, but which can then be shaded by developments next door. In the absence of a qualifying matter, Kainga Ora would have no control over this, and their dwellings could be similarly shaded. d) This same scenario occurs with existing buildings. They will likely be designed to maximise sunlight access, with north or east facing living spaces. This means that any developer building next door is able to, under the MDRS, remove some or all

	of that sun through the erection of a new dwelling at two or three storeys according to the full MDRS. Given that it is often only one, or at maximum, two aspects of a building (usually north and east facing windows) that receive winter sun, the placement of a building next door can have an outsized impact on the neighbouring property if it blocks that viewshaft to the sun. e) Thus, there is a direct conflict between the stated desire of Kainga Ora, which I do not question, to be a 'good' developer, and build dwellings that provide winter sunlight access, and what may happen next door, over which they have no control. f) There may be a conflation between the concerns, and opposition, that Kainga Ora routinely receive to their community and social housing proposals, and the more objective measurement of sunlight and shading in response to built form. I can understand Kainga Ora's concern, if a qualifying matter that requires a consent for three storeys (or above) leads to a consent requirement, then that consent process, may be used to air opposition on matters entirely unrelated to the purposes of ensuring sunlight access to neighbours. I understand how Kainga Ora may perceive such a rule or standard, no matter how carefully it is drafted to avoid this concern. g) I thus understand the risk of a blanket qualifying matter that limits to two storeys, and I also note, that limiting to two storeys only, whilst applying the full MDRS, still results in a small loss of winter sunlight on neighbouring properties. h) I consider that my task is to recommend an appropriate qualifying matter that keeps the additional loss of winter sunlight to a minimum from MDRS built forms whilst restricting the MDRS only to the extent necessary.

NPSUD consideration	NPSUD questions
	a) The IHP has asked about my considerations of the NPSUD, in particular Objective 4, and Policy 6. *Objective 4: New Zealand's urban environments, including their amenity values, develop and change over time in response to the diverse and changing needs of people, communities, and future generations.* *Policy 6: When making planning decisions that affect urban environments, decision-makers have particular regard to the following matters:* *a) the planned urban built form anticipated by those RMA planning documents that have given effect to this National Policy Statement* *b) that the planned urban built form in those RMA planning documents may involve significant changes to an area, and those changes:* *c) the benefits of urban development that are consistent with well-functioning urban environments (as described in Policy 1) any relevant contribution that will be made to meeting the requirements of this National Policy Statement to provide or realise development capacity the likely current and future effects of climate change.* *d)* *i. may detract from amenity values appreciated by some people but improve amenity values appreciated by other people, communities, and future generations, including by providing increased and varied housing densities and types; and* *e) are not, of themselves, an adverse effect*

	b) I consider that Objective 4 relates primarily to the subjective components of changing communities, and how change in urban environments may be perceived as negatively affecting amenity. Objective 4, whilst not preventing considerations of changes that might detrimentally affect amenity, does in my consideration place higher weight on the future urban form and character than present urban form and character. This means that change of built form in urban areas should be considered as a baseline. This includes the changes to typology as envisaged by the MDRS. c) Objective 4, and Policy 6 are to ensure that change in urban environments is not considered by planning instruments to be a negative effect, and as such, anticipated by those documents. I am supportive of such change in urban environments, and I note that to date, my recommendations for a sunlight and shading qualifying matter have not been based on amenity considerations. Change in built form will occur in urban areas. d) I do not consider that the issue of winter sunlight access falls into the category of amenity. I am supportive of the need and policy requirements to be enabling in respect of urban intensification. Instead, access to sunlight, and conversely, the degree of shading is an objective, scientific measure, that does not rely on the more subjective consideration of "amenity" to assess. It can be neutrally and objectively assessed for built form scenarios, as I have undertaken. Furthermore, all evidence before the IHP appears to agree on an objective standard for a minimum level of direct sunlight access in winter, that of at least 3 hours. That a minimum standard exists, or is desirable to achieve, does not appear to be in question. I contrast this with the opinions on amenity, that are often irreconcilable. e) I note that the degree of change anticipated by Objective 4 and Policy 6 is still constrained by the overall requirement to achieve "benefits of urban development that are consistent with well-functioning urban environments" (c). Thus, I consider that the constraint in the NPSUD on considering future change as a negative is still proscribed by the overall well-functioning urban environment

	test as set out in Objective 1 and Policy 1, provided that is well demonstrated by evidence and other relevant tests (such as the s77L qualifying matter considerations). f) Objective 1 requires well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future. I consider access to winter sunlight as a matter of health, and potentially also safety. It is more fundamental than the amenity considerations in objective 4, and as it can be objectively assessed and modelled, it is not treated as matter of amenity. g) I consider that a requirement to ensure sufficient access to winter sunlight is best described as a matter of health and safety under Objective 1, provided that any proposed qualifying matter in turn only limits the application of the MDRS to the minimum extent possible, to still ensure that urban intensification can occur. h) So, in conclusion to the IHP's question I do not consider Objective 4 and Policy 6 to be of substantial weight in assessing the proposed qualifying matter. If I was to be proposing a qualifying matter running amenity arguments that limited all or most change in built form, based on visual appearance, or general disturbance to neighbours, or an opposition to change, then yes, Objective 4 and Policy 6 prevent such arguments. However, that is not the case with the winter sunlight issue. I am proposing a qualifying matter in response to submissions, and detailed evidence, that seeks to only limit the MDRS to the minimum extent necessary to minimise effects on winter sunlight access on neighbouring properties. i) I also note that in considering the winter sunlight matter, I considered 'like for like' scenarios, of the effects of neighbouring MDRS style typologies on other MDRS typologies. As direct sunlight through window height is an objective measure, it is largely independent of built form changes. j) I consider that the more appropriate tests are as set out in s77L for s77I(j) qualifying matters, which in turn require a full assessment against the NPSUD (s77L(b)). I have undertaken such an assessment as part of my s32AA analysis.

Please address the appropriateness of having a sunlight and shading qualifying matter applying to the height standard of the MDRS within Waimakariri, when the adjoining districts with similar topography will apply the MDRS height standard (noting the PC14 recommendation report is at recommendation stage), and noting Mr McIndoe's advice that there are no physical differences between the districts in respect to the effects of shading.	On the basis of the additional modelling, I am no longer recommending a qualifying matter that solely limits height, thus, noting the differing statuses of the Christchurch and Selwyn District Plans, there is no inconsistency as regards to height. In regards to overall consistency, I note the following: • My final recommendation is for a qualifying matter that applies the operative district plan height in relation to boundary provisions and recession planes to protect access to winter sunlight, but still enacting the 11m+1m height requirement of the MDRS, as three storeys can be achieved under the operative district plan recession planes on most sites within the district. If there are places it cannot be achieved (my modelling did not identify any), then amalgamation, or boundary adjustments, which are likely to occur with larger subdivisions would create the opportunity anyway. • 11m+1m is not needed for three stories – three stories can be achieved with less height if these locations occur. • The operative district plan thresholds are similar to the MDRS on the northern

	aspects (55 degrees compared with 60 degrees under the MDRS), but more restrictive on the southern aspects (35 degrees as compared with 60 degrees) • However, given the large section sizes in the district, the variety of built form typologies available, the likelihood of amalgamated sections for some types of development, I do not consider that a more restrictive recession plane on southern aspects to protect the winter sun of neighbouring properties to affect the overall requirement under the MDRS to be enabling of three storeys. • I also note that three storeys can be achieved with less than 11m in height of any particular building, although in most places, as I modelled, 11m can be achieved within the operative district plan recession planes. • Selwyn District Council relied, as I understand it, on the MfE modelling, and did not advance a sunlight and shading qualifying matter. • Christchurch proposed a sunlight and shading qualifying matter, but in my consideration, did not undertake a site specific assessment on every site in a relevant residential zone in their district. Also, they did not model the existing sunlight environment based on latitude and terrain, as I did, instead relying more on comparisons with Auckland. The potential shading effect of the Port Hills and Christchurch's more varied topography was not considered, at least, not on a site specific basis. • So whilst consistency between these Districts should be achieved where possible, and I consider is achieved, with my modified recommendations that maintain the intent of the MDRS to enable three storey buildings, the processes and evidential basis on which the respective IHPs reached their recommendations in respect of qualifying matters, and their IPIs in general are different. I consider that the IHP should assess the qualifying matter on the basis of the evidence before it. • In any case, with the amended qualifying matter, and also noting the current

	lack of demand and assessed non-feasibility of three storey development in the district, the slight differences in recession planes and height in relation to boundary between WDC and CCC/SDC would be minor in consequence of development outcomes available, albeit, having a substantial positive effect on neighbouring properties.
Please provide the brief that you provided to Mr McIndoe to undertake his evaluation. Did this brief take into account the potential for subdivision of larger sites in the MDRZ, and then their subsequent development, such that the larger dwellings he considered would be produced may in fact be smaller, and on smaller lots?	Mr McIndoe has provided this as part of his peer review of my subsequent modelling at Appendix D. His sunlight and shading studies produced consolidated built forms on sites in the District. I modelled both a detached and consolidated built form, of up to three sites per existing allotment. In terms of an effect on sunlight and shading outcomes on neighbouring properties, the outcome is the same regardless of typology. It is height, and in some cases, height in relation to boundary that produces negative sunlight and shading outcomes on next door properties, not the number of dwellings. A single large dwelling next door built to the full MDRS heights would produce the same sunlight shading pattern as several smaller ones built to the same height. The width and length of buildings, and the outdoor space between them are not a significant factor in shading. Smaller buildings built to a lower height would produce the same shading outcome as a larger building built to the same height. Shading is primarily a factor of height first, and height in relation to boundary (i.e recession planes and their starting points) second. Waimakariri District latitudes are not high enough for width and length to become a factor, as they might become, further south. I have considered the issue of viewshafts or 'sunshafts', noting that viewshafts are a common approach in larger subdivisions with master plans. A master-planned development would be able to potentially achieve the placement of buildings built to the MDRS standards (and even with greater height) whilst ensuring greater access to winter sunlight for surrounding and neighbouring buildings at a lower height. However,

	these are three or more unit developments and would occur in a consenting scenario where sunlight and shading is a consideration of consent.
Ms Dale and Ms Rennie for Kainga Ora have identified that there are no objectives or policies to support your recommended sunlight and shading qualifying matter. Please address this matter, along with the scope to include any recommended new objectives and policies that might be required.	I am conscious of my answer to a similar question posed by the IHP to me prior to the 7B hearing, as reproduced below: *Please advise where the RMA enables the MDRS objectives and policies to be amended as you recommend, and if it does allow amendment, what the relevant criteria are for such an amendment to occur. Please also consider whether this amendment is necessary given RESZ-P15. You may wish to seek legal advice in responding to this question.* My answer to the previous question remains as I set out on pg 12 of my response to those questions (https://www.waimakariri.govt.nz/__data/assets/pdf_file/0022/167251/STREAM-7B-V1-IHP-questions-for-Hearing-Stream-7B-answers-FINAL-.pdf) • If District Plans can't amend the MDRS objectives and policies, except for minor grammatical changes, then the scenario arises where qualifying matters implemented under s77J and I, RMA cannot be applied. This would be a case of the compulsory MDRS objectives and policies trumping the law. The s77 tests for qualifying matters only require the assessment of the qualifying matter against the NPSUD tests. I do not consider to be the case, Parliament has set out the requirements for consideration of qualifying matters. • Secondly, and more importantly for me, compulsory policy 2, cl 6(2)(b), sch 3A, RMA, which V1 implements as RESZ-P15, already provides blanket policy coverage for qualifying matters. *"apply the MDRS across all relevant residential zones in the district plan except in circumstances where a qualifying matter is relevant (including matters of significance such as historic heritage and the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga)"*.

	• Thus, I consider there is already scope within policies introduced by Variation 1 that cover qualifying matters, including new qualifying matters. This is under a compulsory policy, as it is clear to me that Parliament intended for there to be coverage and consideration of both existing and new qualifying matters in the framework of IPIs. • So I consider that Kainga Ora is wrong in stating that there is no objective or policy for the proposed sunlight and shading qualifying matter – it is already within RESZ-P15. In terms of objective support, I consider that the qualifying matter is consistent with MRZ-O1, which implements the compulsory MDRS objectives. • The amended qualifying matter enables three storey buildings, and is consistent with the "neighbourhood's planned urban built character" as set out in the MDRS. • If the Panel considers that the compulsory MDRS objectives and policies cannot be amended (which I largely agree with), but that then every qualifying matter requires a bespoke objective and policy itself, then this would be creating a 'catch-22' or tautological interpretation scenario that prevents Parliament's intent of qualifying matters from being considered and applied on their merits. The other qualifying matters, including existing qualifying matters, proposed under V1 would then have to be treated in the the same way, potentially resulting in no consideration of natural hazards, historic heritage, and setbacks from strategic and arterial roads. This may in turn negatively affect Kainga Ora's stated desires for housing outcomes.
Having provided this data, please provide a qualitative evaluation, in the form of an updated assessment of the need for the qualifying matter, taking into particular consideration the expert evidence of Mr	In responding to this, I note the discussion that occurred at hearing stream 7B on the matter, and the broad agreement between Mr McIndoe and Kainga Ora appear on a standard for sunlight access of being at least three hours in winter months. a) I also note what I consider to be an important distinction in how a developer,

McIndoe and Ms Rennie of what is considered to be an acceptable amount of sunlight and the Kainga Ora policy of a minimum of three hours between 9am and 3pm in winter months, and objective 4 and policy 6 of the NPSUD in respect to amenity values changing over time, etc.	such as Kainga Ora, may design and build dwellings on a site to achieve sufficient winter sunlight access, and what another developer may choose to do on an adjacent site. Under the MDRS permitted activity rules, Kainga Ora, or any other developer, have no control on what might occur next door. b) Kainga Ora (or any other developer) may design and build dwellings that are sited to achieve adequate winter sunlight access, but which can then be shaded by developments next door. In the absence of a qualifying matter, Kainga Ora would have no control over this, and their dwellings could be similarly shaded. c) This same scenario occurs with existing buildings. They will likely be designed to maximise sunlight access, with north or east facing living spaces. This means that any developer building next door is able to, under the MDRS, remove some or all of that sun through the erection of a new dwelling at two or three storeys according to the full MDRS. Given that it is often only one, or at maximum, two aspects of a building (usually north and east facing windows) that receive winter sun, the placement of a building next door can have an outsized impact on the neighbouring property if it blocks that viewshaft to the sun. d) Thus, there is a direct conflict between the stated desire of Kainga Ora, which I do not question, to be a 'good' developer, and build dwellings that provide winter sunlight access, and what may happen next door, over which they have no control. e) There may be a conflation between the concerns, and opposition, that Kainga Ora routinely receive to their community and social housing proposals, and the more objective measurement of sunlight and shading in response to built form. I can understand Kainga Ora's concern, if a qualifying matter that requires a consent for three storeys (or above) leads to a consent requirement, then that consent process, may be used to air opposition on matters entirely unrelated to the purposes of ensuring sunlight access to neighbours. I understand how Kainga Ora may perceive such a rule or standard, no matter how carefully it is drafted to avoid this concern.

	f) I thus understand the risk of a blanket qualifying matter that limits to two storeys, and I also note, that limiting to two storeys only, whilst applying the full MDRS, still results in a small loss of winter sunlight on neighbouring properties. g) I consider that my task is to recommend an appropriate qualifying matter that keeps the additional loss of winter sunlight to a minimum from MDRS built forms whilst restricting the MDRS only to the extent necessary. **NPSUD questions** h) The IHP has asked about my considerations of the NPSUD, in particular Objective 4, and Policy 6. *Objective 4: New Zealand's urban environments, including their amenity values, develop and change over time in response to the diverse and changing needs of people, communities, and future generations.* *Policy 6: When making planning decisions that affect urban environments, decision-makers have particular regard to the following matters:* *a) the planned urban built form anticipated by those RMA planning documents that have given effect to this National Policy Statement* *b) that the planned urban built form in those RMA planning documents may involve significant changes to an area, and those changes:* *c) the benefits of urban development that are consistent with well-functioning urban environments (as described in Policy 1) any relevant contribution that will be made to meeting the requirements of this National Policy Statement to provide or realise development capacity the likely current and future effects of climate change.* *d)* *i. may detract from amenity values appreciated by some people but*

	improve amenity values appreciated by other people, communities, and future generations, including by providing increased and varied housing densities and types; and *ii. are not, of themselves, an adverse effect* i) I consider that Objective 4 relates primarily to the subjective components of changing communities, and how change in urban environments may be perceived as negatively affecting amenity. Objective 4, whilst not preventing considerations of changes that might detrimentally affect amenity, does in my consideration place higher weight on the future urban form and character than present urban form and character. This means that change of built form in urban areas should be considered as a baseline. This includes the changes to typology as envisaged by the MDRS. j) Objective 4, and Policy 6 are to ensure that change in urban environments is not considered by planning instruments to be a negative effect, and as such, anticipated by those documents. I am supportive of such change in urban environments, and I note that to date, my recommendations for a sunlight and shading qualifying matter have not been based on amenity considerations. Change in built form will occur in urban areas. k) I do not consider that the issue of winter sunlight access falls into the category of amenity. I am supportive of the need and policy requirements to be enabling in respect of urban intensification. Instead, access to sunlight, and conversely, the degree of shading is an objective, scientific measure, that does not rely on the more subjective consideration of "amenity" to assess. It can be neutrally and objectively assessed for built form scenarios, as I have undertaken. Furthermore, all evidence before the IHP appears to agree on an objective standard for a minimum level of direct sunlight access in winter, that of at least 3 hours. That a minimum standard exists, or is desirable to achieve, does not appear to be in question. I contrast this with the opinions on amenity, that are often irreconcilable.

	l) I note that the degree of change anticipated by Objective 4 and Policy 6 is still constrained by the overall requirement to achieve "benefits of urban development that are consistent with well-functioning urban environments" (c). Thus, I consider that the constraint in the NPSUD on considering future change as a negative is still proscribed by the overall well-functioning urban environment test as set out in Objective 1 and Policy 1, provided that is well demonstrated by evidence and other relevant tests (such as the s77L qualifying matter considerations). m) Objective 1 requires well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future. I consider access to winter sunlight as a matter of health, and potentially also safety. It is more fundamental than the amenity considerations in objective 4, and as it can be objectively assessed and modelled, it is not treated as matter of amenity. n) I consider that a requirement to ensure sufficient access to winter sunlight is best described as a matter of health and safety under Objective 1, provided that any proposed qualifying matter in turn only limits the application of the MDRS to the minimum extent possible, to still ensure that urban intensification can occur. o) So, in conclusion to the IHP's question I do not consider Objective 4 and Policy 6 to be of substantial weight in assessing the proposed qualifying matter. If I was to be proposing a qualifying matter running amenity arguments that limited all or most change in built form, based on visual appearance, or general disturbance to neighbours, or an opposition to change, then yes, Objective 4 and Policy 6 prevent such arguments. However, that is not the case with the winter sunlight issue. I am proposing a qualifying matter in response to submissions, and detailed evidence, that seeks to only limit the MDRS to the minimum extent necessary to minimise effects on winter sunlight access on neighbouring properties. p) I also note that in considering the winter sunlight matter, I considered 'like for like' scenarios, of the effects of neighbouring MDRS style typologies on other

	MDRS typologies. As direct sunlight through window height is an objective measure, it is largely independent of built form changes. q) I consider that the more appropriate tests are as set out in s77L for s77I(j) qualifying matters, which in turn require a full assessment against the NPSUD (s77L(b)). I have undertaken such an assessment as part of my s32AA analysis.
Please directly respond to the Height Variation Control Area sought by Kāinga Ora, and the matter raised by the Panel that Policy 3(d) of the NPS-UD requires building heights and densities of urban form be commensurate with the level of commercial activity and community services in adjacent neighbourhood centre zones, local centre zones and town centre zones. In doing so, please also take into account the recommendations of the section 42A reporting officer for the heights in the relevant commercial zones to be increased.	As I understand it, Kainga Ora sought a Height Variation Control area that originally applied to all of Rangiora, and then have subsequently amended that to be a smaller, but potentially undefined area in and around the Rangiora TCZ, perhaps on similar boundaries to the PDP's originally notified Medium Density Residential Zone (prior to amendment by Variation 1). Kainga Ora have not sought a Height Variation Control area in Kaiapoi, Woodend, or Pegasus, noting that these are relevant residential zones in the meaning of the Enabling Housing Act, and also, as notified, the PDP proposed a medium density residential zone for much of Kaiapoi. So in responding to Kainga Ora, I note this inconsistency, and it remains unclear to me what they are actually seeking, the extent of it, and in relation to additional height above three storeys, what standards might apply to it. If I am to take what I believe is Kainga Ora's position at the hearing, and that their proposed HVCA is the walkable catchment around the Rangiora TCZ, I respond as follows: • The amendments to the proposed qualifying matter restore three storeys (or 11m+1m) as the standard for height in relevant residential zones in the district, albeit with some controls on southern aspect recession planes but which will not affect the overall ability to achieve the stated MDRS built form standards and typologies.

	• No expert has provided evidence of feasible demand for three storey typologies in the relevant residential zones, let alone six storeys. Whilst I accept the requirements to be minimal in amendments to the MDRS only to the minimum extent necessary to accommodate a qualifying matter, such as sunlight and shading, Kainga Ora have presented no economic evidence, nor urban design evidence of the nature to assess the likely outcomes of dwellings constructed to this height. • There is no evidence of a supply shortfall in the District sufficient to justify buildings of this nature, nor any evidence of a likely increase in demand sufficient to require buildings of this nature in Rangiora. This is a typology that in the context of Greater Christchurch, is currently provided for in central Christchurch City, in their High Density Residential Zone. • Given my expertise in sunlight and shading modelling outcomes albeit in the absence of specifically modelling it, something I note that would normally be considered to be a requirement of the submitter to present, I consider that the outcome of such a typology using the MDRS built form standards in the absence of controls would be a considerable increase in shading on adjacent properties, including other 6 storey properties also constructed to the same standard. The outcome, in the absence of built form standard, would be highly detrimental. • I do not support this relief and recommend it is rejected. In response to the NPSUD Policy 3(d) matter, I note the following: • Variation 1 applied Policy 3(d) by increasing the heights in the, NCZ, LCZ to match the MDRS height of 11m. The TCZ heights were already at 11m, so no amendment was required here, however, I would consider that this is in scope of Variation 1 if amendments were required. • I discussed the matter with Mr Willis, and other s42A reporting officers who

	were familiar with this decision, and they confirmed that it was undertaken to apply Policy 3(d). • Mr Willis has later recommended in the context of the PDP that the height limits in the TCZ are increased to 18m, including on the boundary. However, this was not in response to Policy 3(d), it was in response to submitters. • Although the adjustment to the heights occurred under Variation 1, and is thus in scope of the Variation, I consider that the TCZ, NCZ, and LCZ are not within scope of the MDRS itself. Thus, although they enable mixed use activities, they are not relevant residential zones. • Furthermore, if as I am recommending, that the height limit be returned to 11m+1m as the MDRS states, the commensurability at boundary issue is largely removed, as the LCZ and NCZ have the same height limit, and with the TCZ, the step-down is from 18m to 11m. • I consider that NPSUD Policy 3(d) matters have been thus been addressed.
Please respond to Mr Heath's verbal answers to the Panel's questions regarding: **a) the relative viability of 2, 3 and 4 storey development** **b) the methodology used in your Appendix E to represent the shading effects from existing development being increased in height.** **In answering this question, we request that Mr McIndoe review your methodology and provide his opinion to the appropriateness of it in demonstrating the impact of applying the MDRS.**	Mr Heath provided verbal answers to the Panel on the relative viability of 2,3, and 4 storey developments. He has not as I understand it provided written evidence on the feasibility of such developments. Only Mr Yeoman has provided that evidence in the context of the WDCGM22. Mr Yeoman does not consider three-storey development to be currently feasible nor likely to be feasible in the district in the future. I don't consider that Mr Heath provided any evidence in addition to Mr Yeoman, and certainly no evidence to counter Mr Yeoman, other than to state that something should be provided for even when a market did not exist, as in, anticipating a future market. Mr Heath may have also been responding to my recommendations at the time of the hearing to restrict the height to two-storeys. His response may be different in noting that my recommendations have changed in response to my additional modelling work that shows that three storeys is possible, albeit within an adjusted recession plane to

	protect winter sunlight access on neighbouring properties. I do not fully understand Mr Heath's comments about my modelling methodology in respect to variables, and I also note he may not be an expert in the matter, or has not to date presented credentials in this regard to demonstrate his expertise. Nevertheless, at a first principle level, I can respond. • My initial modelling report presented the results of shading on neighbouring properties resulting from three MDRS style buildings being built to the full MDRS height and built form (i.e 11m+1m, 2m setbacks[1] from the boundary, 60 degree recession plane beginning 4m above the boundary, and three units per site). • I thus modelled the likely outcome of the MDRS at three storeys, not existing buildings raised to three storeys, and found a substantial increase in shading on adjacent properties at ground level as a result. • I did show the Panel some visualisations of shading outcomes from existing buildings, but as I stated in my evidence, and then again at the hearing, this was for visualisation purposes only, and was not part of the model. • I did undertake a comparison with the current operative plan envelope, by raising existing buildings to two storeys to represent this. This resulted in less shading than the 3 storey scenario. • Mr McIndoe has reviewed my modelling methodology, and has considered it to be appropriate and thorough. This review is attached as Appendix 2. In reviewing it, Mr McIndoe considered that I add additional modelling scenarios for the second run of work. These are:

[1] The MDRS itself specifies 1.5m for side and front yards, and 1m for rear sites, however, I applied 2m as I consider this to be a more reasonable distance between a window and a boundary, i.e. handling a likely recessed window scenario.

	○ A baseline scenario of what the operative district plan enables, two storey (8m) developments to the operative district plan recession planes – the baseline. ○ A two storey MDRS (up to 8m+1m) – Scenario A ○ The operative district plan recession planes, extended up to three storeys (11m+1m) – Scenario B ○ The proposed Chch PC14 height in relation to boundary and recession plane scenario, up to 11m – Scenario C ○ The full MDRS (11m+1M) – Scenario D • This adjusted methodology applies this typology to all sites in the district as a new built form, and samples the hours of direct sunlight received in these buildings (in response to the neighbouring buildings around it) at ground floor window heights (2.45m), and first floor window heights (5.15m), as recommended by Mr McIndoe. • It samples this based on the aspect of the building, for example, north, east, south, and west, noting that sun does not fall evenly upon a building. • Mr Heath had raised concerns about the choice of variables, and may have stated that I did not consider like for like. Whilst I disagree with his categorisation or assessment of my initial modelling work, as I did consider like for like, the second round of work and the additional scenarios tested provides more clarity over the scenario choice and should reduce or eliminate potential confusion. • When direct sunlight hours are counted, as opposed to total energy, more nuance in any recommendation over the content of any qualifying matter can occur. • The second round results have enabled me to recommend retaining the MDRS

	three storey height, but to adjust the recession planes and height in relation to boundary to match the operative district plan. Whilst not removing all additional shading on adjacent properties, it does minimise the additional shading, whilst still retaining the intent of the MDRS for an additional storey.
Please respond to any outstanding matters from Ms McLeod for Transpower's evidence.	I consider that I have addressed these in my Right of Reply on Medium Density Residential Zones, adopting the following: • Extending the national grid subdivision corridor / national grid yard qualifying matter to land use. • Adjusting grammar and spelling accordingly I have not recommended any changes in regard to my original recommendation on Transpower's request for limited notification of these applications, considering that that sch 3A, RMA does not provide scope for these, as it precludes public and limited notification. I consider that this is the only matter on which I now disagree with Ms Hayes for Transpower. If the IHP interprets the MDRS in the manner Ms Hayes does, then it may be minded to make the amendment requested by Ms Hayes.
You have stated that Variation 1 did not apply to any of the Commercial and Mixed Use Zones. This is contrary to the advice of Mr Willis given during the course of the hearing of those chapters and in his section 42A report. Mr Willis's section 42A report only addressed submissions on the PDP in respect to those chapters, meaning that submissions on the Variation 1 amendments to the CMUZ chapters have	As I set out above in response to a similar question, I considered that the commercial and mixed use zones are not in scope of the MDRS, however, they are, as Mr Willis states, in scope of Variation 1. That may explain the apparent discrepancy. Whilst the IHP can consider them in the context of the amendments that Variation 1 made to their provisions (only on height at boundary), they are not relevant residential zones in the meaning of the RMA Enabling Housing Amendment Act. I have addressed all submissions received under Variation 1 in my s42A report and rights of reply, so there are no outstanding matters.

not yet been reported on. Please advise how the Council proposes these submissions be addressed?	
Please provide your final response in respect to our question on paragraph 160.	As above, I agree with Ms Hayes for Transpower that the qualifying matter should apply to both subdivision and land use activities, and I have recommended changes accordingly.
Please provide any updated assessment in respect to RESZ-P15 and whether this is the appropriate location in the PDP for this policy.	As above, I consider this overarching policy provides the scope for qualifying matters, provided that they have in turn met the relevant tests under s77. The policy currently sits across all relevant residential zones, and thus is not immediately clear that it applies to the medium density residential zone, which is the relevant residential zones that implements the MDRS, and thus, the qualifying matters. Therefore, I consider that the most appropriate location for this policy would be in the MRZ chapter, either as a new MRZ-P3 (with MRZ-P3) renumbered accordingly, or as MRZ-P4, saving the renumbering task and with it being amended to apply to the medium density residential zone only: ~~RESZ-P15~~ MRZ-P4 Medium Density Residential Standards Apply the Medium Density Residential Standards across ~~all relevant residential zones in the District Plan~~ the medium density residential zone except in circumstances where a qualifying matter is relevant (including matters of significance such as historic heritage and the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga). I consider that this can be treated as a minor change under cl16(2).

Please finalise your recommendation in respect to V139.3, taking into account our question above regarding Variation 1 and the CMUZ chapters	The submitter, Foodstuffs South Island [V1 39.3] requests clarity at the zone boundary on how activities, such as existing activities in commercial zones may be affected by MDRS residential activities on the boundary. I note the following standard that applies to the TCZ, NCZ, and LCZ: TCZ-BFS3 Height in relation to boundary when adjoining Residential Zones, Rural Zones or Open Space and Recreation Zones Where an internal boundary adjoins any Residential Zones, Rural Zones or Open Space and Recreation Zones, the height in relation to boundary for the adjoining zone shall apply, and where specified structures shall not project beyond a building envelope defined by recession planes measured 2.5m from ground level above any site boundary in accordance with the diagrams in Appendix APP3. Activity status when compliance not achieved: RDIS Matters of discretion are restricted to: CMUZ-MD4 - Height in relation to boundary Notification An application for a restricted discretionary activity under this rule is precluded from being publicly notified, but may be limited notified. I am not entirely certain on the breadth of the concerns that occur, or may occur at the boundary, raised by the submitter, but insofar as I consider that these standards ensure equal treatment at the boundary. I note that this standard is also now consistent with the amended qualifying matter for sunlight and shading. Insofar as there may be other sensitivity, or reverse sensitivity issues on the boundary, I note Objective 4 and Policy 6 NPSUD, that weight the planned or anticipated future character of an urban environment over that which is currently present. This may reduce the degree to which an existing commercial activity in a commercial zone can consider

	their amenity affected negatively by MDRS residential activities on the boundary.
Please respond to Kainga Ora's expert planning evidence, in particular the updated relief set out in Appendix 2 of Ms Dale's evidence.	I have provided an in-line assessment of this evidence at Appendix E to this right of reply. My summary is that I do not support the relief, for the reasons as set out in that Appendix, which include: • No evidence has been presented justifying an increase in height, such as evidence on demand, and the effects of the effects of such developments on the outcomes expected for the medium density residential zone. • The drafting approach changes compulsory MDRS objectives and policies, which I consider cannot be changed. • The drafting approach that sets out the HVCA still retains the 11m height limit of the three-storey MDRS, so I am unclear, based on Kainga Ora's wording, how additional storeys will apply. Ms Dale has not provided a rule package to support Kainga Ora's relief. • There is an inconsistency between Mr Kemp's comments at the hearing, in respect of his statement outlining that at least 3 hours of direct sunlight access would be considered as a minimum standard for winter, and Ms Dale's amendments, which remove the consideration of direct sunlight as a matter of discretion. • The drafting approach is not integrated across itself.
Please ensure you respond to the following specific points raised in Ms Dale's evidence: **a. Kainga Ora submission on MRZ-P3, where you recommend accepting their**	**Residential character** ~~Provide for activities and structures that support and maintain~~ Enable development to achieve[2] the character and amenity values anticipated for the zone, which provides for:

[2] Kainga Ora [V1 80.3]

submission in Table B and note "reword as submitter requests" but have not updated MRZ-P3 in Appendix A	1. higher density living in areas with better access for walking to parks, main centres or local commercial centres; 2. multi-unit redevelopment opportunities through flexible development controls and encouragement for multi-site redevelopment; 3. high quality building and landscape design for multi-unit residential development with appropriate streetscape landscaping and positive contribution to streetscape character; 4. provides for a peaceful residential environment, in particular minimising the adverse effects of night time noise and outdoor lighting, and limited signs; 5. appropriate internal amenity within sites; 6. a mix of detached, semi-detached and multi-unit living; 7. small-scale commercial, or community-based activities, that service the local community, and home businesses; and 8. a wider range of home business-based commercial activity in the Residential Commercial Precinct adjacent to Rangiora Town Centre. For the other changes sought by Kainga Ora to MRZ-P3, I do not consider that these are within scope of the MDRS, as I note MRZ-P3 covers more than just MDRS development, for instance it covers all multi-unit residential development under the consenting rules and framework. Kainga Ora's relief appears to be focused on MDRS scenarios, which are only a component of the matters that MRZ-P3 covers.
(b) Kainga Ora submission on MDRZ-Built form standards, where you recommend rejecting the submission in Table B without explanation.	If I am to consider Ms Dale's relief as attached at Appendix E as Kainga Ora's final drafting, including on built form standards, my reasons for rejection are as set out in Appendix E, and as summarised above.
Kainga Ora further submission [against WDC 47.21] regarding the definition of 'residential activity' which is referred to in Ms Dale's evidence at paragraphs 3.88-3.91.	Kāinga Ora made a further submission (fs23) in opposition to any rule that seeks to remove garages and other accessory buildings from being considered under the MDRS rules and to the suggestion that roof cavities, facades and foundations are 'non-living accommodation' or non-habitable parts of a building and are therefore not assessed under MDRS built form standards

	There is no direct response to the further submission in the s42A report and it is not possible to follow the further submission points in the Appendix B recommendations. However, in response to the WDC submission point in Appendix B Mr Wilson accepts the point and notes: “Amendments are proposed to the definition of 'residential activity' to ensure they apply to the living accommodation only”. 3.90 In Mr McLennan’s s42A report that covers the definition of both residential unit and residential activity no changes to the National Planning Standard definitions are proposed. 3.91 I entirely agree with the reasons provided in the Kāinga Ora submission. Garages and accessory buildings are simply an ancillary part of peoples living accommodation and just because they are not ‘habitable spaces’ does not make them ‘non-residential’. The proposed approach is not practicable or sensible. In addition, if garages (and accessory buildings) and parts of residential units (facades, roof spaces) are not assessed under the MDRS built form standards, it is not clear what rules would apply as an alternative. I do not consider this submission needs any text amendments as the built form standards (for example for height, HIRB, setback and site coverage) are worded to apply to ‘buildings’ generally. In response to Kainga Ora [V1 FS23] , I change my recommendation on WDC 47.21 to reject, as I consider along with Ms Dale and Mr McLennan, that residential unit, which “means a building(s) or part of a building that is used for a residential activity exclusively by one household, and must include sleeping, cooking, bathing and toilet facilities” covers the living part of the accommodation, and if exclusions are proposed, there would be no other definition that would cover them, other than “structures” which is outside of the MDRS, and thus, any regime that undertook this interpretation would be inconsistent with the MDRS.

Please respond to Ms McKeever evidence on vacant lot subdivison rules, noting that in Table B you agree that clarity is needed on the meaning of 'vacant lot' for the purpose of SUB-R2.	I agree with Ms McKeever and Ms Dale and have adopted their recommendations to take the partially operative Selwyn District Plan approach to this matter. The proposed amendments are: Medium Density Residential Zone Activity status: CON Where: 2. SUB-S1 to SUB18 are met, except where: a. the allotment is for any unstaffed infrastructure, accessway or road; b. the subdivision is of a fee simple allotment from an approved cross lease site, where the exclusive use areas shown on the existing cross lease plan are not altered, and where only SUB-S5 will apply; c. the subdivision site is a reserve created under the Reserves Act 1977, or any esplanade reserve allotment; or d. where otherwise specified in this chapter. 3. Either: a. for every site with an existing residential unit, either: i. the subdivision does not increase the degree of any non-compliance with the built form standards of this zone; or ii. land use consent for the non-compliance has been granted. b. for every site without an existing residential unit, either: i. the subdivision application is accompanied by a land use application that will be determined concurrently with the subdivision application that demonstrates that it is practicable to construct, as a permitted activity, a residential unit on every site ~~and that no vacant sites will be created~~; or ii. <u>Every vacant site (other than a site used exclusively for access, reserves, or infrastructure, or which is wholly subject to a designation) has a dimension not less than 16mx23m and a building square not less than 8mx15m</u> iii. every site (including sites that are subject to a legal mechanism restricting the number of residential units which can be erected): 1. is practicable to construct as a permitted activity a residential unit; and

	2. complies with the built form standards of this zone for each residential unit constructed; and 3. Every vacant site (other than a site used exclusively for access, reserves, or infrastructure, or which is wholly subject to a designation) has a dimension not less than 16mx23m and a building square not less than 8mx15m For the purpose of 3(a)(i), if a subdivision is proposed between residential units that share a common wall, the requirements as to height in relation to boundary in the district plan do not apply along the length of the common wall. Notification An application for a controlled activity under this rule is precluded from being publicly or limited notified.
Please response to Ms Watt's evidence at paragraph 22-26 where she seeks clarity on your statement in Table B regarding the minimum lot size of sites within Kaiapoi Area A that "the number of additional dwellings within Kaiapoi Area A is quantified in evidence by rezoning submitters".	In response, I have not recommended any changes to the extent of Kaiapoi Area A, which has a minimum allotment size of 200m2 implemented by a proposed qualifying matter, not 500m2 as stated by Ms Watt. Kaiapoi Area B has a minimum allotment size of 500m2, and is a much smaller area of land. This may be what she was referring to. I have also not recommended any rezonings within Kaiapoi Area A or B. My response to Ms Watt's question about quantifying the number of rezonings is that no additional dwellings are anticipated in this area as a result of my recommendations. There may be limited infill on some larger sites in this area, or minor residential units constructed, but that is outside of the scope of submissions I have considered, and in accordance with the medium density residential zone provisions that enable infill, up to the 500m2 site minimum. This is, if the qualifying matter is accepted by the IHP. In the event that Ms Watt is referring to qualifying matters and their application to Kaiapoi generally, I consider that as all rezonings in Kaiapoi are greenfield sites outside of the proposed qualifying matter areas, and as such, will be required under the natural hazard and subdivision provisions to

	achieve a minimum floor height above the 1 in 200 year event, in the event my recommendations to rezone these areas are accepted. There is no automatic extension of the qualifying matter to these areas, but I note that as greenfield sites will need to be raised to be above the relevant flood level, once land raising is complete, the hazard will no longer exist on these sites, therefore, the grounds on which to apply a qualifying matter would also not exist. I am not recommending the extension of the qualifying matter to additional land in Kaiapoi in my rezoning right of reply.

Appendix 1 – Statutory tests

1. In recommending a qualifying matter, I am required to consider the relevant statutory tests in the course of a s32AA analysis.

2. The proposed qualifying matter is an "any other matter" qualifying matter under s77I(j) RMA, which in turn requires an analysis under s77L.

3. S77L requires the following analysis:

S77L test	Consideration
Further requirement about application of section 77I(j) A matter is not a qualifying matter under section 77I(j) in relation to an area unless the evaluation report referred to in section 32 also— (a) identifies the specific characteristic that makes the level of development provided by the MDRS (as specified in Schedule 3A or as provided for by policy 3) inappropriate in the area; and	The specific characteristic that makes the level of development provided by the MDRS inappropriate in the area is shading and loss of sunlight on adjacent properties, including new buildings that are built to MDRS or similar standards.
justifies why that characteristic makes that level of development inappropriate in light of the national significance of urban development and the objectives of the NPS-UD; and	Objective 1 of the NPSUD sets out matters that are considered to form a well-functioning urban environment. This includes health and safety. Access to direct sunlight is a critical function of a building in providing for the health of its occupants. I consider that it differs from the considerations of amenity in Objective 4 of the NPSUD in that sunlight is an objective consideration, rather than the subjective considerations of amenity.

	I also note that experts agree on a baseline level of hours of winter sunlight access in winter (3 hours of direct sun), which provides a basis on which to measure change in response to new buildings.
includes a site-specific analysis that— (i) identifies the site to which the matter relates; and (ii) evaluates the specific characteristic on a site-specific basis to determine the geographic area where intensification needs to be compatible with the specific matter; and (iii) evaluates an appropriate range of options to achieve the greatest heights and densities permitted by the MDRS (as specified in Schedule 3A) or as provided for by policy 3 while managing the specific characteristics.	The sites are all sites within the Waimakariri District relevant residential zones. These have been evaluated on a site specific basis for every square metre of their land, using a digital terrain model that undertakes an analysis of shading outcomes based on likely future built form scenarios. As the district is flat, it shows the same outcome for every site in response to changes in built form. A range of options to aim to achieve the greatest heights and densities as permitted by the MDRS is evaluated. I have proposed an amendment to my original qualifying matter restricting development to two-storeys in response to this analysis, considering now that three-stories can be provided for, with a slightly more restrictive recession plane.

Appendix A – Recommended Changes

MRZ-BFS4 Height	
1. The maximum height of any building shall be 12m above ground level. 1. Buildings must not exceed 11 metres in height, except that 50% of a building's roof in elevation, measured vertically from the junction between wall and roof, may exceed this height by 1 metre, where the entire roof slopes 15° or more, as shown in Figure MRZ-1. ~~Legal Effect~~ ~~The highlighted yellow text identifies the part of the standard that has immediate legal effect if no qualifying matter applies.~~	**Activity status when compliance not achieved: DIS** **Notification** **Refer to notification status in MRZ-BFS1.**

MRZ-BFS7 Height in relation to boundary	
~~1. Buildings must not project beyond a 60° recession plane measured from a point 4 metres vertically above ground level along all boundaries, as shown Figure MRZ-3. Where the boundary forms part of a legal right of way, entrance strip, access site, or pedestrian access way, the height in relation to boundary applies from the farthest boundary of that legal right of way, entrance strip, access site, or pedestrian access way. This standard does not apply to:~~ ~~a. a boundary with a road~~ ~~b. existing or proposed internal boundaries within a site~~	**Activity status when compliance not achieved: RDIS** **Matters of discretion are restricted to:** • **RES-MD2 - Residential design principles** • **RES-MD5 - Impact on neighbouring property** **Notification** **An application for a restricted discretionary activity under this rule is precluded from being publicly notified, but may be limited notified.** **Refer to notification status in MRZ-BFS1.**

~~c. site boundaries where there is an existing common wall between 2 buildings on adjacent sites or where a common wall is proposed.~~ 2. Structures shall not project beyond a building envelope defined by recession planes measured 2.5m from ground level above any site boundary in accordance with the diagrams in Appendix APP3 except for the following: a. flagpoles; b. lightning rods, chimneys, ventilation shafts, solar heating devices, roof water tanks, lift and stair shafts; c. decorative features such as steeples, towers and finials; d. for buildings on adjoining sites which share a common wall, the height in relation to boundary requirement shall not apply along that part of the internal boundary covered by such a wall; and e. where the land immediately beyond the site boundary forms part of any rail corridor, drainage reserve, or accessway (whether serving the site or not), the boundary of the rail corridor, drainage reserve, or accessway furthest from the site boundary may be deemed to be the site boundary for the purpose of defining the origin of the recession plane, provided this deemed site boundary is no further than 6m from the site boundary; ~~3. Provided that none of the structures listed in (1) (c) to (e) above has a horizontal dimension of over 3m along the line formed where the structure meets the recession plane as measured parallel to the~~	

~~**relevant boundary.**~~ **3. 2. Where the site is within the Urban Flood Assessment Overlay or Kaiapoi Fixed Minimum Finished Floor Level Overlay, the height of the Finished Floor Level specified in a Flood Assessment Certificate can be used as the origin of the recession plane instead of ground level, but only up to an additional 1m above original ground level.** **Legal Effect** **The highlighted yellow text identifies the part of the standard that has immediate legal effect if no qualifying matter applies.**	

Appendix B – Recommended Responses to Missing Submissions

This table provides responses to the identified missing submissions.

13.2	Dovie Lovell-Smith Ltd - Patricia Harte - on behalf of Mike Greer Homes Ltd	General	Amend	Amend to add in the proposed South Kaiapoi Development Area as an additional New Development Area. The site is located in an area in southern Kaiapoi to the east of Main North Road, west of railway line, and south of the Kaikanui Stream containing the fol	Add a new Residential Development Area (SK – South Kaiapoi Development Area) for South Kaiapoi over the following land: - Pt RS 37428 (CB701/7) limited to the land to the west of the Main Trunk Railway Line - RS 39673 - Lot 1 DP 19366 Refer to Plan	Accept	Area has been recommended for rezoning under the PDP, and also under my recommendation on Mr Fowler's application of the Clearwater test
26.1	Kim McCracken - on behalf of Doncaster Development Ltd	Planning Maps	Amend	Requests a more appropriate provision for medium density housing for Rangiora that only applies to parts of the Rangiora located within walking distance, or 800m, from the town centre, and the balance of residential areas, including 260-282 Lehmans Rd and	Allow in full the submitter's submission on the Proposed District Plan and include 260-282 Lehmans Rd and 32 Parrott Road, Rangiora in the General Residential Zone, along with adjacent areas of Rangiora, if Variation 1 is appropriately modified to enable	Accept	Area has been recommended for rezoning under the PDP, and also under my recommendation on Mr Fowler's application of the Clearwater test
40.2	Aston Consultants Ltd - Fiona Aston - on behalf of Ben Dormer	SD - Rautaki ahunga - Strategic directions	Amend	Amend SD-03 in order to help to enable the submitter's request to rezone 70 Oxford Road, Rangiora (0.81ha) from Rural Lifestyle Zone to Medium Density Residential Zone, and amend the West Rangiora Outline	Amend SD-03: "Urban development and infrastructure that:… 4. provides a range of housing opportunities, focusing new residential activity within existing towns, and identified development areas in Rangiora and Kaiapoi, in order to as a minimum achieve the	Reject	70 Oxford Road is recommended for rezoning, however, amendments to SD-O3 are not required for this to occur.

				Development Plan (ODP) to identify all residential			
43.6	Resource Management Group - Teresa Walton - on behalf of Momentum Land Ltd	SUB - Wawahia whenua - Subdivision	Support	Support in part the minimum allotment area of 200m2 in the Medium Density Residential Zone where the airport noise qualifying matter applies. This is on the proviso that the submitters relief is accepted with regard to use of the Annual Average Outer Cont	Retain SUB-S1 as notified, insofar as it relates to minimum allotment area in the area covered by airport noise qualifying matter. This relief is sought on the basis that the qualifying matter will only apply to the South Block (retirement village site).	Accept in part	The qualifying matter is not recommended for extension to either the North Block or the South Block
44.1	David Michael Lawry	Planning Maps	Oppose	The 50 dBA Ldn Air noise contour should not be accepted as or come under the classification of a qualifying matter so as to restrict further residential intensification. Th e current contours are highly inaccurate. In the last review of the contours back	It is submitted that as the entire question around the outer control boundary and accuracy of the air noise contours is already the subject Regional Council deliberation, that in the interests of reducing the matters for consideration of Variation 1 and i	Accept in part	This matter was traversed in hearing stream 10A, with a recommendation to retain the qualifying matter - airport noise, as notified, however with an adjustment to remove its application to Silverstream on account of a lack of scope.
54.2	Aston Consultants Ltd - Fiona Aston - on behalf of John and Coral Broughton	SD - Rautaki ahunga - Strategic directions	Amend	Amend SD-O3 to require provision of housing to as a minimum achieve housing bottom lines, in order to enable the submitter's request to rezone	Amend SD-O3: "Urban development and infrastructure that:… 1. provides a range of housing opportunities, focusing new residential activity within existing towns, and identified development areas in Rangiora and Kaiapoi, in	Reject	Amendments to SD-O3 are not required for this rezoning to occur, the rezoning is recommended under the PDP and under Mr Fowler's interpretation of

				113 and 117 Townsend Road, Rangiora from Rural Lifestyle Zone to Medium Density Residential Zone.	order to as a minimum achieve		the Clearwater test
55.2	Aston Consultants Ltd - Fiona Aston - on behalf of Miranda Hales	SD - Rautaki ahunga - Strategic directions	Amend	Amend SD-O3 to require provision of housing to as a minimum achieve housing bottom lines, in order to enable the submitter's request to rezone 125 Lehmans Road, Rangiora from Rural Lifestyle Zone to Medium Density Residential Zone.	Amend SD-O3: "Urban development and infrastructure that: … 4. provides a range of housing opportunities, focusing new residential activity within existing towns, and identified development areas in Rangiora and Kaiapoi, in order to as a minimum achieve th	Reject	Amendments to SD-O3 are not required for this rezoning to occur, the rezoning is recommended under the PDP and under Mr Fowler's interpretation of the Clearwater test
57.2	Aston Consultants Ltd - Fiona Aston - on behalf of Dalkeith Holdings Ltd	SD - Rautaki ahunga - Strategic directions	Amend	Amend SD-O3 to require provision of housing to as a minimum achieve housing bottom lines, in order to enable the submitter's request to rezone [212 Johns Rd and 63 Oxford Rd, Rangiora] from Rural Lifestyle Zone to Medium Density Residential Zone.	Amend SD-O3: "Urban development and infrastructure that: … 6. provides a range of housing opportunities, focusing new residential activity within existing towns, and identified development areas in Rangiora and Kaiapoi, in order to as a minimum achieve th	Reject	Amendments to SD-O3 are not required for this rezoning to occur, the rezoning is recommended under the PDP and under Mr Fowler's interpretation of the Clearwater test
59.12	Eliot Sinclair - Samuel Hammond	SWR - Southwest Rangiora	Oppose	Amend DEV-SWR-APP1 Southwest Rangiora ODP.	Amend DEV-SWR-APP1: "Land Use Plan The Outline Development Plan for the South West Rangiora located within … ... Fixed Outline Development Plan Features for the South West Rangiora Development Area: - Location of a concentration	Accept in part	The SWR area will be distinctly shown

					of medium density re		
59.2	Eliot Sinclair - Samuel Hammond	SWR - Southwest Rangiora	Support	Supports the inclusion of the South West Rangiora site being re-zoned as Medium Density Residential Zone to implement the Medium Density Residential Standards. Specifically, supports the change from 'South West Rangiora Development Area' to Medium Densit	Not specified.	Accept	The SWR area has been recommended for rezoning under the PDP and V1 as notified.
59.5	Eliot Sinclair - Samuel Hammond	SWR - Southwest Rangiora	Support	Support the inclusion of South West Rangiora and the Outline Development Plan as an Area Specific Matter in Part 3 as an Existing Development Area.	Not specified	Accept in part	The SWR area will be distinctly shown
61.4	Aston Consultants Ltd - Fiona Aston - on behalf of Richard and Geoff Spark	SD - Rautaki ahunga - Strategic directions	Amend	Amend SD-O3 to enable the submitter's request to rezone for residential development an area of land located north and south of Boys Road, Rangiora that adjoins a Future	Amend SD-03: "Urban development and infrastructure that: ... 4. provides a range of housing opportunities, focusing new residential activity within existing towns, and identified development areas in Rangiora and Kaiapoi, in order to as a minimum achieve th	Reject	Amendments to SD-O3 are not required for this rezoning to occur, the rezoning is recommended under the PDP and under Mr Fowler's interpretation of the Clearwater test

				Development Area as this is consistent with the National Policy Statement on Urban Dev			
62.1	Aston Consultants Ltd - Fiona Aston - on behalf of Rick Allaway and Lionel Larsen	Planning Maps	Amend	Rezone 181, 201, 255, 257, 259, 261, 263, 265, 267, 271, 285, 305, 311, and 315 Lehmans Rd, Rangiora (Lot 2 DP 83770, Lot 1 DP 83770, Lot 1 DP 328154, Lot 2 DP 328154, Lot 3 DP 328154, Lot 4 DP 328154, Lot 5 DP 328154, Lot 6 DP 328154, Lot 7 DP 328154, Lo	Rezone 181, 201, 255, 257, 259, 261, 263, 265, 267, 271, 285, 305, 311, and 315 Lehmans Rd, Rangiora (Lot 2 DP 83770, Lot 1 DP 83770, Lot 1 DP 328154, Lot 2 DP 328154, Lot 3 DP 328154, Lot 4 DP 328154, Lot 5 DP 328154, Lot 6 DP 328154, Lot 7 DP 328154, Lo	Reject	Mr Buckley has recommended rejection of this rezoning request in the context of hearing stream 12C, and I note that it is not within scope of Variation 1 applying either Mr Carranceja's or Mr Fowler's approach to the Clearwater test. I have discussed this with Ms Aston and I understand that she agrees, in the context of the scope of Variation 1.
62.2	Aston Consultants Ltd - Fiona Aston - on behalf of Rick Allaway and Lionel Larsen	SD - Rautaki ahunga - Strategic directions		Amend SD-O3 to help enable the submitter's request to rezone 181, 201, 255, 257, 259, 261, 263, 265, 267, 271, 285, 305, 311, and 315 Lehmans Rd, Rangiora to Medium Density Residential Zone, or a mix of residential density zones.	Amend SD-03: "Urban development and infrastructure that: … 6. provides a range of housing opportunities, focusing new residential activity within existing towns, and identified development areas in Rangiora and Kaiapoi, in order to as a minimum achieve t	Reject	Mr Buckley has recommended rejection of this rezoning request in the context of hearing stream 12C, and I note that it is not within scope of Variation 1 applying either Mr Carranceja's or Mr Fowler's approach to the Clearwater test. I have discussed this with Ms Aston and I understand that she agrees, in the context of the scope of Variation 1.

62.3	Aston Consultants Ltd - Fiona Aston - on behalf of Rick Allaway and Lionel Larsen	WR - West Rangiora	Amend	Amend the West Rangiora Outline Development Plan to include 181, 201, 255, 257, 259, 261, 263, 265, 267, 271, 285, 305, 311, and 315 Lehmans Rd, Rangiora as Medium Density Residential or a mix of MDRZ and Large Lot Residential – Specific Control Area Dens	Amend the West Rangiora Outline Development Plan (ODP) to include 181, 201, 255, 257, 259, 261, 263, 265, 267, 271, 285, 305, 311, and 315 Lehmans Rd, Rangiora (Lot 2 DP 83770, Lot 1 DP 83770, Lot 1 DP 328154, Lot 2 DP 328154, Lot 3 DP 328154, Lot 4 DP 32	Reject	Amendments to SD-O3 are not required for this rezoning to occur, the rezoning is recommended under the PDP and under Mr Fowler's interpretation of the Clearwater test
63.1	Stuart Allan	Planning Maps	Amend	Concerned that 249 Coldstream Road, Rangiora would not adjoin any Rural Lifestyle Zone land, and any adjoining medium density residential developments could affect the site's rural lifestyle activities.	Rezone 249 Coldstream Road, Rangiora from Rural Lifestyle Zone to Medium Density Residential Zone.	Accept	This site is recommended for rezoning to medium density under both the PDP and V1 as notified.
65.1	Inovo Projects Ltd - Max Stevenson - on behalf of Williams Waimak Ltd	Planning Maps	Amend	Rezone the northern portion of 12 Williams St, Kaiapoi from General Industrial Zone (GIZ) to Medium Density Residential Zone (MDRZ) so the entire site is MDRZ. This is a more cohesive and efficient use of this largely vacant land adjoining a residential e	Rezone the northern portion of 12 Williams St, Kaiapoi from General Industrial Zone to Medium Density Residential Zone (MDRZ) so the entire site is MDRZ.	Accept	The bulk of the site was rezoned, however the northern portion is LIZ, and I agree with the submitter that this should be MDRZ instead

76.1	M and J Schluter	Planning Maps	Amend	Land located 237 Johns Road, Rangiora legally described as Lot 3 DP 341829 and part of the West Rangiora Development Area is proposed to be zoned Rural Lifestyle Zone in the proposed Plan. Amendments are sought separately to the provisions of the West Ran	Land located 237 Johns Road, Rangiora legally described as Lot 3 DP 341829 be rezoned from Rural Lifestyle Zone in the proposed Plan to Medium Density Residential Zone.	Accept	This site is recommended for rezoning to medium density under the PDP and under Mr Fowler's interpretation of the Clearwater test as notified.
76.4	M and J Schluter	WR - West Rangiora	Amend	In the Outline Development Plan for West Rangiora in DEV-WR-APP1, the majority of the land located at 237 Johns Road, Rangiora legally described as Lot 3 DP 341829 is identified as "General Residential Density", with only a small area to the north identi	Amend the Outline Development Plan for West Rangiora in DEV-WR-APP1 to enable Medium Residential Density on all residential areas of the Outline Development Plan.	Accept	This site is recommended for rezoning to medium density under the PDP and under Mr Fowler's interpretation of the Clearwater test as notified.
79.11	Aurecon NZ - Mark Allan - on behalf of Bellgrove Rangiora Ltd	NER - North East Rangiora	Oppose	There is explanatory wording under each of the rules that begins "For any activity statuses, any activity will need to comply with the following general activity standards:..". This explanatory text should be revised given no North East Rangiora Outline D	Amend DEV-NER-R1: "... a. The provisions of the General Residential Zone will apply to any part of the Development Area where the District Council's Chief Executive Officer or their delegate (following the receipt of an application) certifies that the cr	Accept in part	The certification provisons have been removed, with this site recommended for rezoning under both the PDP and V1 as notified.

79.12	Aurecon NZ - Mark Allan - on behalf of Bellgrove Rangiora Ltd	NER - North East Rangiora	Oppose	The text for a discretionary and non-complying activity under this rule incorrectly refers to the General Residential Zone and needs to be reworded to reflect the Medium Density Residential Zone.	For discretionary and non-complying activities, delete all references to General Residential Zone and replace with Medium Density Residential Zone.	Accept in part	The certification provisons have been removed, with this site recommended for rezoning under both the PDP and V1 as notified.
79.13	Aurecon NZ - Mark Allan - on behalf of Bellgrove Rangiora Ltd	SER - South East Rangiora	Support	The amendment is consistent with the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 and will enable following certification the Bellgrove South land to assume Medium Density Residential Zone.	Retain as notified.	Accept in part	The certification provisons have been removed, with this site recommended for rezoning under both the PDP and V1 using Mr Fowler's test
79.15	Aurecon NZ - Mark Allan - on behalf of Bellgrove Rangiora Ltd	SER - South East Rangiora	Oppose	The text for a discretionary and non-complying activity under this rule incorrectly refers to the General Residential Zone and needs to be reworded to reflect the Medium Density Residential Zone.	For discretionary and non-complying activities, delete all references to General Residential Zone and replace with Medium Density Residential Zone.	Accept in part	The certification provisons have been removed, with this site recommended for rezoning under both the PDP and V1 using Mr Fowler's test
79.16	Aurecon NZ - Mark Allan - on behalf of Bellgrove Rangiora Ltd	SER - South East Rangiora	Oppose	The South-East Rangiora Development Area Chapter needs to be updated to reflect the Outline Development Plan area will assume Medium Density	Amend Appendix DEV-SER-APP1 to reflect: (1) Land within the South-East Rangiora Outline Development Plan will assume Medium Density Residential Zone (refer Attachment 6)(see full submission) following	Accept in part	The certification provisons have been removed, with this site recommended for rezoning under both the PDP and V1 using Mr Fowler's test

				Residential Zone following certification.	certification; (2) Remove the wording for the Sou		
80.36	Kainga Ora - Homes and Communities - Mel Rountree	SUB - Wawahia whenua - Subdivision	Support	Have no minimum lot size/ area for the MRZ. Minimums (in the rules) should only apply where a subdivision application is accompanied by evidence or an application that demonstrates compliance with MDRS. Instead of a minimum lot size/ area Kāinga Ora suppo	Amend the rule/table to delete any reference to the qualifying matter for airport noise and national grid transmission lines and the 200m2 minimum lot size associated with these. Add a minimum shape factor of 8m x 15m for vacant lot subdivisions in the MR	Accept in part	A minimum shape factor, as per the Selwyn plan approach has been recommended. The airport noise matter was traversed in hearing stream 10A, with my recommendation to largely retain it as notified.
80.56	Kainga Ora - Homes and Communities - Mel Rountree	RESZ - Matters of Discretion for all Residential Zones	Oppose	Oppose the airport noise qualifying matter in its entirety including associated matters of discretion.	Delete RES-MD15 in its entirety.	Reject	The airport noise matter was traversed in hearing stream 10A, with my recommendation to largely retain it as notified.
81.16	Chapman Tripp - Annabelle Lee - on behalf of Christchurch International Airport Ltd	RESZ - Matters of Discretion for all Residential Zones	Support	Support Matter of Discretion RES-MD15 for the Residential Zones.	Retain Matter of Discretion RES-MD15 for the Residential Zones.	Accept	The airport noise matter was traversed in hearing stream 10A, with my recommendation to largely retain it as notified.

Appendix C – Additional sunlight and shading modelling

Housing and shading model update.

1. My name is Peter Gordon Wilson. My qualifications and experience are as set out in my Evidence in Chief for Hearing Stream 12E.

2. I have presented previously the results of my investigation into sunlight and shading effects arising from the medium density residential standards (MDRS) in the Waimakariri District.

3. Following hearing stream 12E, I have been asked to undertake further quantitative and qualitative analysis of my sunlight and shading model, to undertake more granular analysis to ascertain the number of sunlight hours, and for it to be peer-reviewed by Mr Graeme McIndoe, Council's expert on urban design and architecture.

Recap of the sunlight and shading model.

4. To recap, the sunlight and shading model used to compare different built form typologies is GIS based. It operates as follows:

    a. Uses a digital terrain model of the Waimakariri District, using 2022 lidar. This lidar is accurate to plus or minus 1 metre in height.

    b. Applies different built form scenarios as models. The original model applied the following scenarios:

        i. The existing sunlight and shading environment, with the current built form. This was referred to as the existing environment, or the baseline scenario.

        ii. A two-storey scenario, assuming that existing building footprints would be built to the maximum extent possible under the operative district plan envelope – i.e. 8m in height.

        iii. A three-storey scenario, implementing the MDRS built form standards, as set out in schedule 3A of the RMA. This scenario modelled the MDRS typology as buildings of 11m + 1m (for roof space), on a 60 degree recession plane, beginning 4m above the boundary, with a 2m setback from the property boundary. I note that the MDRS itself applies a 1.5m setback on front and side yards, with a 1m setback on rear yards, I applied a 2m setback, as I consider that this more fairly represents where windows may be in any building, as these are often recessed.

        iv. Thus, the MDRS scenario I modelled is slightly more generous for sunlight access than the MDRS standards, and more likely to reflect the actual situation than developers building to the maximum setbacks.

    c. Following hearing stream 12E, I was asked to explain the nature of the scenarios modelled, and if they were a fair modelling representation. I note the comments of Mr Tim Heath, who questioned the logic of the scenarios and the variables. I do not fully understand the logic of Mr Heath's comments, but in considering this issue, I respond to the Panel as follows:

    d. Each scenario modelled is a variable. The comparison is between each scenario as a variable.

    e. Mr McIndoe, in his peer review, has questioned my original two-storey scenario, of existing buildings raised to the full 8m, or two-storey heights, as being unrealistic. This may have been what Mr Heath was referring to in his comments about variables and scenarios. I agree with Mr McIndoe, and for the second round of modelling, I have not included this. If this is what Mr Heath was referring to, then I agree with him also in regard to clarity on the scenarios.

Second round scenario modelling

5. For the second round of modelling, I have modelled consolidated built forms, rather than the detached urban forms I modelled for the first round. On expert advice from Mr McIndoe, I have also applied a 3m setback around the buildings between the site boundary and the location of the building, to represent the outdoor space requirements of the MDRS.
6. The second round modelling scenarios are as follows:

    a. Baseline - Operative district plan - A baseline scenario of the operative district plan development envelope, with 2.5m height in relation to boundary, and compass angle based recession planes in residential zones. This represents a greenfield baseline, of what is a permitted activity on a vacant lot. The most restrictive recession plane angles are on the southern aspects. For modelling purposes, I have applied the most restrictive southern recession angle of 35 degrees. In reality, the northern aspects of any dwelling built to these recession planes will be more enabling, up to 55 degrees. *This scenario assumes a single dwelling per site.*

    b. Scenario A - a two storey MDRS –This scenario applies the full MDRS (at 4m HIRB, 60 degree recession planes), at up to 8m (two storeys), with 1m addition for roof space, but up to 8m in height plus 1m for roof space.
    c.

d. Scenario B – the operative district plan height in relation to boundary and compass angle recession planes, but applying a height of 11m+1m
e. Scenario C – the Christchurch PC14 proposed HIRB - This scenario is as proposed by the reporting officers for PC 14, and applies a 3m height in relation to boundary, and a 55 degree recession plane, up to 11m+1m in height.

f. Scenario D - A three storey MDRS –This scenario applies the full MDRS (at 4m HIRB, 60 degree recession planes), at up to 11m (three storeys), with 1m addition for roof space.

Representation in the model

7. These scenarios are represented in the GIS system, or model, as shapes. Each scenario has a shapefile associated with it. The shapefiles come in two forms:

   a. Vector shapefiles – for visualising in 3D.
   b. Raster shapefiles – for quantitative and mathematical analysis.

8. Vector shapes are better suited for human interpretation, whereas rasters are better suited for computer interpretation.

9. Each shape has a height value associated with it. The distance between layers of each built form scenario is determined by the following equation:

$$distance\ between\ built\ form\ layers = \frac{(maximum\ building\ height - height\ in\ relation\ to\ boundary)}{\tan recession\ plan\ angle}$$

10. These shapes are applied onto the existing digital terrain model for the district.

Receiving sites

11. The hours of direct sunlight are sampled at 2.45 metre heights (representing a ground floor window on an angle that ensures maximum penetration depth into a building) and 5.15 metre heights (representing a first floor window on an angle that ensures maximum penetration depth into a building) for each 1 square metre of building. This represents the sunlight environment that a new building, i.e – constructed to the MDRS or an equivalent standard – would receive if constructed on that site in response to the sunlight environment that is influenced by buildings on neighbouring properties.

12. I consider that the sampling heights also reflect the likely sunlight environment for existing dwellings, particularly those with north or east facing windows.

13. Each receiving site is split into four aspects – north, east, south, and west for understanding the sunlight pattern on the site.

The model itself

14. For each scenario, the model undertakes the following analysis:

   a. Work out a viewshaft to the horizon in 18 degree segments (20 individual segments for a 360 degree view) from each square metre of terrain.

   b. Works out slope of the terrain and aspect of the terrain.

   Runs r.sun[3] for the two equinoxes and solstices (days 80, 171, 266 and 354). This calculates maximum direct beam sunlight hours received for each square meter of terrain in 15 minute increments. There are 8 files for each scenario (2 per day of the year), making for 40 files in total. These are large files, adding up to many gigabytes of information.

15. The files are saved into a spatial geodatabase[4] for ease of producing statistics.

16. Due to time constraints, only Rangiora was modelled, however, as I have previously noted, given the flat terrain of the district, there is no notable difference.

Discussion of results.

[3] A full description of this algorithm, including published references is available here: https://grass.osgeo.org/grass83/manuals/r.sun.html. Full source code for it is available here: grass/raster/r.sun at main · OSGeo/grass
[4] Postgresql v17, running Postgis extensions. https://www.postgresql.org/, PostGIS

17. Full results are available in the Postgis database, however, these are large files, running to many gigabytes. A summary of the results is provided in the Excel spreadsheet attached, and this is summarised for each day and each receiving site in Appendix 1.

18. As stated in my hearing stream 12E evidence, I considered that most sunlight loss arising from additional shading occurred with the change from two-storeys to three-storeys, and that the two-storey scenario I modelled did not result in significant additional shading. However, as I stated above, I have used a two-storey MDRS scenario for the second round of modelling instead, as a better representation of the likely sunlight and shading outcome in relevant residential zones.

19. The modelling produces consistent results which show as both height, and the relative steepness of the angle of the adjacent building increase (i.e. height in relation to boundary and recession planes) increase, the amount of direct sunlight received on a property decreases:

    a. For each additional storey of height, approximately 1 additional hour of shading occurs.
    b. For adjustments to height in relation to boundary settings, or adjusting recession planes, 15-30 minutes of additional shading occurs.

20. For shading outcomes, the various scenarios are ranked as follows:
    a. The current operative district plan envelope (8m, or two storeys) is taken as a baseline.

    b. Scenario A, or a two storey MDRS, produces a 3% loss on Scenario A. For most intents and purposes, a two storey MDRS would produce the same outcome as the operative district plan envelope.

    c. Scenario B, or the ODP envelope applied to a three storey or 11m+1m building produces a 5.80% loss on the baseline scenario. I consider that this would also be for most intents and purposes, the same as the baseline scenario, and not noticeable.

    d. Scenario C, or the Christchurch PC14 proposal (3m height in relation to boundary, 11+1m height, 55 degree recession planes) applied to a three storey or 11m+1m building produces a 5.08% loss on the baseline scenario. I consider that this would also be for most intents and purposes, the same as the baseline scenario, and not noticeable. It is also essentially the same as Scenario B.

    e. Scenario D, or the full MDRS results in a 18% loss on the baseline scenario overall. This would be noticeable and substantial, especially in the winter months when sunlight hours are reduced to begin with.

21. These are annual average losses, and have been broken down by aspect, floor, and day. When broken down by days of the year, there are differences, as follows:

Day 80	Floor	% change from Baseline to Scenario A	% change from Baseline to Scenario B	% change from Baseline to Scenario C	% change from Baseline to Scenario D
	First floor	-2.71%	-4.13%	-4.13%	-22.96%
	Ground floor	-2.04%	-3.79%	-3.79%	-15.81%
Day 171	First floor	-2.38%	-10.71%	-10.71%	-28.17%
	Ground floor	-4.08%	-8.90%	-8.90%	-21.18%
Day 266	First floor	-2.76%	-4.18%	-4.18%	-22.60%
	Ground floor	-1.95%	-3.89%	-3.89%	-15.63%
Day 354	First floor	-1.63%	-2.85%	-2.85%	-11.12%
	Ground floor	-2.40%	-5.89%	-5.16%	-18.45%

Figure 1 Daily average sunlight hour loss per scenarios for days of year and floors

22. Scenario A is a two storey MDRS. It results in the least shading on adjacent buildings on all days of the year, which is consistent with the slightly different approach I undertook to modelling it in the first round of results, however, I consider the second round results to be a more accurate depiction of the scenario.

23. Scenario B is the ODP recession planes and height in relation to boundary at 11m (three storeys), and Scenario C is the proposed Christchurch PC14 approach. These are very similar in outcome in terms of shading effects. Scenario D is the full MDRS, which on average would result in a 20%-30% increase in shading on adjacent properties at ground and first floor levels.

Appropriate access to direct sunlight in winter

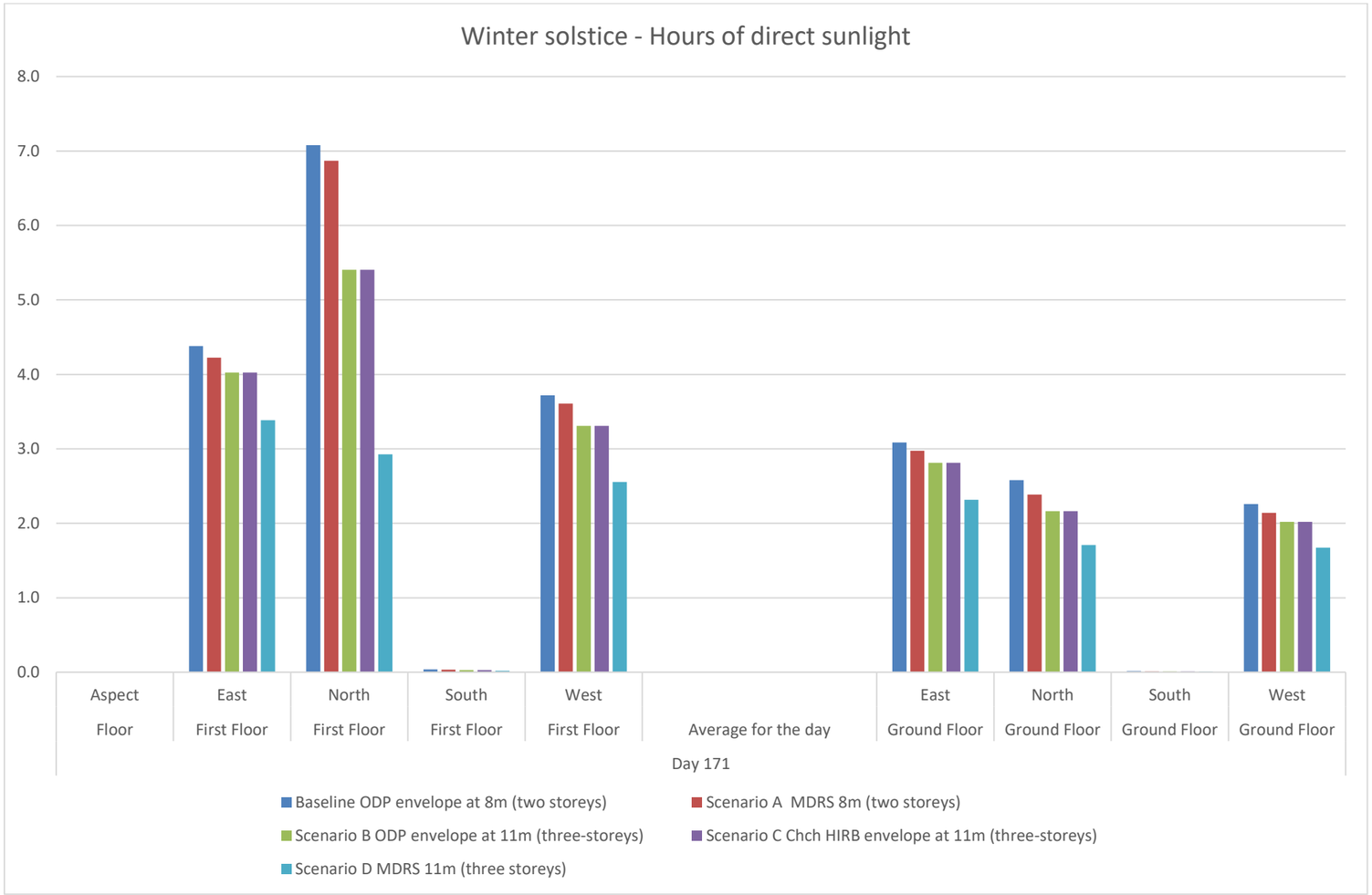


Figure 2 Hours of direct sunlight at the winter solstice

24. The Panel has asked about what is appropriate access to direct sunlight. My understanding, based on Mr McIndoe's evidence, is that this would need to 3 hours or more for a living space. Mr Kemp, for Kainga Ora, also considered this to be a standard.

25. The challenge in this assessment is that as permitted activity, buildings can be erected on neighbouring properties with no consideration of which aspects of existing buildings (at both ground level and first floor level) are designed to receive sun currently, or will be designed to receive sun. This means that MDRS buildings constructed first, can then become shaded by additional buildings constructed next door.

26. In winter there is less direct sunlight received. It is a particular issue for the ground floor northern and western aspects, noting that the eastern aspects receive just over three hours of direct sun on the shortest day of the year, and the southern aspects receive none. In a first floor scenario, all aspects apart from the southern aspect receive more than 3 hours of sunlight per day.

27. As built form scenarios are modelled, the number of hours of direct sunlight received is reduced. In winter, the losses are more substantial than the overall annual average losses, because the amount of hours received is low to begin with. For instance, in the event of a full MDRS (Scenario D) it is between a 25-30% loss of direct sun for ground floors, and between 20%-60% loss for first floors, with all but the northern aspects of a first floor building dropping below 3 hours of direct sunlight per day.

28. When a modified MDRS is modelled, the sunlight loss is less, but still between 10%-20% direct sun is lost. Only the eastern aspects of ground floor sites receive more than 3 hours of direct sunlight during winter months. Therefore, the loss of additional hours of sunlight is more substantial than in summer as the starting point is lower. Under a full MDRS, most of a ground floor of a building would struggle to receive more than 2 hours of direct sun per day. However, under a modified MDRS, aspects can receive more than two hours on northern aspects, and up to nearly three hours on eastern aspects.

Recommendations

29. I originally proposed restricting height to two storeys, or 8 metres. This would ensure that some aspects of a building can receive 3 hours or more of winter sunlight. My statements on this still stand, as if height was restricted to two storeys, then three hours or more sunlight access to adjacent properties would be retained, at least on one aspect.

30. However, in looking at the results, a modified height in relation to boundary and recession plane angle can achieve three storeys with only a modest additional reduction in sunlight hours. This increase in shading time is of the order of 15-20 minutes or so, and may be unnoticeable at this level. Thus, in considering the results, and the requirement to limit any proposed qualifying matters to ensure that the MDRS is as enabling as possible, I do now consider that 11m, albeit with a modified recession plane, is possible. I do not consider that the full MDRS, with a 20% to 30% loss of sunlight would be appropriate, especially as on some aspects of a building it would halve the amount of direct sunlight received.

31. The choice is between Scenario B – using the operative district plan height in relation to boundary and recession planes, and Scenario C, the proposed Christchurch PC14 HIRB provisions. Within the granularity of my modelling, there is no noticeable difference between them.

32. However, I note that Scenario C applies a height in relation to boundary of 3m, and a recession plane of 55 degrees, with MDRS setbacks of 1m or 1.5m from the boundary. Scenario B, or the operative plan approach, applies a height in relation to boundary of 2.5m, with compass angle based recession planes, the most stringent of which is 35 degrees (for southern aspects of a building). Scenario C setbacks are 2m from the boundary. Thus whilst my modelling shows no difference between the two scenarios, in reality, there may be particular sites where, a building is hard up against a setback and boundary, where the steeper 55 degree recession plane on all sides of a building, and the higher starting height, does produce a more detrimental outcome on an adjacent property.

33. Thus, I prefer Scenario C as the basis of a qualifying matter. Such a scenario would continue an approach to development that is well known and understood within the district, albeit at 11m, rather than 8m.
34. I note the concerns from some submitters about enabling the full MDRS, or perhaps greater height. Adopting Scenario C as a qualifying matter may reconcile this seemingly contradictory position. The district has large site sizes, and in the context of new developments, existing large site sizes may be amalgamated for the purposes of developments. Given the existing large site sizes, and plenty of room to build, I consider that the operative plan recession planes, and HIRB provide an appropriate control on sunlight access for neighbouring sites without having to restrict height directly. Thus large sites can have three (or perhaps more) storeys, provided they keep within the recession planes. I noted that in the course of my modelling, 11m, with two to three buildings per allotment could be achieved.

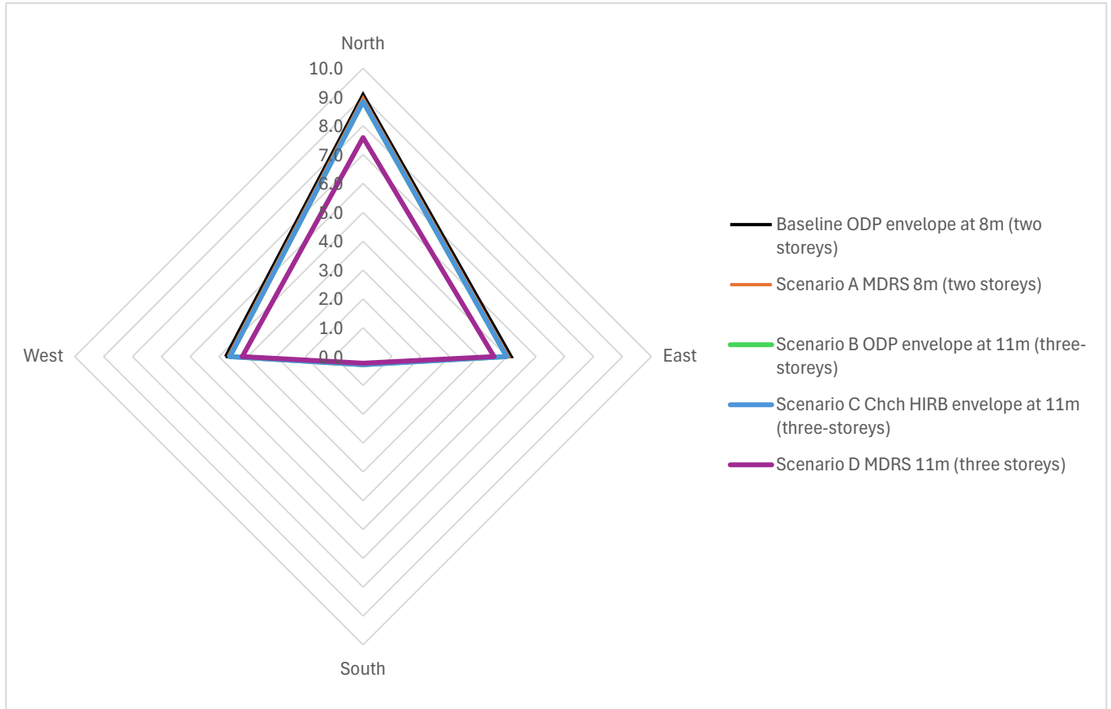
Results

Interpreting results - the radar plots below show hours of direct sunlight received on each of the four primary aspects of a building. The area within the shape is a representation of the total sunlight received. Where a coloured line cannot be seen in a plot means that it lies underneath another line, because of the similarity. In these cases, the numerical results show the difference, if any.

Ground floor	First floor

Day	80
Floor	Ground Floor

	Hours of direct sunlight				
Aspect of building	**Baseline ODP envelope at 8m (two storeys)**	**Scenario A MDRS 8m (two storeys)**	**Scenario B ODP envelope at 11m (three-storeys)**	**Scenario C Chch HIRB envelope at 11m (three-storeys)**	**Scenario D MDRS 11m (three storeys)**
North	9.1	9.0	8.8	8.8	7.6
East	5.1	5.0	5.0	5.0	4.5
South	0.3	0.3	0.3	0.3	0.2
West	4.8	4.7	4.6	4.6	4.2

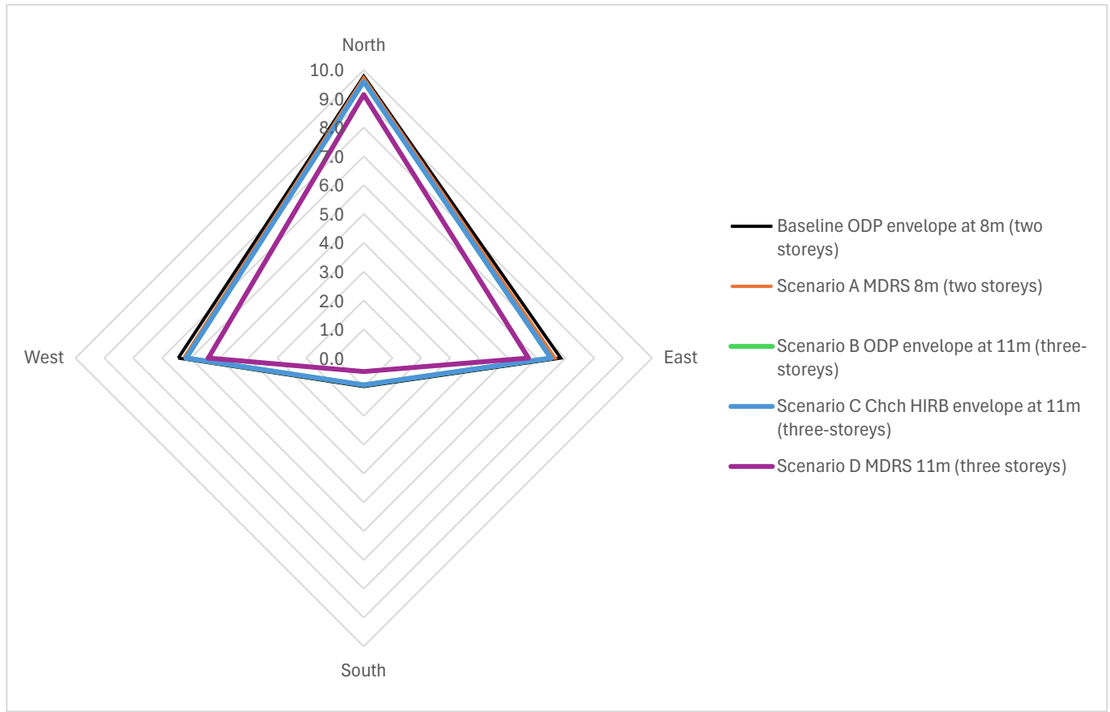


Day	171
Floor	Ground Floor

Hours of direct sunlight

Day	80
Floor	First Floor

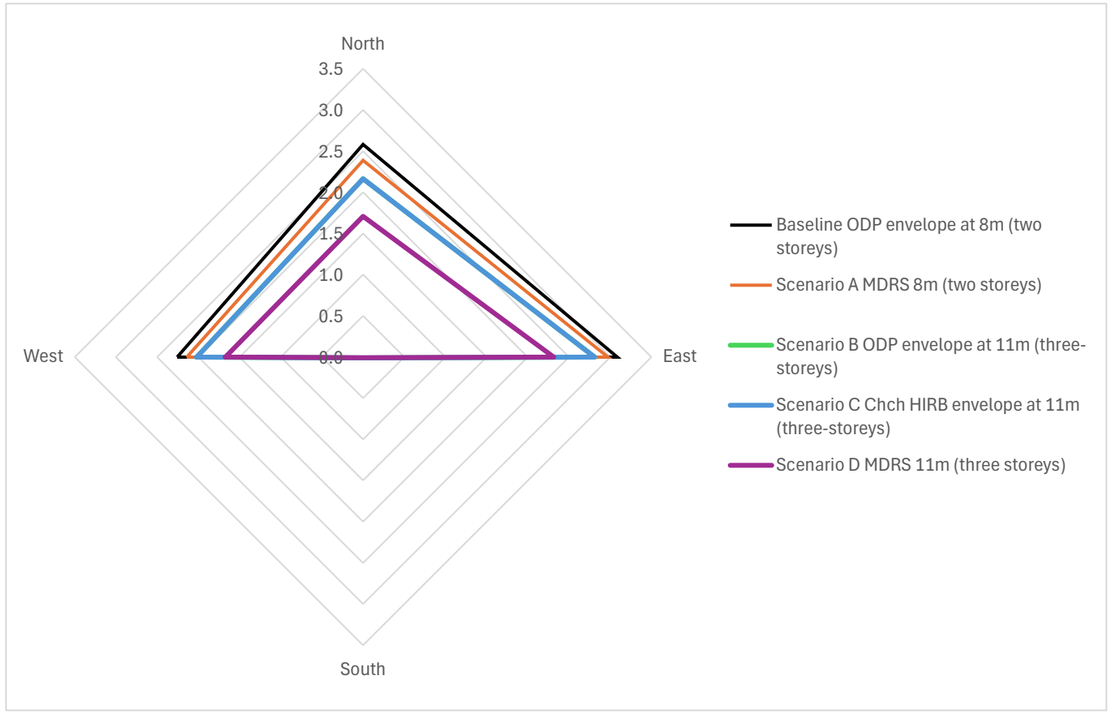
	Hours of direct sunlight				
Aspect of building	**Baseline ODP envelope at 8m (two storeys)**	**Scenario A MDRS 8m (two storeys)**	**Scenario B ODP envelope at 11m (three-storeys)**	**Scenario C Chch HIRB envelope at 11m (three-storeys)**	**Scenario D MDRS 11m (three storeys)**
North	9.8	9.7	9.6	9.6	9.1
East	6.8	6.6	6.5	6.5	5.7
South	1.0	0.9	0.9	0.9	0.5
West	6.4	6.2	6.2	6.2	5.4



Day	171
Floor	First Floor

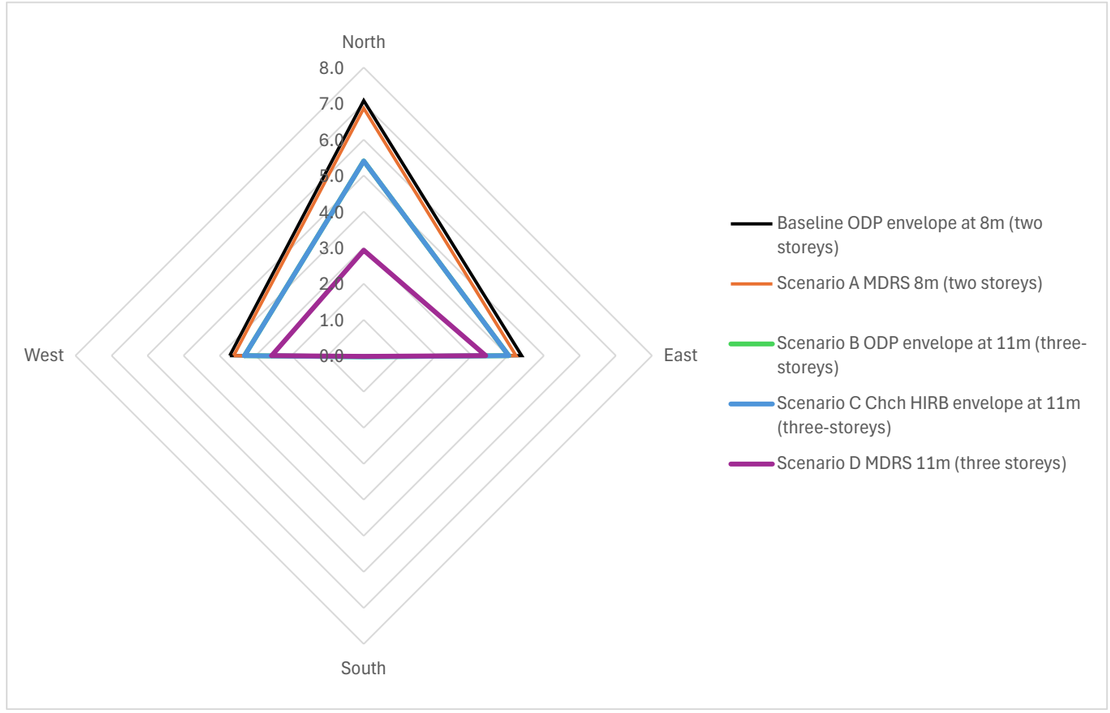
Hours of direct sunlight

Aspect of building	Baseline ODP envelope at 8m (two storeys)	Scenario A MDRS 8m (two storeys)	Scenario B ODP envelope at 11m (three-storeys)	Scenario C Chch HIRB envelope at 11m (three-storeys)	Scenario D MDRS 11m (three storeys)
North	2.6	2.4	2.2	2.2	1.7
East	3.1	3.0	2.8	2.8	2.3
South	0.0	0.0	0.0	0.0	0.0
West	2.3	2.1	2.0	2.0	1.7



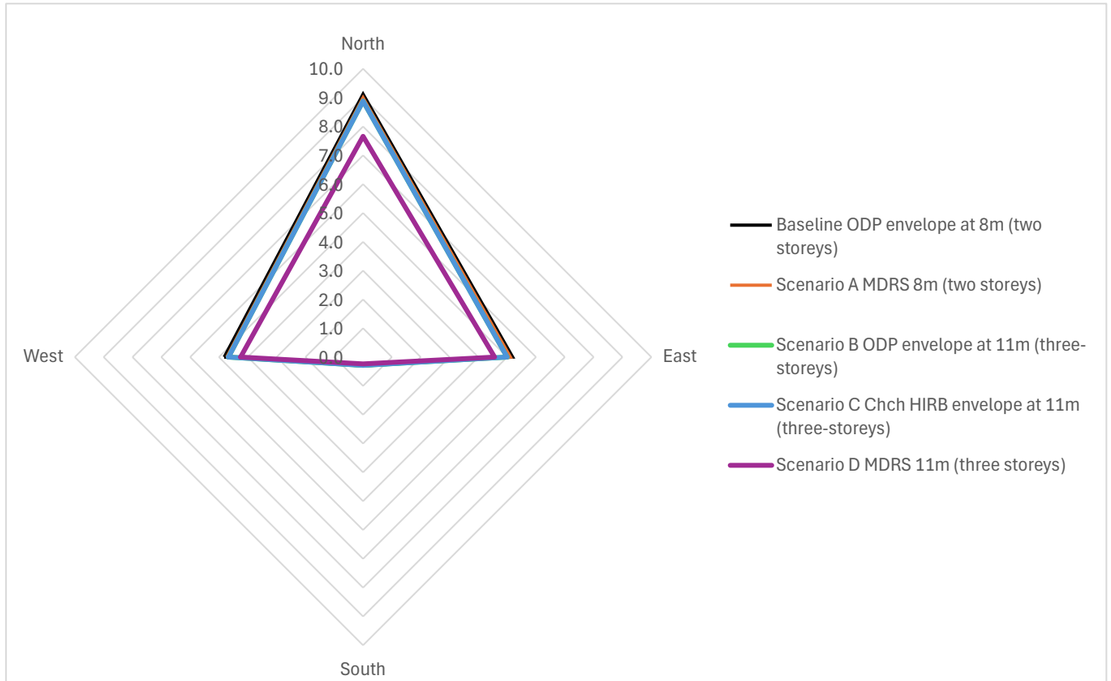
Day	266
Floor	Ground Floor
	Hours of direct sunlight

Aspect of building	Baseline ODP envelope at 8m (two storeys)	Scenario A MDRS 8m (two storeys)	Scenario B ODP envelope at 11m (three-storeys)	Scenario C Chch HIRB envelope at 11m (three-storeys)	Scenario D MDRS 11m (three storeys)
North	7.1	6.9	5.4	5.4	2.9
East	4.4	4.2	4.0	4.0	3.4
South	0.0	0.0	0.0	0.0	0.0
West	3.7	3.6	3.3	3.3	2.6



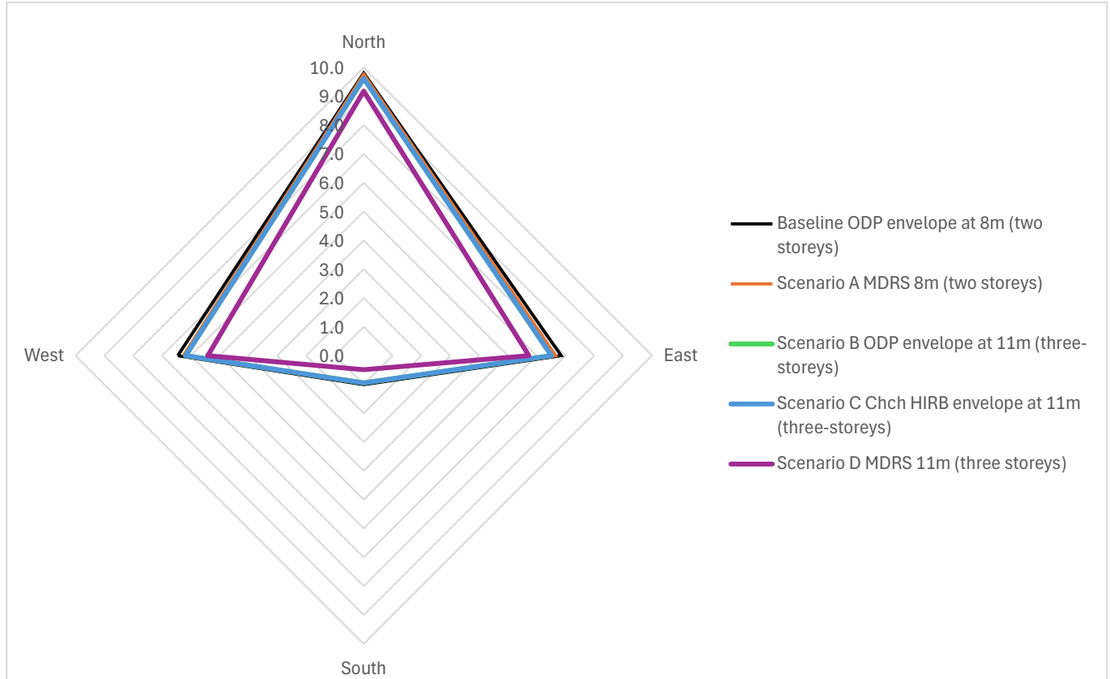
Day	266
Floor	First Floor
	Hours of direct sunlight

Aspect of building	Baseline ODP envelope at 8m (two storeys)	Scenario A MDRS 8m (two storeys)	Scenario B ODP envelope at 11m (three-storeys)	Scenario C Chch HIRB envelope at 11m (three-storeys)	Scenario D MDRS 11m (three storeys)
North	9.1	9.0	8.9	8.9	7.7
East	5.2	5.1	5.0	5.0	4.6
South	0.3	0.3	0.3	0.3	0.2
West	4.8	4.7	4.7	4.7	4.2



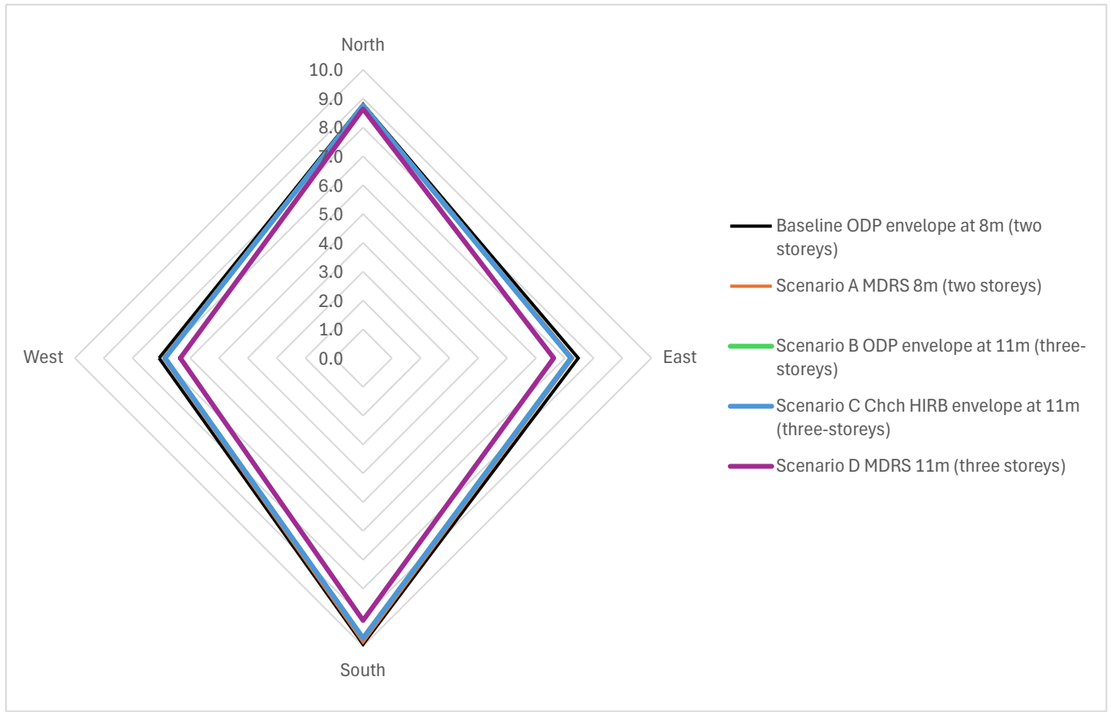
Day	354
Floor	Ground Floor
	Hours of direct sunlight

Aspect of building	Baseline ODP envelope at 8m (two storeys)	Scenario A MDRS 8m (two storeys)	Scenario B ODP envelope at 11m (three-storeys)	Scenario C Chch HIRB envelope at 11m (three-storeys)	Scenario D MDRS 11m (three storeys)
North	9.8	9.8	9.6	9.6	9.2
East	6.8	6.7	6.5	6.5	5.7
South	1.0	1.0	0.9	0.9	0.5
West	6.5	6.3	6.2	6.2	5.4

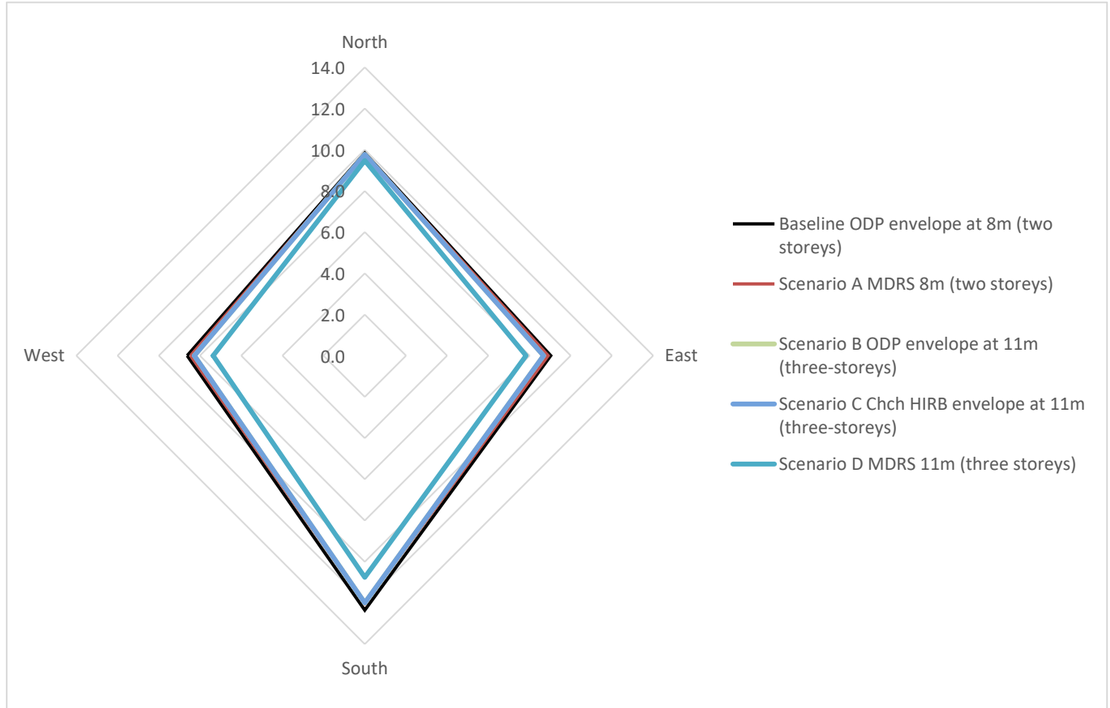


Day	354
Floor	First Floor
	Hours of direct sunlight

Aspect of building	Baseline ODP envelope at 8m (two storeys)	Scenario A MDRS 8m (two storeys)	Scenario B ODP envelope at 11m (three-storeys)	Scenario C Chch HIRB envelope at 11m (three-storeys)	Scenario D MDRS 11m (three storeys)
North	8.8	8.8	8.8	8.8	8.6
East	7.5	7.3	7.2	7.2	6.6
South	9.9	9.9	9.7	9.7	9.1
West	7.1	6.9	6.9	6.9	6.3



Aspect of building	Baseline ODP envelope at 8m (two storeys)	Scenario A MDRS 8m (two storeys)	Scenario B ODP envelope at 11m (three-storeys)	Scenario C Chch HIRB envelope at 11m (three-storeys)	Scenario D MDRS 11m (three storeys)
North	9.8	9.8	9.8	9.8	9.5
East	9.0	8.9	8.7	8.7	7.8
South	12.3	12.0	12.0	12.0	10.8
West	8.6	8.5	8.3	8.3	7.4



Day	Hours of

direct sunlight

Multiple aspects can receive sunlight at the same time

Day	Scenario Floor	Aspect of building	Baseline ODP envelope at 8m (two storeys)	Scenario A MDRS 8m (two storeys)	Scenario B ODP envelope at 11m (three-storeys)	Scenario C Chch HIRB envelope at 11m (three-storeys)	Scenario D MDRS 11m (three storeys)	% change from Baseline to Scenario A	% change from Baseline to Scenario B	% change from Baseline to Scenario C	% change from Baseline to Scenario D
80	First Floor	East	6.8	6.6	6.5	6.5	5.7	-2.84%	-4.96%	-4.96%	-16.35%
80	First Floor	North	9.8	9.7	9.6	9.6	9.1	-0.53%	-1.90%	-1.90%	-6.52%
80	First Floor	South	1.0	0.9	0.9	0.9	0.5	-4.50%	-5.41%	-5.41%	-52.77%
80	First Floor	West	6.4	6.2	6.2	6.2	5.4	-2.94%	-4.25%	-4.25%	-16.20%
80	Ground Floor	East	5.1	5.0	5.0	5.0	4.5	-1.81%	-3.13%	-3.13%	-11.64%
80	Ground Floor	North	9.1	9.0	8.8	8.8	7.6	-1.44%	-2.76%	-2.76%	-16.49%
80	Ground Floor	South	0.3	0.3	0.3	0.3	0.2	-3.08%	-6.12%	-6.12%	-22.95%
80	Ground Floor	West	4.8	4.7	4.6	4.6	4.2	-1.84%	-3.14%	-3.14%	-12.15%
	Day 171										
171	First Floor	East	4.4	4.2	4.0	4.0	3.4	-3.58%	-8.17%	-8.17%	-22.73%
171	First Floor	North	7.1	6.9	5.4	5.4	2.9	-3.01%	-23.67%	-23.67%	-58.66%
171	First Floor	South	0.0	0.0	0.0	0.0	0.0	0.00%	0.00%	0.00%	0.00%
171	First Floor	West	3.7	3.6	3.3	3.3	2.6	-2.95%	-11.01%	-11.01%	-31.28%
171	Ground Floor	East	3.1	3.0	2.8	2.8	2.3	-3.67%	-8.91%	-8.91%	-25.00%
171	Ground Floor	North	2.6	2.4	2.2	2.2	1.7	-7.50%	-16.15%	-16.15%	-33.82%
171	Ground Floor	South	0.0	0.0	0.0	0.0	0.0	0.00%	0.00%	0.00%	0.00%
171	Ground Floor	West	2.3	2.1	2.0	2.0	1.7	-5.17%	-10.52%	-10.52%	-25.92%
	Day 266										
266	First Floor	East	6.8	6.7	6.5	6.5	5.7	-2.80%	-4.93%	-4.93%	-16.35%
266	First Floor	North	9.8	9.8	9.6	9.6	9.2	-0.45%	-1.92%	-1.92%	-6.38%
266	First Floor	South	1.0	1.0	0.9	0.9	0.5	-4.77%	-5.58%	-5.58%	-51.51%
266	First Floor	West	6.5	6.3	6.2	6.2	5.4	-3.01%	-4.27%	-4.27%	-16.16%
266	Ground Floor	East	5.2	5.1	5.0	5.0	4.6	-1.50%	-3.69%	-3.69%	-12.05%
266	Ground Floor	North	9.1	9.0	8.9	8.9	7.7	-1.39%	-2.64%	-2.64%	-16.05%
266	Ground Floor	South	0.3	0.3	0.3	0.3	0.2	-3.07%	-6.17%	-6.17%	-22.64%
266	Ground Floor	West	4.8	4.7	4.7	4.7	4.2	-1.84%	-3.07%	-3.07%	-11.79%
	Day 354										
354	First Floor	East	9.0	8.9	8.7	8.7	7.8	-1.38%	-3.84%	-3.84%	-13.27%
354	First Floor	North	9.8	9.8	9.8	9.8	9.5	-0.57%	-0.68%	-0.68%	-3.70%

354	First Floor	South	12.3	12.0	12.0	12.0	10.8	-2.66%	-2.85%	-2.85%	-12.89%
354	First Floor	West	8.6	8.5	8.3	8.3	7.4	-1.89%	-4.03%	-4.03%	-14.62%
354	Ground Floor	East	7.5	7.3	7.2	7.2	6.6	-2.54%	-3.36%	-3.36%	-11.39%
354	Ground Floor	North	8.8	8.8	8.8	8.8	8.6	-0.32%	-0.53%	-0.53%	-1.84%
354	Ground Floor	South	9.9	9.9	9.7	9.7	9.1	-0.77%	-2.12%	-2.12%	-8.32%
354	Ground Floor	West	7.1	6.9	6.9	6.9	6.3	-2.19%	-2.91%	-2.91%	-10.41%

Figure 3 Overall results

Appendix D – Graeme McIndoe peer review of additional modelling

Urban Design Memo

To	The Independent Hearings Commissioners
Copy to	WDC attention Peter Wilson
From	Graeme McIndoe, Director McIndoe Urban Ltd
Date	25 November 2024
Subject	**Variation 1 to the Waimakariri District Plan** **Urban Design Review of WDC Shading Analysis methodology**

Scope of Review

1. This memo is my response to the Panel's request below to Mr Wilson, with the specific matter relevant to this memo highlighted:

   Please respond to Mr Heath's verbal answers to the Panel's questions regarding:

   a) the relative viability of 2, 3 and 4 storey development

   b) the methodology used in your Appendix E to represent the shading effects from existing development being increased in height. ***In answering this question, we request that Mr McIndoe review your methodology and provide his opinion to the appropriateness of it in demonstrating the impact of applying the MDRS****.*

2. I have reviewed the methodology from my architectural and urban design perspective. This is informed by my background in academia; my building science qualification; and decades of practice including in shading studies.

3. Following the hearing I have reviewed Mr Wilson's evidence and description of methodology as presented to the hearing, provided detailed feedback, and discussed that with him. Subsequently I have also reviewed two iterations of Mr Wilson's further work in progress, given detailed feedback on the methodology to assist with refinement, and also discussed this feedback with Mr Wilson. Most recently, on the date of this memo, I have viewed Mr Wilsons's latest draft shading analysis.

4. Specific exclusions in relation to the above:
   a. Mr Wilson makes recommendations on the district plan standards that should apply based on the outcomes of this study. That is an RMA planning matter and outside the scope of this review of methodology.
   b. I use data from and work with experts in Global Information Systems but GIS is not my skill. This review also does not include critique of programming or software which is outside my sphere of expertise.

General observations on methodology

5. Use of lidar imagery is industry standard practice in understanding regional terrain.[1]

6. Mr Wilson's explanation of the r.sun technique in his evidence is comprehensive and clear and in my opinion the technique is fit for purpose.
   a. The software *"**r.sun** computes beam (direct), diffuse and ground reflected solar irradiation raster maps for given day, latitude, surface and atmospheric conditions."*
   b. GRASS GIS which is the source of this software originated with work in 1982 in the US Army Corps of Engineers Construction Engineering Research Laboratory. With development from then it became in 2006 a founding project managed by the Open Source Geospatial Foundation (OSGeo). It is managed by a Project Steering committee with members from various universities and agencies in the US and Europe. [2]

7. While noting the scope exclusion above, from an overview perspective the software Mr Wilson uses is apparently internationally well understood. The approach is broadly similar to that used by Sense Partners/PWC in their work for the MfE as described by Mr Wilson in his evidence. I have also reviewed the MfE modelling as cited and agree with Mr Wilson's summary.
   - Sense Partners and PWC (for MfE) selected sample sites in various cities including Christchurch and the extent of shade estimated with use of the Icarus model.
   - The findings were calibrated to a 2018 study (Fleming et al 2018) which estimated the value of shade for Wellington.[3]
   - In the MfE study, price is extrapolated from sunlight received, but does not, as Mr Wilson has identified, highlight actual measurement of the sunlight received.
   - The MfE study was a whole of nation overview and looked at sample sites. Mr Wilson's study looked at every site in the identified four WDC urban areas.

8. Irrespective of the merits of the MfE approach, it is logical and appropriate, as Mr Wilson has done for this study of urban sites in the WDC district, to instead measure hours of sunlight received.

Key changes to Mr Wilson's methodology since the hearing

New focus on hours of sunlight rather than energy received

9. In developing the shading study Mr Wilson has focused the output on describing the hours of sunlight received rather than energy received as in the previous analysis. I agree with Mr Wilson that this is most helpful as the number of sunlight hours received is both objectively measurable and can readily be understood.

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[1] LIDAR was also used in the same way in the January 2022 Sense Partners / PWC study. (Refer page 145.)

[2] https://grass.osgeo.org/grass84/manuals/r.sun.html sourced 7 October 2024

[3] Sense Partners and PWC (page 147)

Geographical scope of testing

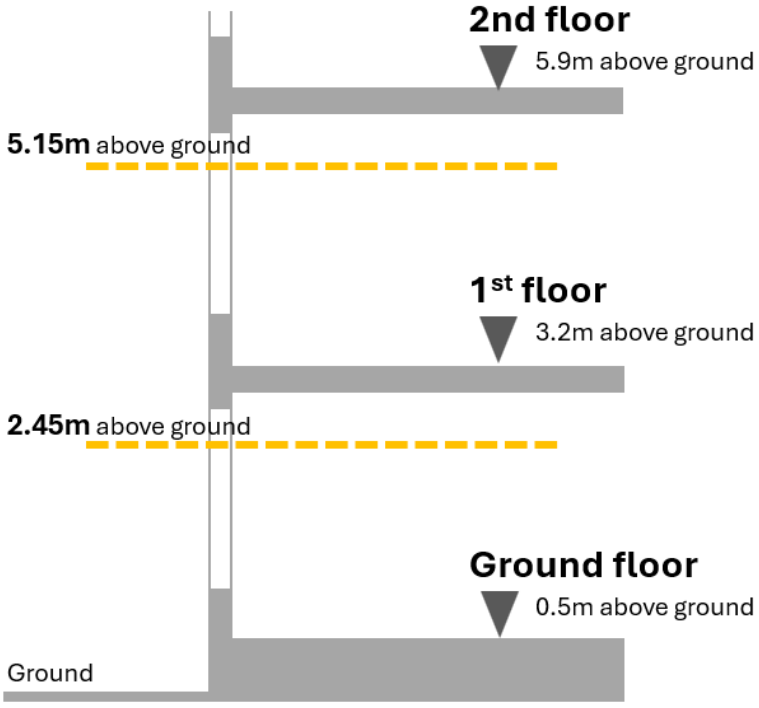
10. The study investigates attached dwellings on each residential lot in the district. Testing on all actual residential lots throughout Rangiora, Woodend/Pegasus, and Kaiapoi ensures fully comprehensive site-specific testing through the district.

Type of development tested

11. Appropriately, this now relates to how multi-unt developments of three units are, under the MDRS, likely to be developed on a single lot. Mr Wilson has described these as 'consolidated' forms. These consolidated, attached, multi-unit forms also relate to the site planning studies carried out by McIndoe Urban and described in my urban design evidence to the hearing.

Parameters for scenario modelling of forms

12. The horizontal planes for sunlight assessment at ground and first floors are set at 2.45m and 5.15m above ground respectively as described in the diagram below. This relates to the following parameters which I advised Mr Wilson on:
    a. The ground floor is nominally 0.5m above ground to allow for the combination of drainage gradients required on even nominally 'flat' sites, and the height above finished ground to meet New Zealand Building Code requirements;
    b. Based on examples of projects from WDC, 2.7m is a common and suitably representative floor to floor dimension.
    c. The diagram shows that the planes on which sunlight is measured are, at 1.95m above floor level. That is approximately 0.25m below typical window head height which is a suitable datum for measuring sunlight into the windows of a house. Other heights could be used, but because all models consistently use the same datum levels, the outcome of comparative assessment will be sound.



Boundary setbacks

13. In the absence of specific site planning of every lot in the sunlight model, 3m boundary setbacks have been used. This is a realistic representative boundary setback for the purpose of modelling consolidated multi-unit development. That is because it allows for the MDRS private outdoor space. In the reality of planning any lot there would be increased setbacks on some sides of any development to allow for vehicle circulation and also potentially for the MDRS 4m outlook space from living rooms. At the same time there would be reduced setbacks on other sides.

Scenarios tested

14. The number of scenarios has been increased and their parameters adjusted to allow robust and relevant comparison. These:
    a. Allow identification of change relative to the existing situation, the 'base case';
    b. When applying the MDRS 11m+1m maximum height, identify the sunlight hours difference between the MDRS HIRB and Operative WDC HIRB; and
    c. When applying the MDRS HIRB, identify the difference between maximum heights of 11+1m and 8+1m.

15. Thus the effect of varying height, and the effect of varying HIRB can be independently measured and assessed. It also allows the magnitude of these effects relative to the base case to be measured and understood. That in turn gives a sense of the magnitude of the sunlight hours change that may occur when varying height and/or HIRB. This provides quantitative evidence that will inform robust determination of the appropriate height and HIRB standards with consideration of the sunlight/shading qualifying matter.

Conclusions

Appropriateness of methodology

16. Returning to the question asked by the Panel:
    a. I have reviewed Mr Wilson's methodology and consider with qualification noted above on excluding review of the software and programming, that the methodology used is sound.
    b. This methodology is highly appropriate as a means of demonstrating the impact of applying the MDRS on sunlight and shading. That is because it is based on suitably representative parameters for development, provides robust quantitative outcomes and is comprehensively applied to all sites in the district.

17. While there is, as with all simulations and modelling, some element of simplification in the development parameters, the same simplifications apply to all scenarios. Therefore, the methodology provides robust comparative assessment.

Appropriateness of presentation

18. Presentation of findings tabulating the percentage change in sunlight hours in combination with simple to understand diagrams showing the hours of sunlight from each aspect allow the results of the r-sun analysis to be clearly understood.

Final outputs

19. I have reviewed and commented in writing on the tabulated outputs delivered to me in draft form on 25 November 2024. In doing so I have searched for both patterns of logical consistency and any anomalies in the draft results. I have advised Mr Wilson accordingly to assist him with verification and/or refinement. I have not viewed the final outcome of this analysis which is to be confirmed after 25 November.

Graeme McIndoe
Architect and Registered Urban Designer (UDIA) Director, McIndoe Urban Ltd

Appendix E – Consideration of Ms Dale's relief, for Kainga Ora

Kāinga Ora Stream 7B Updated Relief Sought following s42A

In the tables below black text is as notified, red text is V1 as notified, "green mark up" amendments from Section 42A Report, and **"pink mark up"** Kāinga Ora evidence relief sought.

Variation 1 – Relief Sought

RESZ-P15	Medium Density Residential Standards Apply the Medium Density Residential Standards across all relevant residential zones in the District Plan except in circumstances where **greater building height is provided for in an identified area around the Rangiora Town Centre Zone and** a qualifying matter is relevant (including matters of significance such as historic heritage and the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga).

In considering this, I note that RESZ-P15 is a compulsory policy under the MDRS. As stated in my right of reply in response to the issue of changing compulsory objectives and policies, I consider that I cannot change this objective or policy, except for minor grammatical changes. Even if I were to have scope to change it, I do not consider it fair or reasonable to change it to reference one qualifying matter only, rather than all qualifying matter. RESZ-P15 and the compulsory policy it implements is not a list of qualifying matters – that list is in Table RSL-1. I also consider that if the HVCA is accepted, then there is no need to adjust any policy, as the medium density residential standards apply as a minimum. Although I do not support the proposed HVCA, the changes Kainga Ora seek in respect of MRZ-O1 below are more consistent with the drafting of V1.

MRZ-O1	Housing types and sizes The Medium Density Residential Zone provides for a variety of housing types and sizes that respond to: i. housing needs and demand; and ii. the neighbourhood's planned urban built character, including 3-storey buildings and up to five stories where identified.

In considering this, I note that I consider that the drafting approach is more appropriate (unlike above), but still requires a more than grammatical change to a compulsory MDRS objective and policy. As stated for the reasons in my Right of Reply, I do not support five stories, due to the absence of evidence presented by Kainga Ora both on demand for this typology, and the likely effects, including sunlight and shading, that would result from this.

MRZ-P1	Housing types Enable a variety of housing types with a mix of densities within the zone, including 3-storey attached and detached dwellings, and low-rise apartments, including apartments of up to five stories in an identified area around the Rangiora Town Centre Zone, except as directed by a qualifying matter.

In considering this, I note that I consider that the drafting approach is appropriate (unlike above), however, as stated for the reasons in my Right of Reply, I do not support five stories, due to the absence of evidence presented by Kainga Ora both on demand for this typology, and the likely effects, including sunlight and shading, that would result from this.

MRZ-P3	Residential character Enable development including building and activities to achieve the character and amenity values anticipated by the planned built form for the zone, which provides for:1. Medium density living across the zone consisting of a mix of detached, semi detached, multi-unit and low rise apartment living options, with increased height **opportunities surrounding the Rangiora Town Centre.**

2. Re-development opportunities for three or more residential units through flexible development controls.

3. Good quality building and landscape design which ensures development contributes to a safe and attractive public realm and streetscape.

4. Appropriate internal amenity for residents including quality outdoor living spaces and services space.

5. Integrated provision of vehicle and pedestrian access and parking.

~~Provide for activities and structures that support and maintain the achieve the character and amenity values anticipated for the zone, which provides for:~~

~~1. higher density living in areas with better access for walking to parks, main centres or local commercial centres;~~
~~2. multi-unit redevelopment opportunities through flexible development controls and encouragement for multi-site redevelopment;~~
~~3. high quality building and landscape design for multi-unit residential development with appropriate streetscape landscaping and positive contribution to streetscape character;~~
~~4. provides for a peaceful residential environment, in particular minimising the adverse effects of night time noise and outdoor lighting, and limited signs;~~

	~~5. appropriate internal amenity within sites;~~ ~~6. a mix of detached, semi-detached and multi-unit living;~~ ~~7. small-scale commercial, or community-based activities, that service the local community, and home-businesses; and a wider range of home business-based commercial activity in the Residential Commercial Precinct adjacent to Rangiora Town Centre.~~

In considering this, I note that I consider that the drafting approach is appropriate, however, as stated for the reasons in my Right of Reply, I do not support five stories, due to the absence of evidence presented by Kainga Ora both on demand for this typology, and the likely effects, including sunlight and shading, that would result from this.

-

MRZ-BFS4 Height	
1. ~~The maximum~~ height ~~of any~~ building ~~shall be 12m above~~ ground level. 1. Buildings must not exceed ~~11~~ ~~8~~ 11 metres in height, except that 50% of a building's roof in elevation, measured vertically from the junction between wall and roof, may exceed this height by 1 metre, where the entire roof slopes 15° or more, as shown in Figure MRZ-1. Legal Effect The highlighted yellow text identifies the part of the standard that has immediate legal effect if no qualifying matter applies.	Activity status when compliance not achieved: RDIS Matters of discretion are restricted to: • RES-MD5 - Impact on neighbouring property Notification Refer to notification status in MRZ-BFS1.

In considering this, I note the Kainga Ora version of the relief still applies a 11m height limit, not the five or more stories that their objectives and policies seek. Thus on the drafting presented by Ms Dale, their MRZ-BFS4 is inconsistent with the objectives and policies that they have put forward. For the activity status and matter of discretion, the KO relief is much the same as mine.

MRZ-BFS5 Building and structure setbacks

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1. Any building or structure ~~other than a garage~~ shall be set back a minimum of ~~2~~1.5m from any road boundary ~~(other than a strategic road or arterial road boundary where the minimum setback shall be 6m)~~ except for: ~~a.~~ any fence permitted by MRZ-BFS8; ~~b.~~ poles and masts up to 6.5m in height above ground level; ~~c.~~ structures other than a fence, less than 10m² and less than 3m in height above ground level; ~~d.~~ any caravan; ~~e.~~ the replacement, maintenance and minor upgrading of any infrastructure; and ~~f.~~ any structure or residential unit adjoining an accessway that does not have doors or windows that open into that accessway. 2. ~~Any garage shall be set back a minimum of 6m from the~~ road boundary. 3. ~~2.~~ Any building or structure shall be set back a minimum of 1m from any internal boundary (except on corner sites) except that buildings on adjoining sites which share a common wall, the internal setback shall not apply along that part of the internal boundary covered by such a wall. 4. Habitable room ~~windows within any~~ residential unit ~~on the first floor or above shall avoid direct views into an adjacent~~ residential unit ~~located within 9m by:~~ ~~a. being offset by a minimum of 0.5m in relation to any existing window in an adjacent~~ residential unit~~; or~~ ~~b. having sill heights of 1.5m above~~ floor level~~; or~~ ~~c. having fixed obscure glazing below 1.5m above~~ floor level. ~~5.~~3. On corner sites, vegetation or structures exceeding 1m in height above ground level shall not be located within the structure and vegetation setback area identified by Figure MRZ-~~2~~1. ~~6.~~4. All buildings shall be set back a minimum of ~~4.5m~~ 2.5m from any site boundary with the rail corridor.	Activity status when compliance not achieved: RDIS Matters of discretion are restricted to: • ~~RES-MD2 – Residential design principles~~ • RES-MD5 - Impact on neighbouring property • RES-MD6 – Road boundary setback Notification ~~An application for a restricted discretionary activity under this rule is precluded from being publicly notified, but may be limited notified~~. Refer to notification status in MRZ-BFS1.

5. Any building or structure shall be set back a minimum of 12m from any National Grid support structure as per rule EI-R51. Legal Effect The highlighted yellow text identifies the part of the standard that has immediate legal effect if no qualifying matter applies.	

I note the Kainga Ora version of the relief removes the 6m setback qualifying matter from strategic and arterial roads, and does this without undertaking the relevant assessment under s77I or s77L. It also reduces the rail corridor setback qualifying matter from 5m (as proposed in V1), and 4m in the PDP, to 2.5m, again without any s77I or s77L assessment. It also removes the matters of discretion that apply when the MDRS, or the V1 version of it, cannot be met, without an assessment as to why they should be removed. I do not support the removal of RES-MD2 and RES-MD6 as matters of discretion, certainly not without evidence justifying them.

MRZ-BFS6 Street interface	
1. Where the site has direct road frontage, any residential unit ~~or~~ minor residential unit facing the road shall: a. ~~have at least one~~ habitable room ~~or kitchen located facing the street at~~ ground level~~; and~~ b. ~~include at least 20% of the front façade in glazing (within window or door panels) of which at least half is clear; and~~ c. shall have a door that is directly visible and accessible from the street. 2. Garage doors that face the street shall have a combined maximum width of 6.5m.	Activity status when compliance not achieved: RDIS Matters of discretion are restricted to: • RES-MD13 Windows to the street • ~~RES-MD2 – Residential design principles~~ Notification ~~An application for a restricted discretionary activity under this rule is precluded from being publicly notified, but may be limited notified.~~ Refer to notification status in MRZ-BFS1.

I do not support the removal of RES-MD2 as a matter of discretion, certainly not without evidence justifying its removal.

MRZ-BFS7 Height in relation to boundary

1. Buildings must not project beyond ~~a 60° recession~~ plane measured from a point ~~3~~ 4 metres vertically above ground level along all boundaries, as shown Figure MRZ-3. Where the boundary forms part of a legal right of way, entrance strip, access site, or pedestrian access way, the height in relation to boundary applies from the farthest boundary of that legal right of way, entrance strip, access site, or pedestrian access way. This standard does not apply to: a. a boundary with a road b. existing or proposed internal boundaries within a site c. site boundaries where there is an existing common wall between 2 buildings on adjacent sites or where a common wall is proposed. 2. Structures ~~shall not project beyond a~~ building ~~envelope defined by recession planes measured 2.5m from~~ ground level ~~above any~~ site ~~boundary in accordance with the diagrams in~~ Appendix APP3 ~~except for the following:~~ a. ~~flagpoles;~~ b. ~~lightning rods, chimneys, ventilation shafts, solar heating devices, roof~~ water ~~tanks, lift and stair shafts;~~ c. ~~decorative features such as steeples,~~ towers ~~and finials;~~ d. ~~for~~ buildings ~~on adjoining~~ sites ~~which share a common wall, the~~ height in relation to boundary ~~requirement shall not apply along that part of the~~ internal boundary ~~covered by such a wall; and~~	Activity status when compliance not achieved: RDIS Matters of discretion are restricted to: • ~~RES-MD2 - Residential design principles~~ • RES-MD5 - Impact on neighbouring property Notification ~~An application for a restricted discretionary activity under this rule is precluded from being publicly notified, but may be limited notified.~~ Refer to notification status in MRZ-BF

e. ~~where the~~ land ~~immediately beyond the~~ site ~~boundary forms part of any~~ rail corridor~~, drainage reserve, or~~ accessway ~~(whether serving the~~ site ~~or not), the boundary of the~~ rail corridor, ~~drainage reserve, or~~ accessway ~~furthest from the~~ site ~~boundary may be deemed to be the~~ site ~~boundary for the purpose of defining the origin of the recession plane, provided this deemed~~ site ~~boundary is no further than 6m from the~~ site ~~boundary:~~ ~~3. Provided that none of the~~ structures ~~listed in (1) (c) to (e) above has a horizontal dimension of over 3m along the line formed where the~~ structure ~~meets the recession plane as measured parallel to the relevant boundary.~~ ~~3.~~ 2. Where the site is within the Urban Flood Assessment Overlay or Kaiapoi Fixed Minimum Finished Floor Level Overlay, the height of the Finished Floor Level specified in a Flood Assessment Certificate can be used as the origin of the recession plane instead of ground level, but only up to an additional 1m above original ground level. Legal Effect The highlighted yellow text identifies the part of the standard that has immediate legal effect if no qualifying matter applies.	

I do not support the removal of RES-MD2 as a matter of discretion, certainly not without evidence justifying its removal.

RES-MD2	Residential design principles 1. The scale and form of the development is compatible with the planned urban built form of the neighbourhood and will provide visual interest. This includes a variety of building forms, articulation and materials to avoid overly lengthy or continuous rooflines and monolithic forms. 2. Development that contributes to a safe and attractive public realm and streetscape. This includes the provision of landscape and the orientation of building frontages to face the street and open spaces, avoiding street facing facades dominated by garages. 3. Development delivers quality on-site amenity and occupant privacy that is appropriate for its scale. This includes provision of planting including on site boundaries and accessways and creation of usable and attractive outdoor living spaces. 4. Provision of pedestrian and vehicle access and integration of parking (where relevant) in a way that does not dominate the development, particularly when viewed from the street or other public open spaces. 5. Provision of suitable storage and service spaces which are conveniently accessible, safe and/or secure and which are screened from the street or other public open space. 6. Crime Prevention through Environmental Design (CPTED) and the delivery of a safe environment for both occupants and users of any adjacent streets or public open areas. ~~1. Context and character:~~ ~~a. The extent to which the design of the development is in keeping with, or complements, the scale and character of development anticipated for the surrounding area and relevant significant natural, heritage and cultural features.~~ ~~b. The relevant considerations are the extent to which the development:~~ ~~i. includes, where relevant, reference to the patterns of development in and/or anticipated for the surrounding area such as building dimensions.~~

~~forms, setback and alignments, and secondarily materials, design features and tree plantings; and~~

ii. retains or adapts features of the site that contribute significantly to local neighbourhood character, potentially including existing historic heritage items, Sites of Ngāi Tahu Cultural Significance shown on the planning map, site contours and mature trees.

2. Relationship to the street and public open spaces:

a. Whether the development engages with and contributes to adjacent streets, and any other adjacent public open spaces to contribute to them being lively, safe and attractive (including impacts of setback requirements for road or rail).

b. The relevant considerations are the extent to which the development:

i. orientates building frontages including entrances and windows to habitable rooms toward the street and adjacent public open spaces;

ii. designs buildings on corner sites to emphasise the corner;

iii. needs to minimise south-facing glazing to minimise heat loss; and

iv. avoids street façades that are blank or dominated by garages.

3. Built form and appearance:

a. The extent to which the development is designed to minimise the visual bulk of the buildings and provide visual interest.

b. The relevant considerations are the extent to which the development:

i. divides or otherwise separates unusually long or bulky building forms and limits the length of continuous rooflines;

ii. utilises variety of building form and/or variation in the alignment and placement of buildings to avoid monotony;

iii. avoids blank elevations and façades dominated by garage doors; and

iv. achieves visual interest and a sense of human scale through the use of architectural detailing, glazing and variation of materials.

4. Residential amenity:

a. In relation to the built form and residential amenity of the development on the site (i.e. the overall site prior to the development), the extent to which the development provides a high level of internal and external residential amenity for occupants and neighbours.

b. The relevant considerations are the extent to which the development:

i. provides for outlook, sunlight and privacy through the site layout, and orientation and internal layout of residential units;

ii. directly connects private outdoor spaces to the living spaces within the residential units;

iii. ensures any communal private open spaces are accessible, usable and attractive for the residents of the residential units; and

iv. includes tree and garden planting particularly relating to the street frontage, boundaries, accessways, and parking areas.

5. Access, parking and servicing:

a. The extent to which the development provides for good access and integration of space for parking and servicing.

b. The relevant considerations are the extent to which the development:

i. integrates access in a way that is safe for all users, and offers convenient access for pedestrians to the street, any nearby parks or other public recreation spaces;

ii. provides for parking areas and garages in a way that does not dominate the development, particularly when viewed from the street or other public open spaces; and

iii. provides for suitable storage and service spaces which are conveniently accessible, safe and/or secure, and located and/or designed to minimise adverse effects on occupants, neighbours and public spaces.

6. Safety:

a. The extent to which the development incorporates CPTED principles as required to achieve a safe, secure environment.

b. The relevant considerations are the extent to which the development:

i. provides for views over, and passive surveillance of, adjacent public and publicly accessible spaces;

ii. clearly demarcates boundaries of public and private space;

iii. makes pedestrian entrances and routes readily recognisable; and

iv. provides for good visibility with clear sightlines and effective lighting.

Whilst I consider that the amended version is broadly consistent with the notified version, the lack of detail and specificity in the Kainga Ora relief may create issues when it comes to consenting, and with the detail removed, may no longer be considered as restricted discretionary, due to the lack of detail in the matter of discretion.

RES-MD12	Outlook space 1. The ability of the affected habitable room to receive natural light. ~~natural sunlight and daylight especially on the shortest day of the year.~~ 2. The extent to which habitable rooms have an outlook and visual and landscape quality of that space. ~~and sense of space.~~ ~~3. The degree to which a reduction in outlook space would contribute to a visual perception of cramped living conditions.~~

	4. The extent to which visual privacy is provided between habitable rooms of different residential units, on the same site. ~~or adjacent sites.~~ 5. The extent to which the development provides additional outlook spaces from habitable rooms.

There is a tension between Kainga Ora's statements at hearing 7B, in respect of what I consider their consideration was of a direct sunlight standard of 3 hours or more, their stated desires as a "good developer" to achieve winter direct sunlight access in their dwellings, and to also, as I presume, have other developers on their boundary, design in a manner that ensures that their sunlight on their developments is in turn protected. However, the drafting proposed above goes against these statements, and it leads me to question their intent. In considering their intent, am I to consider Mr Kemp's statements in respect of achieving sunlight access, are at odds with Ms Dale's drafting. It does appear from the drafting above that in policy, Kainga Ora are not seeking that direct sunlight in winter is a matter of consideration. I cannot support this relief.

RES-MD14	Landscaped areas 1. The extent to which the proposed landscaping enhances the anticipated residential amenity and is integrated within the site design to: a. define and enhance on-site outdoor living spaces; b. reduce the visual impact of large buildings through screening and planting; c. screen service areas, loading areas, and outdoor storage areas from public vantage points. ~~; and~~ ~~d. mitigate the heat effects from intensification and impervious surfaces.~~ 2. ~~The extent to which the development incorporates CPTED principles as required to achieve a safe, secure environment.~~ 3. The effects on the permeability of the site for stormwater run-off and subsequent effects on adjoining sites.

I note that the proposed removal of the CPTED principle clause is inconsistent with what Kainga Ora seek in RES-MD2, which is to add this factor. What Kainga Ora appear to be stating is that on-site landscaped areas should not consider this factor, except that the design principles for the site should consider it. I consider that the drafting is inconsistent and not integrated. As for anticipated amenity, versus residential amenity, I note that it is the objectives and policies for the zone that set out what the purpose of the zone is, and these would be used to assess the future environment.

RES-MD17	Building Coverage 1. Effects on visual amenity values, including dominance, and the compatibility of the built form with the anticipated character of the zone. ~~with the receiving environment.~~ 2. ~~Provision of adequate outdoor living space on site.~~

I note that it is the objectives and policies for the zone that set out what the purpose of the zone is, and these would be used to assess the future environment.

Table SUB-1: Minimum allotment sizes and dimensions

The following shall apply:

- For unit title or cross-lease allotments, the allotment area shall be calculated per allotment over the area of the parent site.
- Minimum areas and dimensions of allotments in Table SUB-1 for Commercial and Mixed Use Zones, Industrial Zones and Residential Zones shall be the net site area.
- Allotments for unstaffed infrastructure, excluding for any balance area, are exempt from the minimum site sizes in Table SUB-1.

Zone	Minimum allotment area	Internal square	Frontage (excluding rear lots)
Residential Zones			

Medium Density Residential Zone(without qualifying matters)	~~**200m²**~~ **n/a** **for the purpose of the construction and use of residential units** ~~No minimum for multi-unit residential development where the design statement and land use consent have been submitted and approved~~ For the purpose of creating vacant lots there is no minimum site size	**n/a** for the purpose of the construction and use of residential units For the creation of vacant lots 8m x 15m	**n/a**

I note Kainga Ora's intention here, as I have agreed to it, but I note that as it only applies to the areas without qualifying matters, there would be inconsistent coverage. Instead, I recommend the approach I have set out which amends the rule itself to address the vacant lot issue, rather than the standard (SUB-1 is a standard).

Medium Density Residential Zone (with qualifying matter - airport noise)	200m² (except if subject to qualifying matter - natura hazards)
Medium Density Residential Zone (with qualifying matter - natural hazards)	Kaiapoi Area A 200m² Kaiapoi Area B 500m²
Medium Density Residential Zone (with qualifying matter - national grid subdivision corridor) also refer to rule SUB-R6	200m²