BEFORE HEARING COMMISSIONERS
FOR THE PALMERSTON NORTH CITY COUNCIL

I MUA NGĀ KAIKŌMIHANA WHAKAWĀ
MO TE KAUNIHERA O PAPAIOEA

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of proposed Plan Change I: Increasing Housing Supply and Choice to the Palmerston North District Plan

SECTION 42A TECHNICAL REPORT OF ANDREW BURNS ON BEHALF OF PALMERSTON NORTH CITY COUNCIL

URBAN DESIGN

Dated 25 July 2025

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A. EXECUTIVE SUMMARY

1. I co-authored the report 'PNCC MRZ Standards Report' dated November 2023 which provided analysis and testing of potential Medium Density Residential Zone ("**MRZ**") standards, informing the preparation of this plan change.

2. The key conclusions of this s 42A report are that:

   (a) The proposed provisions for Plan Change I ("**PCI**") achieve both intensification for the notified MRZ area and a higher level of amenity for future medium density housing occupants and their adjoining properties than the controls set by Medium Density Residential Standards ("**MDRS**"). I consider that good urban design outcomes for MRZ living environments can be achieved.

   (b) Medium density dwelling outcomes that complied with the notified standards were tested on a range of typical Palmerston North lots showing that realistic and successful development is achievable.

   (c) Submissions relevant to urban design have been addressed and organised under the proposed PC:I provisions. Consideration of those submissions have led to the recommendations below.

3. Outline of recommendations:

   (a) I recommend the location of the MRZ boundary aligned with the mid-block zone is maintained and not adjusted as sought by one submitter. It is preferrable from an urban design and streetscape perspective to achieve coherent street environments. This is achieved by the proposed zone location and would be undermined by a zone boundary running down the middle of a street.

   (b) MRZ-R7: I recommend the zone extents are not amended as sought by Kevin Keliher as the alternative zone boundary approach is simplistic and does not take into account access to the necessary range of services, infrastructure and facilities. Nor do I support the request for 35% coverage and a minimum 70m² unit size as 35% is excessively restrictive and would preclude intensification, and the proposed 70m² minimum unit size is unnecessary and would preclude studio or one-bedroom apartments.

(c) MRZ-O2 and MRZ-P3: I recommend the notified objective and policy are retained as they establish a logical cascade from urban design vision (objective) to implementation guidance (policy). This approach establishes the framework for standards that follow. The submitter's simplified objective lacks the specificity needed to guide consistent urban design outcomes while the request policy is too high level, losing clarity on what compatibility with the planned built form of the zone means.

(d) MRZ-P3: One submission requesting the inclusion of the wording: "*a reasonable amount*" will add uncertainty in design assessment processes, leading to inconsistent outcomes and undermining the policy's effectiveness. Another submitter requests adding the text: "*and direct visual*" relating to frontage connections to the street. Legible connections between the dwelling frontage and the street are already achieved through MRZ-S20 and would conflict with MRZ-S13 that enables entrances to be located along a side façade.

(e) MRZ-S1: An 11m maximum building height in combination with the stepped recession plane (Height in Relation to Boundary ("**HIRB**")) of 5m + 45° and 2.8m + 45° is appropriate to enable intensification up to and including 3 storeys while achieving acceptable sunlight, visual dominance and privacy outcomes for adjoining sites.

(f) MRZ-S2: The notified, stepped recession plane is a better outcome than the MDRS (4m + 60°) because it allows for flexibility on site while addressing potential adverse neighbour effects.

(g) Application of the 2.8m + 45° HIRB standard to accessory buildings will allow for reasonably scaled accessory buildings without the need for consent.

(h) MRZ-S3: The notified side yard setback of 1m should also apply to the rear yard. This aligns with MDRS and proposed 1m outlook standard and is more enabling than the Palmerston North District Plan ("**District Plan**") whilst still achieving acceptable privacy and shading outcomes.

(i) MRZ-S3: Allow for no setback for garages for up to 7m in length and contained beneath a 2.8m + 45° HIRB. This better enables intensification on smaller lots whilst having minimal shading and dominance effects. I also recommend retaining the alternative 2.5m garage setback standard in addition to the 5.5m standard.

(j) MRZ-S3 Matters of discretion for setbacks: I recommend that shading effects on adjoining sites are removed as a matter of discretion, but that privacy effects are retained and further enabled to address reverse sensitivity effects on non-residential sites.

(k) MRZ-S4: 50% site coverage is appropriate, enabling intensification while maintaining appropriate residential amenity through the package of other standards.

(l) MRZ-S4 Matters of discretion for coverage: Retain matters of discretion for shading and privacy. These are relevant because the potential impacts of the placement of additional building form resulting from infringement of the coverage standard may include additional shading and loss of privacy. I support consideration of reverse sensitivity effects related to privacy.

(m) MRZ-S6: I recommend this standard is removed as it contradicts MRZ-S7 and PRZ-P3. As the MRZ intensifies with taller and more intensive building development, access to sunlight will become more important.

(n) MRZ-S7: I recommend this standard is changed so that a 30m²/4.5m diameter ground-level outdoor living space applies to dwellings with three or more bedrooms and the 20m²/4.0m diameter space for dwellings up to and including two bedrooms.

(o) MRZ-S8: Outlook spaces of 6m x 4m, 3m x 3m and 1m x 1m are retained as notified, with a correction of an omission, so that secondary or additional windows from the primary living and bedroom spaces are required to be 1m x 1m.

(p) MRZS-10: Should be retained as notified, including Clause 3 regarding the location of stormwater detention tanks being restricted to side and rear

yards. Even when screened, stormwater tanks in the front yard would still appear as a screened tank. Allocating service elements in a front yard is unacceptable from a visual amenity perspective and would not provide a reasonable level of amenity for adjoining properties and the street.

(q) MRZ-S12: The standard as notified has been calibrated to relate to different types of frontage and aligns with the MRZ Standards Report. Proposed amendments to the wording are supported.

(r) MRZ-S13: Retain as notified because front door orientation provides for good urban design outcomes. The standard provides for sufficient building layout / design flexibility on site while achieving important street-to-building legibility outcomes.

(s) MRZ-S14: Retain as notified because it achieves important public amenity outcomes - visual interest enhancing the visual amenity of the street; contributing to public safety by facilitating façade treatments that allow outlook over the street and informal surveillance.

(t) MRZ-S15: Should be retained as notified as expanses of parking at the street front are inconsistent with the required streetscape outcomes (MRZ-P3.5), and the proportion required by this standard is consistent with MRZ-S14 which seeks to give effect to positive streetscape outcomes and satisfy Policy MRZ-P3.5.

(u) MRZ-S19: Regarding on-site rubbish storage, I support the notified standard with proposed adjustments. This addresses the appearance of the development in views from internal lanes and the street.

(V) MRZ-S20: I support the amendment sought by the Palmerston North City Council ("**the Council**") and the consequential amendments agreed with Ms Jenkin and Ms Fraser to simplify the standard and address fence height including within visibility splays. The amended fence standard will provide for front boundary definition and reasonable privacy while also maintaining a visual connection between the dwelling and the street.

B. INTRODUCTION

4. My name is Andrew Davies Burns.

5. I have been engaged by the Council to provide evidence on urban design in relation to PC:I.

6. I am a director at McIndoe Urban Limited ("**MUL**"), a specialist urban design consultancy based in Wellington and have held that post since 2013. My qualifications are MA Urban Design (dist); Dip. Urban Design; BArch; BBSc. I am a Registered Urban Designer (UDIA), a full member of the Royal Town Planning Institute (MRTPI) and a Fellow of the Royal Society of Arts.

7. I have 30 years' experience in urban design, architecture, planning and academia. I am co-Chair of Kāinga Ora's Wellington Design Review Panel and co-Chair of Wellington City Council's pilot Design Review Panel, a property committee member for Presbyterian Support Central. I have been a guest lecturer in urban design and reviewer for the School of Architecture, Victoria University of Wellington for many years. I was a Built Environment Expert for Design Council CABE (UK) and a design panel member for LB Newham and also for Royal Borough of Windsor and Maidenhead. I am a former director of Matrix Partnership Ltd, an urban design practice in London (2003-2013) and seconded urban design director to Arup (South Africa, 2012). Prior to these roles, I worked as an urban designer for Urban Initiatives Ltd (London) and DEGW plc (London) from 1997 to 2003. I held part-time lectureships at Masters level in urban design at Oxford University's Department for Continuing Education, Kellogg College (August 2010 – March 2013, MSc course in Sustainable Urban Development) and Oxford Brookes University's Joint Centre for Urban Design (August 2006 – March 2013, MA course in Urban Design), and the Bartlett School of Planning, at University College London (2004 - 2006).

8. I have extensive experience in residential design, district plan and city strategy formulation, professional design review, and urban design teaching and training. I have particular expertise in planning for growth and large scale residential and centres master planning. In Palmerston North I am leading or have led residential masterplans and district plan changes for Aokautere, Kākātangiata, Mātangi (Whiskey Creek), 160 Napier Road and Mandersons Bush; in Auckland master planning of Auranga and Providence Point (Drury); and in Wellington and Kāpiti,

Shelly Bay Masterplan, Petone and Hutt Central Spatial Plans, for seven metro, town and local centre plans for Paraparaumu, Waikanae, Ōtaki, Paekākāriki, Raumati Beach and Paraparaumu Beach, and a masterplan for 1,200 dwellings including a new centre at Waikanae North (Peka Peka).

9. I also consider the following experience to be relevant:

(a) Urban design expert review for the Environmental Protection Authority on developments in Auckland and Wellington (2024, 2021).

(b) Lead Author (2013) for the residential chapters of the Auckland Design Manual.

(c) Section 42A urban design reporting for Plan Change G: Aokautere (2024).

(d) Joint author for a Draft Residential Design Guide (2024) for the Council.

(e) Urban design lead for a FTAA application for Kāpiti Central including a new town centre (Metro Zone) with extensive medium density housing (2025-ongoing).

(f) Provided evidence at the Wellington City Council District Plan Hearing (2024) on the Design Guide Residential and as part of conferencing was a contributing author of this guide.

(g) Directed medium density housing studies for the Council (2014) to test and promote proposed residential standards and assessment criteria. This material was used by the Council for public consultation.

(h) Lead author of the refresh for the CABE publication (UK) Creating Successful Masterplans (2004).

(i) Masterplan and Design Code lead for London's (then) largest social housing estate renewal project at Woodberry Down for over 5,000 dwellings (2004-2008).

(j) Urban design lead for Kainga Ora's 350 dwelling Arlington development, Wellington (2019 and 2024).

(k) Post-occupancy evaluations for Wellington City Council of two of their completed social housing projects (2014).

C. INVOLVEMENT

10. MUL began work on this project in early 2022, and have been providing advice including:

(a) General design input and research into Council-led workshops defining urban design issues for MRZ and assisting with approaches to MRZ extents.

(b) Testing bulk and form standards for permitted development of 4-6 units as an alternative to restricted discretionary activities.

(c) Comment on draft standards (August 2022).

(d) Identifying the range of issues relevant to well-functioning environments from an urban design perspective and issues observed from completed medium density developments in Palmerston North (provided over the period 2022-2024).

(e) Advised on the suitability of numerous additional identified sites to be zoned as MRZ (August 2024).

(f) Developing illustrations of how the draft MRZ standards might apply to typical Palmerston North lot types, including sunlight shade testing.

(g) Prepared an urban design response to the outcomes of pre-engagement consultation (August 2024).

(h) Testing of standards as described below.

11. I worked alongside other technical expertise engaged by the Council to report on urban design matters including:

(a) Section 42A 'PNCC MRZ Standards Report' dated November 2023 which provided analysis and testing of potential MRZ standards that informed the notified provisions for PC:I.

(b) Providing diagrams to support proposed PC:I planning provisions.

D. CODE OF CONDUCT

12. I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023. I confirm that I have stated the reasons for my opinions in this report and have considered all the material facts that might alter or detract from those opinions.

13. Statements expressed in this report are within the scope of my expertise, except where I rely on the technical advice I have referred to in paragraph 14 of this report.

14. I have all the information necessary to assess the application within the scope of my expertise and am unaware of any gaps in the information or my knowledge.

E. SCOPE

15. My s 42A report addresses the following matters:

    (a) General comments on urban design aspects of PC:I and the process of urban design testing and inputs into the notified MRZ standards.

    (b) My response to submissions relevant to urban design.

16. In preparing this report, I have reviewed the evidence of other Council experts relevant to my expertise, including evidence on:

    (a) Planning (Sarah Jenkin);

    (b) Traffic and transport (Harriet Fraser); and

    (c) Landscape (Dave Charnley).

F. GENERAL URBAN DESIGN COMMENTS ON PC:I PROCESS AND INPUTS

17. The following section provides a general outline of the range of work undertaken by MUL to develop and test PC:I standards.

Relationship To MDRS

18. The intent of PC:I was to apply the MDRS where these standards are relevant and helpful to achieving the plan's objectives. Given that the Council is not required

to apply the MDRS in their entirety (as a Tier 2 authority), the Council preferred an approach that departs from the standards where alternative approaches will deliver better outcomes for the community. Notable proposed departures from the MDRS include modifications to Outlook Space requirements and HHIRB standards This approach is designed to achieve an appropriate balance between enabling residential intensification and ensuring the creation of a well-functioning, liveable urban environment.

19. The proposed departures from the MDRS have been informed by comprehensive testing of the implications that different variants of development standards would have for development potential on individual sites and for the effects of development across site boundaries. The results of this testing and analysis are identified in the sections that follow.

Testing of Standards

20. As part of investigations advising on potential standards, a series of tests were carried out as described below.

21. Testing was undertaken by MUL for Auckland Council in 2015, and this was used to inform the Unitary Plan of that time. This testing included reference to multiple built developments in Auckland, particularly in relation to assessing the suitability of proposed front yard setback, HIRB, outlook space, front fences and garage standards. This methodology and findings provided a starting point for the PC:I analysis.

22. Building on this foundation, MUL undertook testing for PC:I to compare sunlight shading generated by different approaches. This analysis examined envelopes described by the MDRS, HIRB and other standards, the 2022 Draft MRZ HIRB and other standards; and the District Plan HIRB and other standards on a representative block and lot configuration.[1]

23. The results of this testing informed the PC:I approach. Testing for various times and block orientations at the winter solstice, summer solstice and spring equinox found the proposed MRZ standards as notified led to an appreciable reduction in shading effects on adjoining lots. A reduction in shade compared to the

[1] Refer to **Attachment A**: Sunlight shading - Urban Design Memo #6.

outcomes possible under the National Planning Standards for Urban Development ("**NPSUD**") MDRS indicates reductions ranging from 17%-36% (10am) to 20-24% (midday) and 4-7%% (2pm) at midwinter depending on lot position. At the spring equinox reductions in shade ranged from 19%-62% (10am), 26%-51% (midday) and 33%-52% (2pm). At midsummer no difference in shade was observed at 10am or midday and reduction in shade of 12%-66% at 2pm, though the area (sq.m) of shade noted was small. This testing indicated a departure from the MDRS was appropriate.

Minimum site area (2022)

24. In parallel with the shading analysis, testing was undertaken to determine whether a minimum site area standard would be necessary or appropriate. This study tested the possibility of development on a 150m² lot. It found that reasonable development complying with a 5m+45° HIRB, 35m² private open space and under 50% site coverage can be achieved on a small narrow site. The conclusion was that a minimum site area standard may not be required, noting that:

    (a) amenity (or well-being of residents) is delivered effectively by the combination of other standards; and

    (b) a 150m² minimum site area could preclude walk-up apartments where the site size per unit might be 75m² or 50m², contradicting intentions of intensification, diversity, choice and affordability.

MRZ Standards: Highbury Incremental Test (2022)

25. To understand how the proposed standards (at that time) would work in practice over time, a staged development test was undertaken in Highbury. This test illustrated the effect of theoretical staged development in accordance with MRZ standards with reference to existing, short, medium and long term. Highbury was chosen as a representative area where medium density housing might be likely to occur, providing insights into how the standards would perform in a real neighbourhood context. These studies illustrate the beneficial effect of the variation in HIRB in contributing to a well-functioning urban environment being variation in height for visual interest in addition to the reduction of shading and visual dominance effects on adjoining lots.

HIRB analysis: Understanding development implications

26. Given the significance of the proposed HIRB departures from MDRS, several specific tests were undertaken to understand the implications of these departures. The first of these was a rear lot yield analysis that tested the implications for development on small, medium and large lots of the MDRS HIRB compared to the proposed modified HIRB for the MRZ. It found the proposed HIRB limited development on rear lots, but not to the extent that significant development would not be possible.

27. A boundary test further demonstrated the practical implications of the proposed HIRB standard. This showed that a two-storey building 1.0m from the boundary can be 6.0m high with the proposed PC(i) 5m+45° recession plane and 5.7m high with the MDRS 4m +60° recession plane. This demonstrates that while the proposed standard would be restrictive on the location of the third storey of a building, requiring it to be located further from the boundary, it is slightly more enabling than the MDRS in allowing two storey development.

28. The most comprehensive HIRB testing involved a yield analysis on a typical 60m x 150m urban block with typical lots. This theoretical exploration applying proposed yard standards and 50% maximum site coverage found that the MDRS HIRB of 4m+60° allows 2.9% more GFA on a corner lot and 6.4% more GFA on other lots than the proposed 5m+45°. The analysis concluded that:

    (a) This degree of reduction of potential GFA is inconsequential given that a 5m+45° HIRB allows theoretical potential GFA of 574m² or 622m² per 450m² depending on lot location.

    (b) Conversely the minor and inconsequential increase in development potential arising from applying the MDRS HIRB 4m+60° is at the cost of appreciable increased potential shading and visual dominance across the boundary.

Visual dominance testing (2022, 2024)

29. Complementing the shading analysis, visual dominance testing was undertaken to understand the experiential impacts of different standards. The 3D models referred to above were viewed from an adjoining lot (refer **Attachment B**), with

four representative views modelled to explore visual dominance at the rear, middle and front portions of the adjoining lot.

30. The results reinforced the PC:I approach. A consistent reduction in visual dominance was observed in all four views from the proposed standards relative to the MDRS. The reduction in visual dominance was measured and ranged from 13% to 26% depending on the selected view, with an average reduction in visual dominance of 19%.

Lot testing: Testing the package of standards on typical lots (2024)

31. The final stage of testing involved evaluating how all the proposed standards would work together in practice. Lot testing was undertaken to evaluate the potential to achieve three permitted units on representative typical lots in Palmerston North,[2] typically with on-site vehicle storage and turning, all in accordance with proposed PC:I standards. This was the final integrated 'truth testing' of the proposed package of standards.

32. Testing (refer **Attachment C**) showed that three substantially sized units designed as part of a multi-unit development are possible on a range of lot types and sizes typically found in Palmerston North. All provided for garages and vehicle parking on site and all but the 'small lot option' provided for vehicle manoeuvring on site.

33. The testing revealed that practical, well-sized housing outcomes could be achieved under the proposed standards. Recognising that typical units in multi-unit developments are smaller than detached houses on similar sized lots, these achieved gross floor areas per unit varying from three 2.5 bed units of 139m² each on a small 500m² lot which includes an on-site driveway and vehicle manoeuvring, and three 4.5 bed units at approximately 260m² each on a 1,265m² rear lot. These units were able to achieve reasonable floor area outcomes with two storey dwellings. Development to three storeys would be possible on parts of these lots, though that would be constrained at the upper level by the HIRB, and measured areas show that with additional area the units would have a considerably larger GFA than would be likely for this development type.

2 The representative lots and their dimensions were selected jointly with Council Officer Simon Mori using a process of desk review of aerial photographs and cadastral plans.

Conclusions informed by urban design investigation and testing

34. The testing programme led to two key conclusions informing the proposed approach:

(a) It is possible to take an approach to standards that is more aspirational and nuanced than the MDRS to achieve higher quality outcomes that better achieve a well-functioning environment and enable intensification; and

(b) When infill lots in Palmerston North are developed, that the proposed package of controls will readily allow sensible configurations of suitably sized multi-unit developments.

35. I am confident that the extent and location of the proposed MRZ standards will contribute to achieving a well-functioning environment at the neighbourhood and site-specific scales:[3]

(a) At the neighbourhood scale, the parameters for achieving a well-functioning environment are addressed by facilitating intensification in and around well-serviced centres and sub-centres and with walkable access to primary schools and local parks, which relates to the extent of the MRZ.

(b) At the site scale, a well-functioning environment relates to the on-site living environment. Here, matters include visual privacy; access to open and natural space; good daylight and adequate access to sunlight; safety and security; visual interest; and provision for social interaction. These matters are addressed by the range of proposed standards including provision for suitably located private open spaces and reasonable outlook for dwellings, form standards including maximum height, HIRB and space around buildings, and articulation of building form and avoidance of blank walls at the street frontage through provision of windows/glazing.

[3] This is informed by MUL's work on defining the attributes of a well-functioning environment in the context of Palmerston North. (**Attachment D,** Urban Design Memo #2, Oct 22).

G. RESPONSE TO SUBMISSIONS

36. I have considered the submissions and further submissions for PC:I. I have identified several issues related to my expertise. The following sections provide my urban design assessment of those submissions and provides my opinions on the relief sought by the submissions from an urban design perspective.

37. My assessment first addresses submission points that relate to the objective and policy framework guiding development outcomes. Then I work through submission points relating to the performance standards, before finally considering broader submission points that relate to the overall zone approach.

H. OBJECTIVES AND POLICIES

Planned built form (MRZ-O2 and MRZ-P3)

38. Kāinga Ora ("**KO**") (SO199.16) and (SO199.19) seek to restructure the policy framework by moving detailed content from objective MRZ-O2 into policy MRZ-P3, while simultaneously replacing the existing policy content entirely. In this restructuring, two design criteria would be deleted altogether, specifically MRZ-O2 (d) and (j), which respectively set an objective for built development that is 'adaptable and healthy' and 'energy efficient'.

39. In my view, these requested changes would undermine the urban design intent of the provisions for the following reasons:

    (a) Overall, the notified objective MRZ-O2 and policy MRZ-P3 establish a logical cascade from urban design vision (objective) to implementation guidance (policy) and then on measurables in the standards. The proposed restructure disrupts the cascade by moving detailed design criteria into policy without maintaining the overarching vision.

    (b) The notified policy establishes the framework for the standards relating to building design that follow, whereas the submitters proposed replacement text does not do that.

    (c) KO's shortened and simplified proposed objective lacks the specificity needed to guide consistent urban design outcomes, is insufficiently detailed, and the revised policy (utilising the previous detail from the

objective) would be too high level to provide necessary specificity. Important aspects of the notified policy which give clarity on what compatibility with the planned built form of the zone means are therefore lost.

(d) The existing policy content provides more specific guidance on how buildings should relate to and integrate with the existing character of the zone. Replacing this with relocated objective content would eliminate important urban design direction, weakening the link between the objective and implementation through standards.

(e) Removing "adaptable and healthy" and "energy efficient" criteria eliminate fundamental urban design principles that are essential for creating resilient, liveable medium density neighbourhoods, such as building orientation and layout.

(f) KO proposed policy amendment (1) includes reference to "streets and neighbourhoods" which is beyond the scope of policy MRZ-P3 which applies to "residential buildings".

40. R & G Norris (SO191.3) submit that MRZ-P3 is insufficient in relation to noise and safety protection for surrounding properties, contending that the criteria do not address what is acceptable in terms of people density and vehicle numbers. I do not support the submission for the following reasons (note I do not address the matter of 'noise' as this is outside my area of expertise):

(a) Residential density will be inherently limited by built form controls through the establishment of site coverage, outlook spaces, height limit, HIRB etc, that collectively restrict how many bedrooms or habitable spaces are possible on a site.

(b) Vehicle impact is controlled through design requirements where parking provision and space for vehicle movement is inherently competing with built form on urban sites. If more vehicles are provided for there will be less space for buildings, smaller buildings with fewer bedrooms, thus creating a self-regulating mechanism. This approach illustrates how urban design can utilise multiple performance standards to achieve

acceptable residential environments without prescriptive density controls.

41. Phocus planning (SO185.9) recommend a change to sub-clause 6 of MRZ-P3 "to integrate a reasonable amount of landscaping, with building and access design", and subclause 7 to "provide a reasonable amount of visual interest through the modulation and articulation of facades and roof forms." This is identified as being to allow greater flexibility and affordability.

42. I do not support this submission for the following reasons:

    (a) The introduction of the subjective "reasonable amount" language will add uncertainty in design assessment processes, leading to inconsistent outcomes and undermining the policy's effective guidance of quality urban form. Whereas the policy as notified was clear that certain qualities are to be provided; and

    (b) The proposed change will compromise important urban design outcomes by weakening requirements for the amenity and outcomes in relation to two important qualities of neighbourhood character and streetscape quality.

43. Chris Teo-Sherrell requests that PRZ-P3 sub point 5 related to legible frontage connections to the street is amended to include the text "and direct visual" to prevent the use of vegetation and fencing inside the site blocking views of facades.[4]

44. I do not support this submission because a legible connection between the dwelling frontage and the adjoining street does not need to have a direct visual connection. Legibility can be achieved in other ways including the appropriate design of pathways, landscape structure, building modulation (e.g. canopy projections) and frontage fenestration. The submission would conflict with the front door orientation standard (MRZ-S13) that enables entrances to be located along a side façade. In such cases the entry may not be visually direct but equally as well achieved by the techniques noted above.

[4] SO184.14.

MRZ-P3 - Rubbish and recycling

45. SO166.1 the Council proposes an addition of a further, 8th matter to MRZ-P3:

> Site layouts provide adequate rubbish recycling collection and storage facilities.

46. I note Enviro NZ in SO203.9 submits that SUB-MRZ-P1 should be amended to "including safe waste kerbside collection'.[5] While I consider this is a valid concern, I consider it is best addressed at the time of site planning and design rather than subdivision design, so I consider it alongside the Council's proposed addition.

47. I support the Council's proposed change at SO166.1, and with the sentiment behind SO203.9. In my opinion appropriate waste management is an important matter relating to the operational functionality and visual amenity of intensive residential development.

I. GENERAL MATTERS (MRZ-R7)

MRZ-R7 - An alternative approach to managing residential intensification

48. Kevin Kelliher requests amendment to MRZ-R7 and an alternative approach to defining zone boundaries based on distance from The Square. [6] I do not support this submission, because the proposed 35% building coverage is excessively restrictive and would preclude intensification, and the proposed 70m² minimum unit size is unnecessary and would preclude studio or one-bedroom apartments. Further, the alternative zone boundary approach is simplistic and does not take into account access to the necessary range services, infrastructure and facilities.

Accessibility

49. Submissions on this topic include:

    (a) Patricia Cardinelli-Wayne requests amendments to address access so that houses are affordable and accessible to the disabled community. [7]

5 This is in the 'Compilation of Original Submissions' at page SO203.9, rather than SO203.10 as listed in the 'Summary of Submissions'.
6 SO121.1
7 SO01.1.

The submitter mentions challenges for disabled people living in three storey dwellings.

(b) Anita Sciascia is concerned that houses of more than one storey will disadvantage anyone with mobility issues. [8]

(c) Roanne Hautapu requests that a proportion of multi-storey homes are genuinely accessible, with a related request from Kimberly Coates that universal design be included as a minimum standard to ensure all new builds have a proportion of accessible dwellings. [9]

(d) The submission of Age-Friendly Palmerston North is neutral, but they advise: "consider the needs of older people and people with mobility and accessibility needs, including in relation to building accessibility, building design, housing typology and parking requirements." [10]

50. I do not support further changes for the following reasons:

(a) As a matter of course, some units will be capable of being accessible for those in wheelchairs including the ground floor units of walk-up apartments, and all floors of apartments will be serviced by lifts.

(b) Based on my work with different developers in New Zealand, it would be prohibitively expensive to require lifts for full accessibility in two or three storey townhouses. However, depending on the internal layout and provision of a bedroom as well as necessary service, kitchen and living areas – the ground floor of a multi-level house might also be liveable for a disabled person.

(c) Single storey housing remains enabled in the MRZ and in the larger General Residential Zone, and existing single storey housing is available throughout the city, providing accessible housing options. The three-storey height is set for consistency with the MDRS which does not require accessibility provisions.

8 SO70.1.
9 SO129.6, SO152.1.
10 SO195.1.

Locating MRZ boundary at mid-block

51. Ash Garstang argues that the Zone boundary should not cut through the middle of a residential block, because one neighbour benefits and the other suffers effects.[11]

52. I do not agree with this submitter, as mid-block zone boundaries allow for a back-to-back relationship. In the case of the proposed package of standards, the operative HIRB (2.8m + 45°) applies to the rear boundary and rear third of side boundaries meaning that 'backyard amenity' for neighbouring properties will be similar to that already provided under the District Plan. The additional Outlook Space standard also requires a 6m separation for living areas that would generate greater setbacks than under the District Plan.

53. There will always be a junction between zones, and this has to happen somewhere. Accepting the amenity outcomes noted above, it is preferrable from an urban design and streetscape perspective to achieve coherent street environments. This is achieved by the proposed zone location and would be undermined by a zone boundary running down the middle of a street.

Minimum Lot Size

54. John and Margaret Wood seeks amendment of minimum lot size from "proposed 350m² to 450-500m² for reasons relating to supporting a generous living environment and the well-being of residents.[12] I do not support this as the package of standards including site coverage, outdoor living space and outlook space will provide reasonable amenity in intensifying neighbourhoods, and opportunities exist for larger lots in existing MRZ areas and lower density residential zones.

J. MAXIMUM BUILDING HEIGHT (MRZ-S1)

55. Multiple submitters have expressed concern about the proposed 11m height for a range of reasons. These concerns are addressed below under the following key themes.

11 SO117.1.
12 SO159.2.

Privacy

56. Multiple submissions raise concerns about privacy effects across boundaries and loss of backyard privacy[13]. I do not support these submissions, as I consider that the proposed controls include multiple design mechanisms that adequately address these concerns:

(a) Visual privacy is primarily addressed through the outlook space standard. There will be the possibility of some windows at a possible 3rd level, but the proposed HIRB will require those to be set back further from the boundary than would otherwise occur.

(b) Reduced distance between the side walls of buildings will provide for greater visual privacy when the windows on opposing walls are offset.

(c) Potential overlook effects from third-floor levels are mitigated through graduated HIRB controls. The 5m+45° HIRB standard ensures that the boundary-facing wall of any third floor will be set back approximately 3.5-4.4m from the side boundary if it is located on the front two thirds of a site [14], and approximately 5.7m-6.5m from the boundaries on the back third of lots or on rear lots where a 2.8m + 45° HIRB applies.

(d) Backyard privacy is preserved through retention of the existing 2.8m +45° HIRB to the rear third of side boundaries and rear boundaries of street facing lots, and all boundaries of rear lots, maintaining established privacy expectations.

Sunlight and shading (in general)

57. Multiple submissions express concern about maintaining sunlight access across boundaries.[15] Submitters SO116.32 and SO191.32 seek amendments to require that a development does not shade an adjacent building in winter between 9am and 4pm. Related concerns about maintaining daylight are raised by SO105.1 and SO109.1.

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13 SO21.1, SO47.1, SO59.1, SO69.1, SO72.1, SO82.1, SO85.1, SO87.1, SO88.1, SO93.1, SO114.1, SO157.2, SO62.1, SO96.1.

14 Setback range allows for 0.5m raised ground floor and either 2.7m or 3m inter-storey heights.

15 SO31.1, SO33.1, SO47.1, SO54.1, SO59.1, SO72.1, SO88.1, SO113.1, SO157.2, SO161.1, SO193.1.

58. I do not support these submissions because I consider that the proposed controls appropriately balance the intensification objectives with sunlight protection provisions:

(a) Shading effects are an inherent outcome of the medium density development as anticipated by the MDRS. However, the proposed MRZ provisions specifically modify the MDRS HIRB to minimise shading effects on neighbouring properties while still enabling medium density housing typologies. Shade testing indicates reduction in shading effects on adjoining lots compared to MDRS by 4% to 36% at midwinter and by 19% to 62% at the spring equinox. Minimal or no difference in shade was observed at mid-summer.

(b) The specific winter sunlight protection sought by some submitters would create overly restrictive development parameters that would undermine intensification objectives. To require there to be no additional shade in the seven hours between 9am and 4pm in mid-winter would severely constrain building form. Testing through shade modelling leads us to be confident that the standards are appropriately calibrated so that there will not be excessive shading of adjacent properties, while maintaining housing intensification.

(c) The daylight concerns raised are addressed through the same boundary relationship controls that manage direct sunlight access, ensuring that the cumulative impact on neighbouring properties' natural lighting remains within acceptable limits for medium density residential environments.

Potential shading to existing solar panels

59. Various submitters express concerns about rooftop shading leading to reduced solar power generation from existing solar installations.[16] I do not support these submissions for the reasons outlined under sunlight and shading concerns, with the additional consideration that rooftop locations will receive more sunlight

[16] SO32.1, SO47.1, SO51.1, SO59.1.

than ground-level areas analysed in the shading studies as these are elevated above ground level.

60. To further demonstrate levels of sunlight received on roof forms and solar panels, I have testing shading on roofs for two representative locations – one to the north of the city and one to the south. The two locations were chosen to represent different city grid alignments. The results can be found at **Attachment E**.

61. The first location is in the south of the city and tests shading on an existing single storey detached dwelling with rooftop solar panels facing north, west and east on a circa 800sq.m lot. A compliant development of 3 dwellings was modelled on the adjoining lot to the north, building up to an allowable 2 and 3 storeys across the lot as the proposed HIRB standards permit. Shading was tested at both midwinter and the spring equinox at 10am, 12noon, 2pm and 4pm comparing the existing environment with a PC:I permitted 3-unit outcome. The existing environment generates some shade on vertical surfaces but none on roofs. For PC:I at midwinter at 10am no shade falls on the solar panels though some shade falls on parts of the roof. At midday shade is generated over approximately 25% of the subject dwelling solar panels. At 2pm practically no shade falls on the solar panels and at 4pm, an hour before sunset, approximately 25% of the solar panels are in shade. At the spring equinox no shade generated by the PC:I permitted proposal falls on the roof or solar panels of the subject property.

62. The second location in the north of the city is on the more prevalent 'Palmy grid'. This is a regular shaped circa 600sq.m lot with a single storey detached dwelling with solar panels on the north-facing slopes of the roof. Shading studies for PC:I at midwinter indicate practically no shade on the roof and solar panels at 10am. At midday and 2pm approximately half of the solar panels are shaded with the majority of the panels in shade by 4pm. At the equinox no shade occurs on the subject property roof until 4pm when approximately 50% of the solar panels are shaded. The existing environment generates considerable shade on vertical surfaces in the midwinter afternoon though no shade on roofs.

63. The tests on the two locations indicate that for 3/4 of the year (equinoxes and assuming midsummer has even more reduced shade outcome), shading from a PC:I permitted development will have practically no effect on the solar panels of the subject properties. Shading will occur at midwinter affecting at most 25%

of the southern property's solar panels for around 2-3hrs and 40%-50% of the northern property's panels for circa 4hrs. I consider this level of shade to be part and parcel of the more permissive package of standards necessary to enable housing intensification. Based on other sunshade studies (**Attachment A**) I also note that the proposed HIRB standards provide less shading than that generated by a MDRS outcome.

Restrict maximum height to, variously, two storeys, 8m or 9m

64. Multiple submissions request that maximum height be restricted to two storeys, 8m or 9m.[17]

65. I do not support these submissions, as restricting permitted height to two storeys would undermine the intensification objectives. The proposed 11m height limit specifically enables three-story development as a critical component of achieving medium density housing outcomes.

Restrict maximum height to one storey

66. Some call for reduction in maximum height to one storey (for example SO53.1, SO70.1, SO73.1, SO82.1, SO85.1, SO93.1, SO157.2. I recommend these submissions be declined because single storey development is lower than currently permitted by the District Plan, and such restriction would reduce potential for intensification rather than increase it.

Impact on existing character, street character and/or visual intrusion

67. Multiple submissions express concerns about impacts of building height on existing character, street character, and visual intrusion,[18] Including the relationship of three storey development to existing one storey development. I do not support the concerns raised by these submitters for the following reasons:

    (a) Character preservation is explicitly deprioritised under the NPSUD framework and so from an urban design point of view it has not formed a strong factor in my assessments.

[17] SO31.1, SO54.1, SO104.1, SO108.1, SO110.1, SO131.1, SO158.1.
[18] SO58.1, SO61.1, SO59.1, SO89.1, SO93.1, SO158.1, SO108.1, SO111.1, SO207.2, SO54.1, SO88.1.

(b) In any event, the proposed standards will help address the matter of visual intrusion by reducing the scale of development in the more sensitive mid-block / rear portion of sites. For the rear 1/3 of a site, the proposed HIRB is 2.8m + 45° reflecting the District Plan outcome. Where the proposed outlook space applies (6m depth from a main living room window) this will further reduce the bulk of development at the rear part of a site for neighbouring properties.

(c) The scale relationship between three storey and existing development is managed under the proposed plan. In my opinion, three-story developments can successfully integrate and sit comfortably with two-story development which is allowed under the operative 9m permitted height limit.

68. Submission SO113.1 seeks to confine increased height to 'new' areas rather than existing housing areas, citing concerns, including additional shading. I do not support this submission, as:

(a) Urban intensification enabling three storeys needs to occur in areas where residents have access to appropriate infrastructure and facilities. Those will be in infill situations identified by the MRZ boundaries and any 'new' areas comprehensively planned to include those services and designed as walkable neighbourhoods.

Potential overheating and maintenance challenges

69. SO160.1 submits that maximum permitted height should be reduced because the top floor of three storey houses will be prone to overheating and will present maintenance, fire and paramedic access challenges. I do not support this submission because the top floors of a three-storey dwelling in the sun will be no more prone to overheating than the top floor of the two storey dwellings currently permitted in the zone. Mitigating risk of overheating and providing for maintenance are matters properly and routinely dealt with by detailed building design and construction, and I note that fire service ladder trucks allow access to three storey buildings.

Support for 11m maximum height

70. In addition to various submitters who support the plan change as notified, several submitters specifically support the proposed height standard.[19]

71. Overall, our analysis demonstrates that the 11 m maximum height limitation, set in conjunction with an appropriate HIRB standard (and other standards referred to in this section) will collectively manage potential shading and visual dominance effects across boundaries and will maintain reasonable amenity across the boundary. In particular, proposed retention of the operative HIRB of 2.8m + 45° for the rear third of sites, and all boundaries of rear sites will contribute to reducing these effects.[20]

Height restriction (and HIRB) for Accessory Buildings

72. Submitters Richard Houlahan, Leith Consulting, and the Council consider the notified height standard for accessory buildings is insufficient to provide for the construction of Accessory Buildings, such as garages and/or 'granny flats'.[21] In the Council's related submission point SO166.22, it proposes to modify MRZ-S2 by applying a 2.8m + 45° HIRB to garages and accessory buildings.

73. I agree in principle with the points raised by these submitters and consider that the Council's proposed amendments would appear to be sensible, as changes to allow for reasonably scaled accessory buildings without the need for consent are appropriate where the effects of heights of those buildings are managed effectively and appropriately by the modified HIRB.

74. I note the revised text from the Council's submission includes "garages", however garages appear to fall within the definition of accessory buildings anyway, so this reference would be superfluous.

Exceptions to maximum building height

75. Chris Teo-Sherrell requests reducing the 11m maximum building height at MRZ-S1 to 10m and also amending the exception from 50% to 5%.[22]

19 SO02.1 and SO33.1, SO132.1.
20 Refer to McIndoe Urban *PNCC MRZ Standards Report*, pages 7,8 for full analysis.
21 SO180.1, SO170.1, and SO166.21.
22 SO184.36.

76. I do not support this submission. This is because a 10m maximum height would not readily enable 3 storey walk-up apartment developments that are likely to require specific engineering design with greater inter-storey heights than town houses. This is supported by my experience of providing design review for the Council observing that most 3 storey walk-up developments exceed the District Plan permitted 9m height by 1.5m or more[23] due to inter-storey heights of 2.8m-3.2m and accommodating minimum floor levels to address flooding (refer to MRZ-S11). The 10m height and 5% exception would also reduce potential for expressive roof forms that contribute to visually interesting, individualised and attractive multi-unit developments. My experience over many years of design review for the Council is that poor quality multi-unit developments often display limited modulation and articulation of form and roof.

K. HEIGHT IN RELATION TO BOUNDARY (MRZ-S2)

77. One submitter, Richard Houston, recommends keeping the HIRB in MRZ-S2 the same as in the Residential Zone to avoid dominance and loss of sun.[24] Sheila Barrass seeks minimal height increase especially near boundaries.[25]

78. KO opposes the HIRB in MRZ-S2 in part, supporting the 5m+45° but along all site boundaries, and seeks a comprehensive review in order to better provide for flexibility in built form /residential typologies while still managing the potential for adverse effects to adjoining properties.[26] Leith Consulting supports the standard as notified and considers it is supported by the urban design report and "provides a more nuanced approached to the MDRS standards for Palmerston North."[27]

79. Submitter Chris Teo-Sherrell requests nuanced standards with more restrictive standards on the south side of lots to protect neighbours' sun. Further, the submitter seeks amendment to the notified standard which is considered to lead to "massive shading effects" and suggests possible nuancing of the standard to relate to boundary alignment.[28]

23 For example, applications for Crewe Crescent, Church Street and Highbury Clusters.
24 SO109.2.
25 SO86.1.
26 SO199.31.
27 SO170.2.
28 SO184.40.

80. I note the submission by Leith Consulting in support of the notified HIRB standard as developed and tested in the MUL "PNCC MRZ Standards Report". I do not support the submissions by KO, Richard Houston, Sheila Barrass or Chris Teo-Sherrell for the following reasons:

(a) The comprehensive suite of tests and investigations that have been undertaken[29] demonstrate that the notified HIRB is fit for purpose, allowing for flexibility on site while addressing the potential for adverse effects to neighbouring properties; and

(b) The comprehensive review investigations undertaken by MUL describe the proposed standard better provides for two storey development closer to the boundary than the MDRS 4m+60°.

HIRB and privacy

81. Ministry of Education Te Tāhuhu o Te Mātauranga is concerned about loss of privacy in backyards and seeks restriction of height to limit overlooking.[30] I do not support this submission for the following reasons:

(a) Height at the boundary is controlled by the notified HIRB. For the rear 1/3 of a site, this standard retains the current District Plan requirement of 2.8m +45°. Under this control, two storey development must be set back approximately 3m-3.6m from the boundary (depending on floor to ceiling heights). While three storey development would require a setback of 5.7m-6.5m from the boundary. The notified standards maintain these same setback distances, ensuring that privacy relationships remain unchanged.

HIRB and shading

82. Robert and Gill Norris request that no shading occur to adjacent buildings between 9am and 4pm in mid-winter. Grant Baldwin seeks more restrictive standards on the south side of lots to protect neighbours' sun.[31]

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29 Refer to McIndoe Urban *PNCC MRZ Standards Report*, pages 8-16 and shading studies at **Attachment A**. Also see **Attachment F** Recession Plane Analysis.

30 SO96.2.

31 SO191.32 and SO84.1.

83. Richard Sheehan seeks minimal height increase especially near boundaries.[32] Richard Houston recommends keeping the HIRB the same as in the Residential Zone to avoid dominance and loss of sun. [33]

84. Kevin and Ngaire Smidt submit that this standard should be amended to avoid mid-winter shade on adjacent buildings between 9am and 4pm. [34]

85. Some submitters support the HIRB in addressing adverse shading effects, for example Paul J Moughan and Lynnette Thurston-Paris.[35]

86. I do not support the submissions seeking more restrictive HIRB standard for the following reasons:

(a) The 5m + 45° angled plane requires the highest parts of three storey buildings to be set back further from boundaries than the MDRS standard on the front two-thirds of sites (refer **Attachment F** and MRZ Standards Report).

(b) Retaining the operative 2.8m + 45° HIRB for the rear portion of sites will minimise impact on neighbouring properties.

(c) Requiring no additional shade in the seven hours between 9am and 4pm in mid-winter would be excessively restrictive. Our shading analysis confirms that the proposed standards are appropriately calibrated to prevent excessive shading of adjacent buildings, with the maintained 2.8m +45° HIRB standard continuing this level of protection.

(d) There has been comprehensive review of the effects of the proposed HIRB including extensive testing on typical lots as previously described, leading to a departure from the MDRS HIRB providing improved protection of amenity, and minimising shading and visual dominance at the rear of sites.

32 SO86.1.
33 SO109.2.
34 SO116.3.
35 SO33.1 and SO161.1.

Modification to HIRB diagram

87. The Council requests replacement of Figure 2 with an updated version to show that the boundary recession plane continues when a building exceeds the permitted maximum height of 11m.[36] I support this request and agree that the HIRB diagram should be adjusted to show continuity of the HIRB beyond the maximum height limit. This clarification is important for discretionary applications that may exceed the 11m height limit. I prepared the original diagram at Figure 2 and have made the necessary adjustment.

L. SETBACKS (MRZ-S3)

Sunlight and privacy effects

88. Pam Marks, Wendy Stewart and Richard Houston consider the proposed setbacks are too shallow and Jenifer Mark seeks increased distance from boundary for two and three storey buildings to address sunlight and privacy effects across the boundary.[37] Robert and Gill Norris submit that accessory buildings higher than 2m should be included, citing "shade, privacy appearance" concerns.[38]

89. I do not support these submissions because:

(a) A key factor in sunlight protection is the combination of maximum height and HIRB, not setback distances. The stepped HIRB design specifically protects the more sensitive rear of sites in 'mid-block' areas.

(b) Larger side yards would restrict development on smaller and narrower lots. The MRZ must differ from operative standards to enable intensification through multi-unit development.

(c) Privacy outcomes from reducing side and rear yard separation distances are minimal, because:

36 SO166.23.
37 SO88.2, SO91.1, SO109.2, 81.1.
38 SO191.34.

(i) Closer side walls of buildings actually provide for better visual privacy when windows on opposing walls are offset.

(ii) The 1.0m setback is consistent with the MDRS standard and the proposed 1.0m outlook space standard.

(iii) The height of accessory buildings in side yards is more effectively controlled by HIRB.

90. I note a correction is required to the table at MRZ-S3 sub-clause 1 that should read as 'Side and Rear' (not just 'Side'). I consider this to be a simple drafting omission.

Building to the boundary in the side yard

91. Chris Teo-Sherrell seeks to allow building up to the side boundary in certain circumstances for better use of the site.[39] I partly support this submission as I consider that facilitating this for attached garages and accessory buildings in the side yard is sensible, subject to a 7m limitation on length for garages and the 2.8m+45° HIRB as demonstrated at **Attachment G**. I consider that as that there is no increase to maximum building coverage, this would facilitate better use of the site area, allowing greater site planning flexibility and facilitation of intensification with appropriate control of cross-boundary effects.

Garage frontage setback

92. The Council propose deletion of MRZ-S3, clause 2 which relates to setbacks for front-facing garages.[40] I do not support this for the following reasons:

(a) This has the consequence of removing the provision for a garage door setback to be 2.5m, that is 1m from the permitted frontage alignment of the dwelling. This compromises the presentation of buildings to the street and reduces efficiency of development on smaller sites.

(b) Loss of this standard covering the required minimum frontage setback of a garage where parking is provided in front of the garage can be

39 SO184.41.
40 SO166.25.

expected to lead to situations where the ends of vehicles impinge on the footpath.

(c) With regard to the notified 2.5m garage setback standard, I have further discussed this matter with Ms Fraser (traffic expert for the Council). I recognise potential accessibility issues might arise if vehicles were to attempt to park within the 2.5m setback and overhang adjoining footpaths, impeding pedestrian movement. This would be contrary to the anticipated walkable outcomes for the MRZ.

93. I have reviewed the revised standard set out in the planning evidence of Ms Jenkin that reinstates part of clause 2 into a single table at clause 1 for 5.5m garage setbacks and support this approach. However, I recommend the alternative minimum 2.5m garage setback is retained for the reasons set out above, this notwithstanding Ms Fraser's concerns over illegal parking.

Garage setback from side or rear boundary

94. The Council propose an editorial text change that appears to eliminate the setback standards for garages as set out at MRZ-S3 clause 2, requiring only the table at clause 1 to be applied.

95. The notified standard MRZ-S3 does not allow for garages less than 7m long to be located within the side boundary, but states that garages more than 7m long should be set back not less than 1.0m. I recommend a drafting correction to address this. In the notified MRZ Standards report I said (pg.17):

> Providing for garages within the side yard over a limited distance allows for better use of the site while maintaining privacy over the boundary. Given that the site coverage standard applies, this provides for greater site planning flexibility without allowing over-development of the site.

96. I do not support the Council submission. This is for the reason that this editorial change is paired with removal of street facing garage door setback standards which introduces urban design compromises.

Accessory buildings in side and rear yards

97. Kevin and Ngaire Smidt seek inclusion of accessory buildings higher than 2m, however it is unclear what is being proposed.[41] The Council seeks to introduce a new 2.0m height restriction for accessory buildings within side or rear yards.[42] Richard Houlahan recommends increasing the height of accessory buildings from 2.8m to 3.8m for constructability reasons (MRZ-S1 clause 2).[43]

98. The District Plan definition of accessory buildings includes garages and therefore the 2m height restriction submission will preclude garages from occurring within side yards. The overlap between the accessory building definition and garages generally needs to be addressed.

99. I do not support the submission by the Council but support in part the submission by Richard Houlahan. The requested 2m restriction is not consistent with good site planning and facilitating intensification while manging cross-boundary effects in the MRZ, as previously discussed in this evidence. I recommend applying the 2.8m+45° HIRB standard with max length of 7m as the control for accessory buildings within side yards, which would also address the concern of Mr Houlahan.

Setbacks and Lot size

100. Brent Norrish opposes building closer together with smaller lot sizes, citing risks of increased conflict and lack of space for exercise, play and gardening.[44] I do not support this submission for the following reasons:

(a) Having more buildings closer together is an inevitability of a neighbourhood transitioning into a MRZ. However, while allowing that, proposed standards for maximum building coverage, outlook space and outdoor living space ensure appropriate and useful spaces between buildings are provided.

41 SO116.34.
42 SO166.26.
43 SO180.1.
44 SO111.2.

(b) One of the criteria for setting MRZ zone boundaries is reasonably close access to a public park, which along with the access routes to it contributes to potential for exercise and play.

(c) Reduction of side yard from 1.5m to 1.0m will contribute to intensification on site and the 1.0m yard depth allows for better use of the land as a 1.5m strip at the boundary is unlikely to have any particular utility other than potential for more planting at side boundaries in situations where the unit faces the street.

Increase side boundary setback to 3.0m

101. Sheila Barrass seeks a side boundary setback of 3.0m to protect light for single storey dwellings when new multi-storey units are built.[45] I do not support this because 1m setback will provide sufficient light and doubling the operative side yard setback requirement (tripling the proposed setback), conflicts with intensification objectives.

Matters of discretion for setback standard infringement

102. BP, Mobil and Z Energy generally support the proposed setback standard but request an additional matter of discretion related to reverse sensitivity on adjoining non-residential sites. [46] KO supports the proposed standard for setbacks but seek to remove shading and loss of privacy effects as matters of discretion, preferring these to be addressed by HIRB and Outlook Space standards.[47] The amendments sought are:

> Matters of discretion where the standard is infringed:
> 1. Shading effects on adjoining sites;
> 2. Loss of privacy effects on adjoining residential sites;
> 3. Dominance effects on adjoining residential sites. and
> 4. Safety effects on the land transport network and pedestrians.
> 5. Reverse sensitivity effects on adjoining non-residential sites.

103. I partly agree with these changes because HIRB controls are better at addressing side/ rear yard shading. However, I consider that privacy effects should be

45 SO186.1.
46 SO78.6.
47 SO199.33.

retained as a discretionary consideration here, which recognises that building closer to a boundary than 1m may influence amenity and create potential conflicts between the different land uses. Importantly I note that parts of a building closer to the boundary than 1m are less likely to have windows (due to requirement for fire resistance rating) and therefore better cross-boundary effects might be provided.

104. I support consideration of reverse sensitivity on non-residential sites. For dwellings, breaching setbacks could impact on residential amenity and has the potential to generate conflicts with commercial activities. Consideration of these reverse sensitivity effects (positive or negative) should therefore be a matter over which discretion is reserved.

M. BUILDING COVERAGE (MRZ-S4)

105. Leith Consulting and Kāinga Ora support the notified 50% site coverage standard[48]. Sheila Barrass opposes the standard, but the relief sort is unclear and appears to refer to setbacks. [49]

106. I consider the 50% coverage standard remains appropriate. A 50% coverage standard enables greater intensity through medium density (aligning with MDRS) while maintaining appropriate residential amenity through other performance standards.

Matters of discretion for building coverage infringement

107. BP, Mobil and Z Energy generally support the 50% coverage standard but request an additional matter of discretion related to reverse sensitivity on adjoining non-residential sites. [50] KO supports the proposed standard for maximum building coverage, however, seeks to remove shading and loss of privacy effects as matters of discretion on the basis that they are better covered by HIRB and Outlook Space standards. [51]

108. KO, BP, Mobil and Z Energy seek the following amendments:

48 SO170.4 and SO199.33.
49 SO186.2.
50 SO78.6.
51 SO199.34.

Matters of discretion where the standard is infringed:

1. Shading effects on adjoining sites;

~~2. Loss of privacy effects on adjoining residential sites;~~

~~3. Dominance effects on adjoining residential sites. and~~

4. Safety effects on the land transport network and pedestrians.

5. Reverse sensitivity effects on adjoining non-residential sites.

109. I do not support the removal of shading and privacy discretions here. They remain relevant because the potential impacts of the placement of additional building form resulting from infringement of the coverage standard may include additional shading and loss of privacy on adjoining sites that they would not otherwise experience, and these effects may cumulatively be in excess of what is otherwise permitted by the package of standards.

110. On the other hand, I do consider that reverse sensitivity effects on non-residential sites should be a matter over which discretion is reserved, though in the context of site coverage breaches this is primarily concerned with privacy matters. Breaching 50% coverage will result in less open space available around the building that could impact on privacy for the subject dwelling(s). This has the potential to generate conflicts with commercial activities. Consideration of reserve sensitivity in relation to privacy could therefore be valuable.

N. LANDSCAPED AREA (MRZ-S5)

111. Chris T-Sherrell requests that the following amendment is made: "No vegetation may be used to interrupt the visual connection between windows and doors in the front facade of the ground floor of a building on a front site with a public road" seeking a clear non-vegetated area of 1.0m – 2.5m in height.[52] The submitter has a related point at SO184.14 regarding direct line of sight that I have addressed under MRZ-P3.

112. In addition to my comments at MRZ-P3, I do not support this submission. Preventing landscape planting and in particular vertical planted structure at site frontages would reduce both street character and on-site liveability, including the potential for achieving privacy screening to private outdoor spaces located to the front of a site. Planting is unlikely to occur in front of pathways to front

[52] SO184.47.

doors, or driveways thus ensuring views towards dwelling facades will always be available.

O. SHADE (MRZ-S6)

113. Rangitāne o Manawatū ("**Rangitāne**") support a requirement for outdoor shaded space being included as a performance standard. [53] However, Phocus Planning, KO and the Council all seek deletion of the standard, arguing that it conflicts with current practice where daylight is also required in these spaces, creates overregulation that is complex to enforce, and that shading can be achieved through simpler means like umbrellas or shade sails.

114. I agree with removing MRZ-S6 for the following reasons:

(a) From an urban design perspective private outdoor living spaces should be provided with a "reasonable level of…sunlight", which is recorded in MRZ-P3, and the requirement for the shaded space seems to contradict that.

(b) It may also contradict MRZ-S7 which requires spaces to face the north, east or west, specifically so that they can receive sun.

(c) A requirement for shade to the private outdoor living space is likely to increase shade to the dwelling it is attached to, and this will also be contrary with MPZ-P3 which requires a reasonable level of sunlight to the residential unit.

(d) As the MRZ intensifies with taller and more intensive building development, access to sunlight will become more important.

P. OUTDOOR LIVING SPACE (MRZ-S7)

Thresholds for outdoor living spaces

115. Leith Consulting recommends changing the threshold for a 30m²/4.5m diameter ground-level outdoor living space from dwellings with two or more bedrooms to

53 SO185.50, SO199.35, SO166.28.

three or more bedrooms, with 20m²/4.0m diameter for units with up to two bedrooms.[54]

116. I support this change as it adds flexibility to site planning and avoids avoiding over-specifying open space for minor dwellings and granny flats. The change would not alter the amount of open space around a dwelling which is managed by the maximum building coverage standard, therefore, reasonable residential amenity will be retained.

Provision for pets

117. Kate Vandemeer seeks a percentage of units with greater minimum outdoor space for pet ownership.[55] I do not support this, for the following reasons:

(a) The proposed standard is a minimum and larger outdoor living spaces can and will occur;

(b) The outdoor living space will be supplemented by other private open space on each lot, and the 50% maximum building coverage standard allows for additional fenced areas suitable for pets; and

(c) Areas within the MRZ are within walking distance of reserves, allowing for dog walking opportunities.

Outdoor living space on multiple levels

118. Chris Teo-Sherrell[56] seeks modification to MRZ-S7 to require outdoor living space area required in subclause 3 to be distributed over multiple levels for multi-storey houses. I do not support this for the following reasons:

(a) This would create an excessive minimum standard for multi-storey houses, inconsistent with the intent of intensification and it would compromise affordability; and

(b) It would also fail to provide for apartments by removing the open space provision suitable for that dwelling type.

54 SO170.7.
55 SO14.1.
56 SO184.49.

Q. OUTLOOK SPACE (MRZ-S8)

119. Phocus Planning submit MRZ-S8 should be removed, arguing that these standards are over-regulated, overly complex, and unnecessary as yard separation requirements will assist with on-site amenity and privacy.[57] I do not support this submission for the following reasons:

(a) The proposed standard has its origins in the MDRS Outlook standard that was informed by the Auckland Council's Operative Unitary Plan Outlook Space standard that MUL helped develop. [58]

(b) The proposed outlook space standard has been tested on typical sites and is workable with 1m side yard separation distances. It encourages principal living rooms and the main bedroom to have outlook over the private rear of the property or towards the street, however analysis shows that outlook spaces are also possible with other orientations on typical infill sites.

(c) This standard is a primary means of achieving space between buildings, outlook and privacy between units within a comprehensive development on a site, as the 1.0m side yard alone is insufficient.

(d) The outlook space for all other habitable rooms of 1.0m x 1.0m is coordinated with the 1.0m side yard setback.

Reduction of outlook space for main living room

120. KO seek to reduce the 4m x 4m outlook standard to be consistent with notified outdoor living requirements, and Leith Consulting proposes 5m x 4m for the main living area outlook space.[59]

121. I do not support these changes for the following reasons:

57 SO185.52.
58 Refer PNCC MRZ Standards Report, pages 24-26 for detailed discussion of outlook space and its rationale.
59 Parts of SO199.36 and SO170.8.

(a) Both distances are insufficient to provide suitable outlook and eliminate visual dominance in outlook from the main living area if an 11m high blank wall is located opposite the primary living room window.

(b) The 6m standard allows an appropriate 12m distance for privacy between living rooms directly facing each other, verified through work including multiple site observations undertaken for Auckland Council's Unitary Plan. Conversely an 8m or 10m separation is insufficient and can be expected to compromise privacy in the living rooms where face-to-face living room windows are likely to be screened.

(c) MUL's decades of experience working in Auckland applying and reviewing these standards gives me confidence that 6m x 4m is necessary for reasonable amenity while facilitating intensification.

(d) KO's request for consistency with outdoor living requirements conflates two standards being implemented for different reasons. Those being, the minimum dimension of a space suitable for outdoor living with the minimum extent of outlook from the main window of the dwelling.

Reduction in outlook space related to the primary bedroom & outlook space standard for additional windows in the primary living and primary bedroom

122. Leith Consulting and KO seek to replace the 3m x 3m outlook space from the primary bedroom with a 1m x 1m requirement, arguing the change addresses constraints on viable locations of the primary bedroom against side boundaries which require a setback of 1m.[60]

123. I do not support the request to reduce the outlook from a primary bedroom's primary window from 3m x 3m to 1m x 1m. This is because the request would permit the principal bedroom window of one unit to face squarely into the principal bedroom window of another unit 2m away. In such a case visual privacy will be, without use of indoor blinds, non-existent while bedroom-to-living room separation could be 7m, also requiring window screening. These dimensions permit a very poor design outcome with extremely low amenity for residents, and critically, do not perform well against the matters of discretion,

60 SO170.8 and part of SO199.36.

indicating the intent of the standard. This is not consistent with achieving a well-functioning urban environment both on site and across the boundary.

124. In addition, I note what I consider to be an omission in the standard – that the outlook space for any second window in primary bed and living rooms should not be required to be more than 1m x 1m, however as notified, outlook spaces for any second windows for the primary living and bedroom will likely need to be 6m x 4m and 3m x 3m respectively. This limits sensible site planning with units at 1m from boundaries and is unnecessary from an internal amenity perspective. An outlook space no larger than 1m x 1m should be required for additional windows to these primary rooms. That is consistent with our Standards Report.

125. One way this can be addressed (subject to planning advice), is by the following amendment:

> 1 metre in depth x 1 metre in width outlook space for all other habitable rooms and any additional windows in the main living area and/or primary bedroom.

R. STORMWATER ATTENUATION DEVICE (MRZ-S10)

126. KO seeks removal or modification of clause 3 of MRZ-S10 to read: "Any above-ground stormwater attenuation tank ~~must be located in a side or rear yard~~ that is not located within a side or rear yard must be screened."

127. I do not support this change because even when screened, this would appear as a screened tank, and allocating service elements in a front yard is unacceptable from a visual amenity perspective and would not provide a reasonable level of amenity for adjoining properties and the street, in accordance with MRZ-O2. There will be many ways to locate such a tank unobtrusively in the side or rear yard.

S. FRONT FAÇADE GLAZING (MRZ-S12)

128. The Council seeks amendments to the table to introduce a requirement for corner sites or a site with two frontages and also to introduce a new figure to describe the standard. I do not support these submissions as, the wording in the table already specifically addresses corner sites and I consider the wording of

the standard to be sufficiently clear to not require further diagrammatic explanation.[61]

129. Phocus Planning submit in support but recommend an adjustment to wording to clarify that the standard does not apply to all buildings such as small garden sheds. [62] Leith Consulting supports the standard, saying that it "provides a more nuanced approach to the MDRS standard which anecdotally is not flexible enough for different scenarios creating the need for unnecessary resource consents."[63]

130. I support the submitters for the reasons provided in their submissions. The standard as notified is calibrated to relate appropriately to different types of frontage and the percentages have been tested by MUL measuring alternative façade compositions. There is no benefit in the standard applying to accessory buildings, which will be single storey smaller structures and, except for the side wall of a side entry garage, will not be in the front yard.

T. FRONT DOOR ORIENTATION (MRZ-S13)

131. KO and Phocus Planning seek deletion of standard MRZ-S13, considering front door location doesn't impact neighbourhood amenity and that glazing requirements in MRZ-S12 provide sufficient street engagement.[64] Leith Consulting supports the standard as providing for good urban design outcomes.[65]

132. I do not support KO or Phocus Planning's submission. I consider that MRZ-S13 provides for sufficient building layout / design flexibility on site while achieving important street-to-building legibility outcomes, including Crime Prevention Through Environmental Design ("**CPTED**") where direct visual and physical connections between street (or shared access lane) and dwelling are achieved and concealment avoided. It is also the key standard to implement the policy (see MRZ-P3) of providing legible connection to the street through entrance location, a policy requirement that I also consider important.

61 SO166.31.
62 SO185.55.
63 SO170.12.
64 SO199.3, SO185.57.
65 SO170.13.

133. The standard allows for the front door of street-facing units to be on the side façade of the street front unit. In my view, this allows design flexibility while preventing entrances at the rear of units which would compromise legibility and wayfinding.

134. For completeness, I agree with KO that the glazing requirements in MRZ-S12 provide for appropriate street frontage engagement, but that is in combination with entrance location in MRZ-S13.

Illustration of front door location standard

135. The Council submits that a new figure showing front door location be added to assist with plan implementation of MRZ-S13. [66] I have reviewed the text for this relatively short and tightly defined standard and consider this to be sufficiently clear to not require a supporting diagram.

U. GARAGES (MRZ-S14)

136. Alan Kirk submits that the street facing garage width standard at MRZ-S14 are too restrictive and "may not be possible to manage".[67] Leith Consulting seeks deletion of the standard,[68] while submitters Kevin and Ngaire Smidt and Robert and Gill Norris support this standard.[69]

137. I do not consider the standard should be changed for the following reasons:

(a) The purpose of this standard as stated in the Standards Report[70] is to avoid dominance of street frontages by blank garage doors; contribute visual interest which will enhance the visual amenity of the street; and to contribute to public safety by facilitating façade treatments that allow outlook over the street and informal surveillance. In my view, these are important public amenity considerations.

66 SO166.32.
67 SO135.2.
68 SO170.14.
69 SO116.37, SO191.37.
70 MUL PNCC MRZ Standards Report, pages 34, 35.

(b) The proportions and widths have been determined by testing a range of lot widths with standard garage door sizes and consideration of the width of garages within.

(c) The 50% maximum standard enables a regular 2.4m wide garage door in a narrow dwelling façade down to 4.8 metres wide with a front door beside that.

V. ON-SITE CARPARKING – LOCATION (MRZ-S15)

138. Leith Consulting seek deletion of MRZ-S15 (1)(a) which requires that on-site car parking facing the road must not comprise more than half the width of the building facade to which it relates. I do not support this submission, as expanses of parking at the street front of a site are inconsistent with the required streetscape outcomes (refer Policy MRZ-P3.5), and the proportion required by this standard is consistent with MRZ-S14 which seeks to also give effect to positive streetscape outcomes and satisfy Policy MRZ-P3.5. I consider this to be important.

W. ON-SITE RUBBISH STORAGE AND COLLECTION (MRZ-S19)

139. Various submitters have submitted in support and opposition to the requirements for communal rubbish bins required by MRZ-S19, with some seeking amendments. [71] KO support the inclusion of the proposed standard for onsite rubbish storage and collection however also seek that matter 2 is deleted, arguing that there are no matters of discretion relate to onsite amenity. [72] MRZ-S19 (2) says:

> "Communal rubbish storage areas must be screened or located so as not to be visible from a public *road*."

140. In my view, I recommend that if there is a missing matter of discretion relating to this standard, then the discretion should be added rather than the standard deleted. Subject to any planning opinion, the following discretion would be appropriate in my view:

71 SO116.40 in support, SO184.62 support with amendment, SO185.63 oppose in part requesting subclause 2 relating to screening to be removed.

72 SO199.44.

"Appearance of the development in views from internal lanes and the street."

141. I support the retention of the screening requirements because this is an important design and amenity consideration, ensuring the public fronts of dwellings to the street and the dwelling frontages to the common public areas are not visually dominated by service infrastructure and functions.

142. I agree with the submitter who noted that screening "*is especially important for the attractiveness of the front dwelling. Many people would regard the sight of rubbish receptacles from the street as undesirable*."

X. FENCES AND STANDALONE WALLS (MRZ-S20)

143. KO supports the proposed standard. [73] Leith Consulting seeks deletion of clause 2b), arguing that it does not effectively address dog control. [74] Phocus Planning support height reduction to ensure pedestrian visibility next to access points but consider there should be no requirement for open construction above 1.1m.[75]

144. Hern Teo-Sherrell calls for amendment of the front fence standard with minimum fence heights and types of fences to allow residents to interact and to reduce burglaries, or low well-maintained hedges.[76]

145. The Council recommends modifying clause 2 of the text to be consistent with Rule 10.6.1.4(d) of the District Plan.[77]

146. I support Phocus Planning's submission in part in relation to visibility access points and with submission SO104.3 regarding visual interaction. With regard to the Council's submission I agree that the amended clause 2 will:

(a) Provide for front boundary definition and reasonable privacy while also maintaining a visual connection between the dwelling and the street for purposes of streetscape quality and public safety.

73 SO199.45.
74 SO170.20.
75 SO185.64.
76 SO104.3.
77 SO166.37.

(b) Minimise visual dominance effects to immediate neighbours and the street or adjoining public place.

(c) Contribute to safety on the footpath at points of vehicle entry.

(d) Avoid tall and blank fences visually dominating road and public space boundaries.

Fence height next to vehicle entries

147. I support Phocus Planning's request for height reductions to ensure pedestrian visibility next to access points, and I note Robert and Gill Norris who "strongly support …improved pedestrian safety through better visibility of exiting vehicles".[78] However, in my view, the current sub-clause 3 fails to address safety at driveway connections to the street. As notified, it only addresses side fences next to an accessway, when the height of front fences adjacent to driveways should also be reduced. The notified text is:

> Within 2.5 metres of any boundary adjoining a public *road*, any fence or standalone wall on a side boundary next to a vehicle *access leg** must be no more than 1.1 metre high.

148. Subject to any planning amendment, I consider that the replacement text below would appropriately address my concern:

> That part of a side boundary fence within 2.5m of the street edge and next to a driveway; and that part of a front fence within 2.5m of a driveway must be no more than 1.1 metres high.

149. I consider this amendment or text to that effect is appropriate for the following reasons:

(a) MRZ-S20 as it is currently proposed facilitates poor urban design outcomes and compromises visual amenity in views from and along the street due to visual monotony, and compromise to public safety due to restricted potential for natural surveillance.

78 SO191.41.

(b) The revised standard provides for front boundary definition and reasonable privacy while also maintaining a visual connection between the dwelling and the street for purposes of streetscape quality and public safety.

(c) The standard as notified does not address safety on the footpath at points of vehicle entry.

150. At **Attachment H** I provide the results of testing amended fencing provisions developed with Ms Jenkin, Ms Fraser and Mr Charnley. This demonstrates application to several different lot widths.

Clarification of fence height measurement

151. David Lane seeks amendment to clause 2(a) to clarify that fence height is measured from site ground level.[79] I do not support this submission as MRZ-S20 2(a) clearly states the height of the fence is "above ground level" and 'Ground Level' is clearly defined in the district plan, Section 4: Definitions.

Andrew Burns

25 July 2025

[79] SO164.4.

Y. ATTACHMENTS (A - H)

A Sunlight Shading Urban Design Memo #6

B Visual Effects - HIRB Studies

C Lot Testing Urban Design Memo #7

D Well-Functioning Environment Urban Design Memo #2

E Roof and solar panels shading

F Height Recession Plane Analysis

G Garage Setback Analysis

H Testing Fence Height Provisions

Urban Design Memo #6

To	PNCC attention Simon Mori (PNCC), Sarah Jenkin (Navigatrix)
From	Andrew Burns (McIndoe Urban Ltd)
Date	09 August 2024
Subject	**Sunlight access / shading of 2022 draft MRZ standards**

1 Scope

This Memo provides sunlight shading analysis prepared by McIndoe Urban in October 2023 as part of the development of 2022 draft MRZ standards.

We identify:
a) Testing of a typical Palmerston North city block of 150m x 60m and lots sized 30m x 15m.
b) Comparative sunlight shading generated by:

- MDRS HIRB and other standards
- 2022 Draft MRZ HIRB and other standards
- Operative District Plan HIRB and other standards

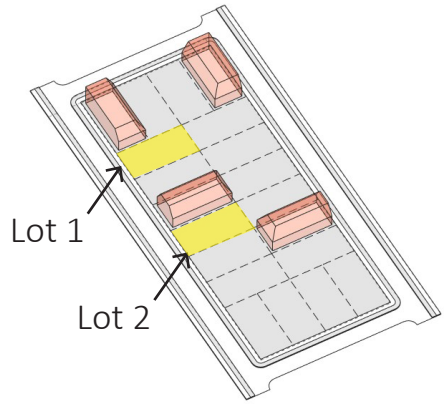
Shading Study - Comparative analysis of MDRS & PCI outcomes

Variables:

Block orientations: A (EW), B (NS)
Proposed adjacent (south) lots: 1, 2
Dates: 21 Jun, 23 Sep, 22 Dec
Times: 10am, 12pm, 2pm.
Types: MDRS, PCI, Op.DP

		MDRS (m2)	PCI (m2)	Difference (m^2)	Reduction (%)	Op.DP (m2)
Block Orientation A, Lot 1						
Summer	10am	0	0	0	0%	0
Solstice	12pm	0	0	0	0%	0
(22 Dec)	2pm	12.41	4.24	8.17	66%	0.01
Spring	10am	9.72	3.71	6.01	62%	0.37
Equinox	12pm	45.94	22.46	23.48	51%	19.21
(23 Sep)	2pm	95.64	45.88	49.76	52%	36.16
Winter	10am	143.8	91.63	52.17	36%	46.15
Solstice	12pm	105.85	80.17	25.68	24%	74.87
(21 Jun)	2pm	201.24	187.62	13.62	7%	152.59
Block Orientation A, Lot 2						
Summer	10am	0	0	0	0%	0
Solstice	12pm	0	0	0	0%	0
(22 Dec)	2pm	25.88	22.7	3.18	12%	0.21
Spring	10am	25.63	20.72	4.91	19%	0.88
Equinox	12pm	104.92	77.26	27.66	26%	43.05
(23 Sep)	2pm	211.11	141.52	69.59	33%	87.54
Winter	10am	159.78	131.95	27.83	17%	117.01
Solstice	12pm	320.55	257.41	63.14	20%	214.5
(21 Jun)	2pm	420.88	405.8	15.08	4%	375.81
Block Orientation B, Lot 1						
Summer	10am	69.53	31.48	38.05	55%	29.26
Solstice	12pm	17.22	7.05	10.17	59%	2.67
(22 Dec)	2pm	0	0	0	0%	0
Spring	10am	105.8	53.88	51.92	49%	42.31
Equinox	12pm	22.5	9.44	13.06	58%	4.08
(23 Sep)	2pm	0	0	0	0%	0
Winter	10am	307.77	280.15	27.62	9%	201.17
Solstice	12pm	160.75	80.81	79.94	50%	58.21
(21 Jun)	2pm	0	0	0	0%	0
Block Orientation B, Lot 2						
Summer	10am	157.4	104.27	53.13	34%	64.44
Solstice	12pm	37.2	32.62	4.58	12%	5.9
(22 Dec)	2pm	0	0	0	0%	0
Spring	10am	225.09	160.06	65.03	29%	102
Equinox	12pm	40.09	38.13	1.96	5%	9.64
(23 Sep)	2pm	0	0	0	0%	0
Winter	10am	358.18	358.32	-0.14	0%	327.02
Solstice	12pm	161.95	135.48	26.47	16%	79.79
(21 Jun)	2pm	0	0	0	0%	0

Block Orientation A



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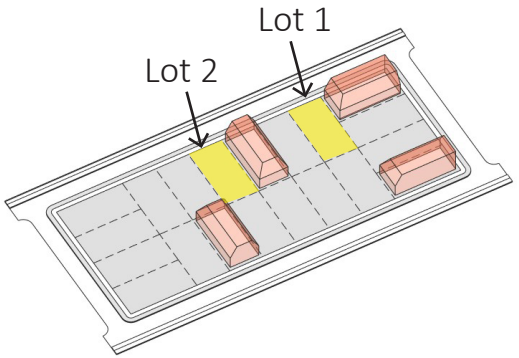

Shading Study: Block Orientation A

Winter Solstice
21 June

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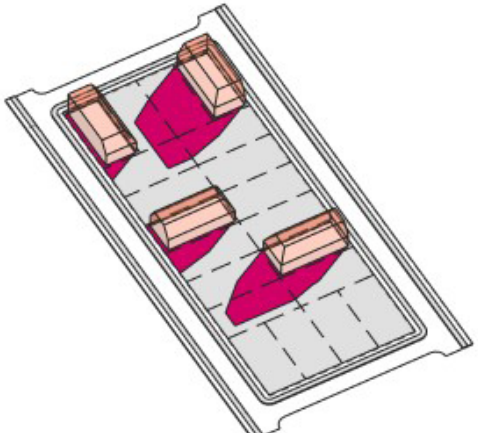	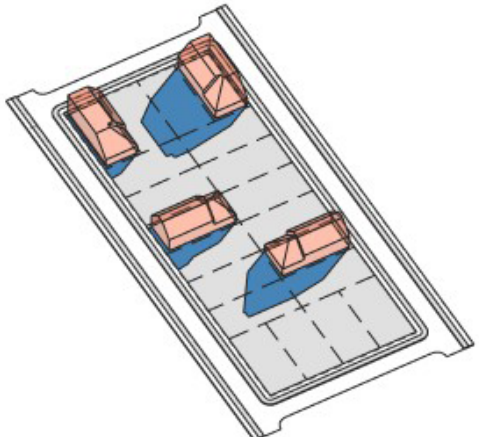	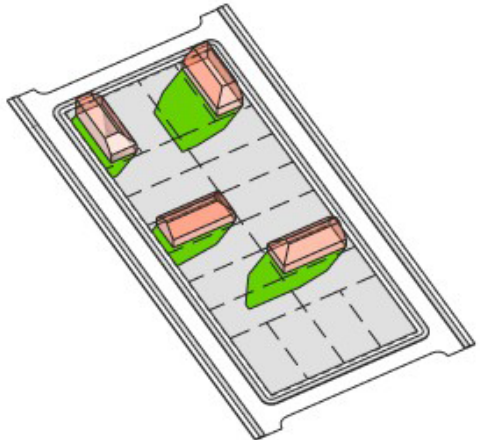	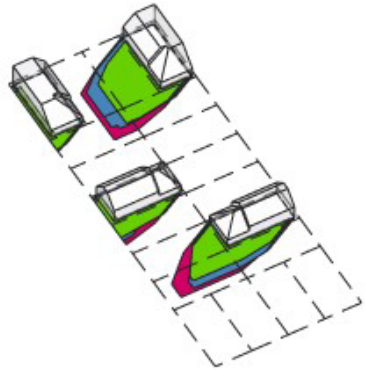
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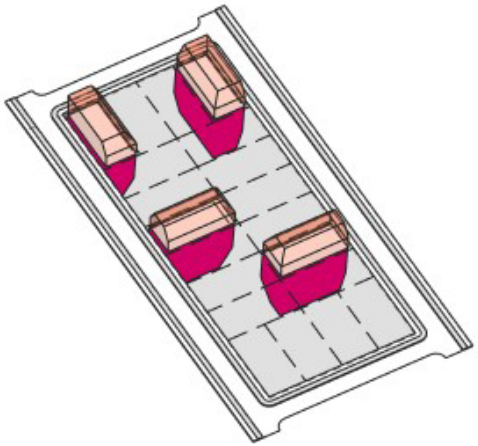	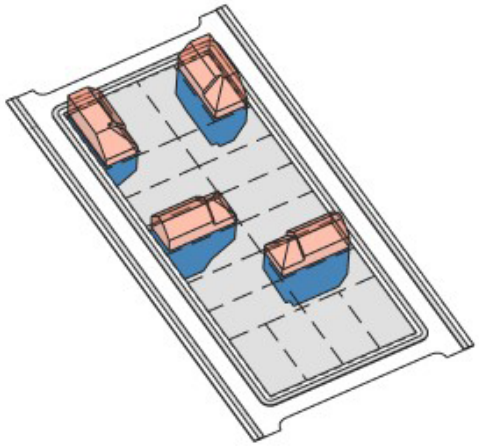	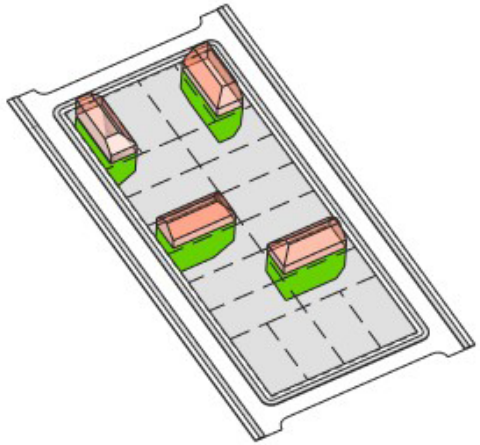	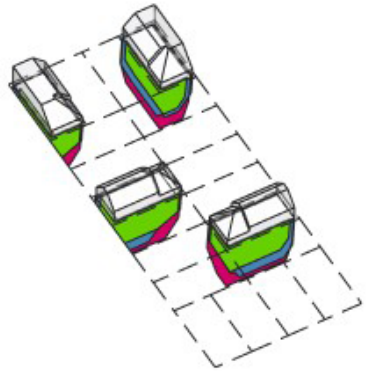
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Shading Study: Block Orientation A

Winter Solstice
21 June

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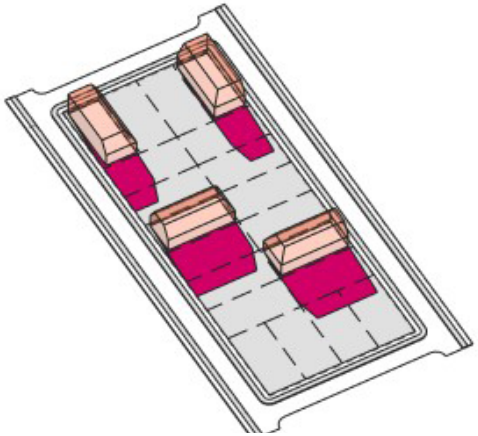	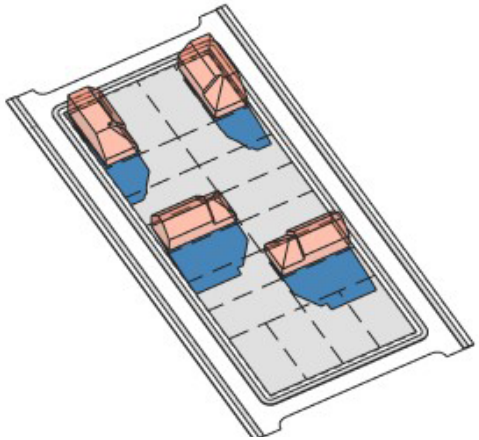	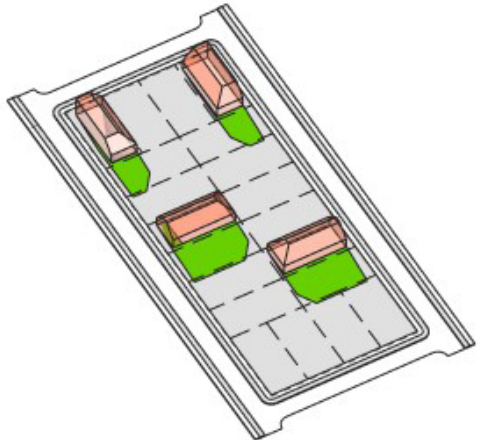	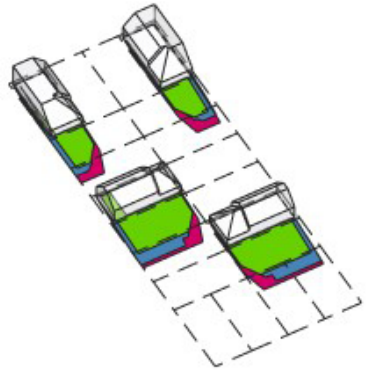
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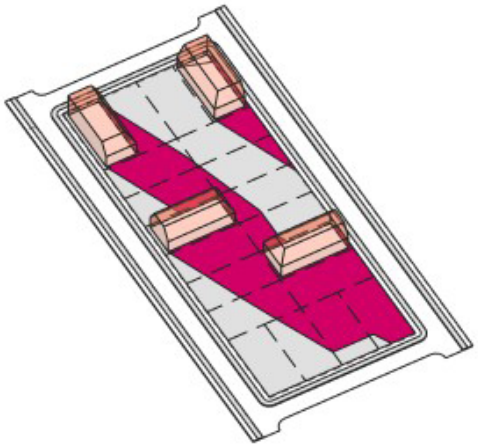	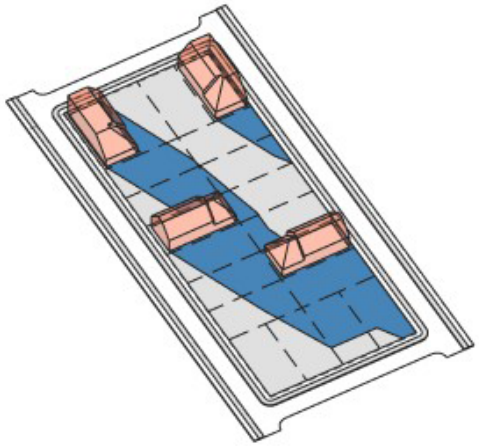	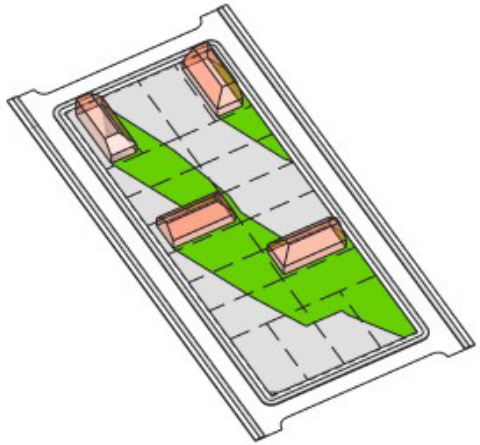	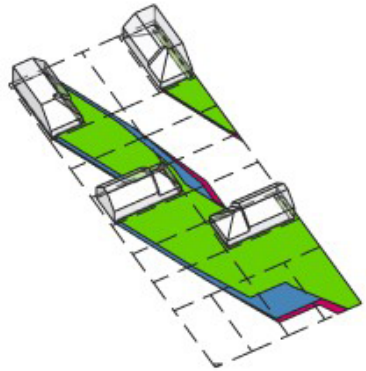
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Shading Study: Block Orientation A

Spring Equinox
23 September

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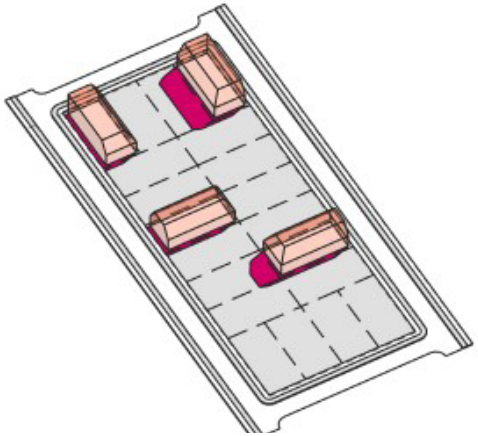	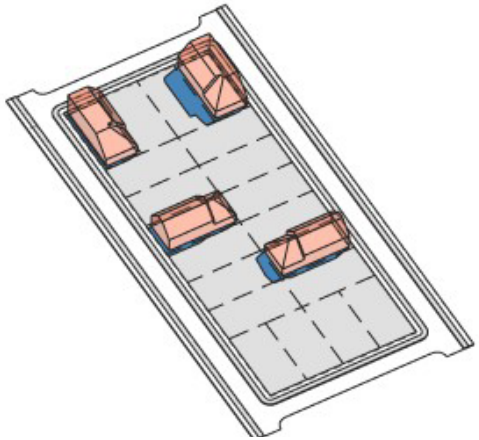	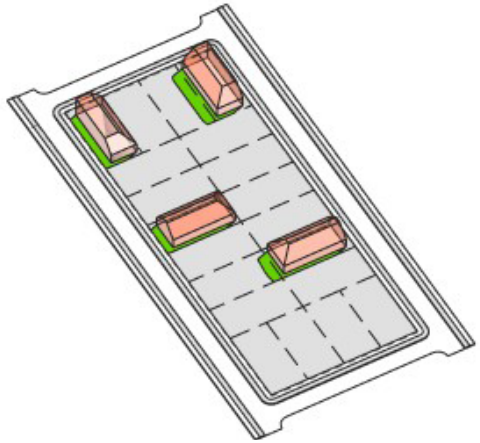	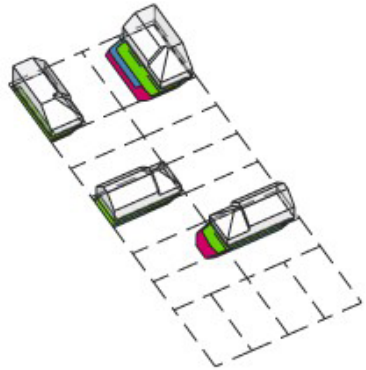
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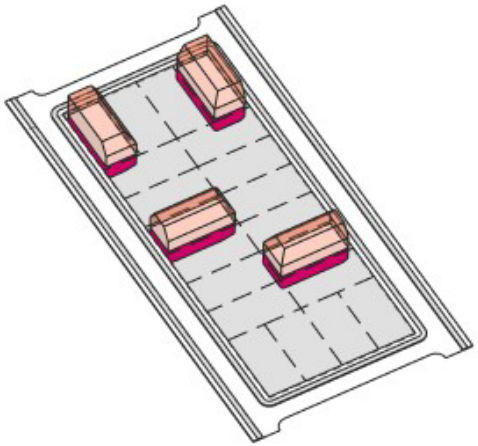
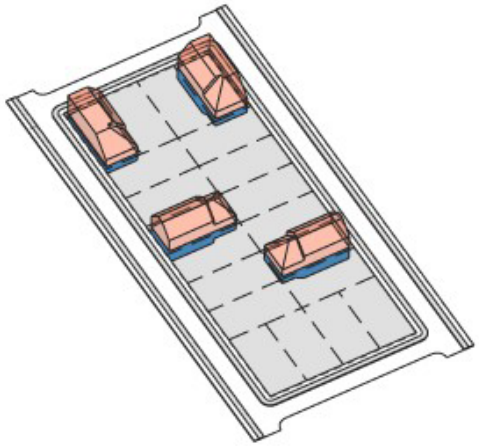
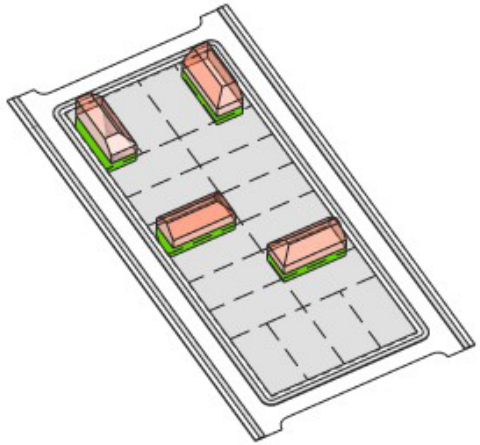
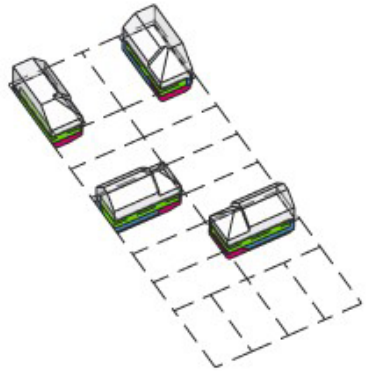
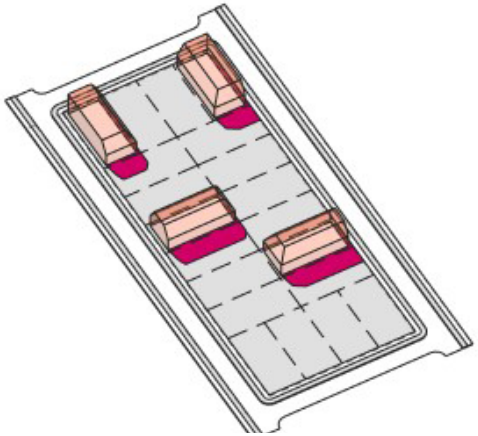
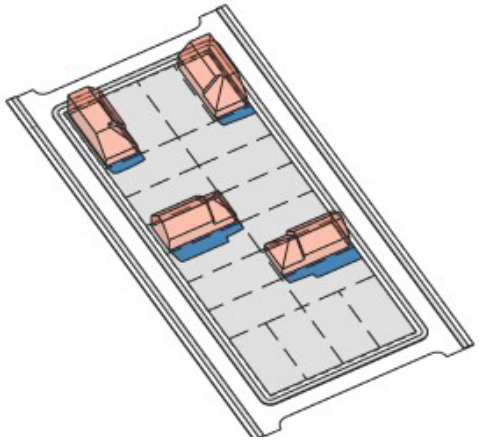
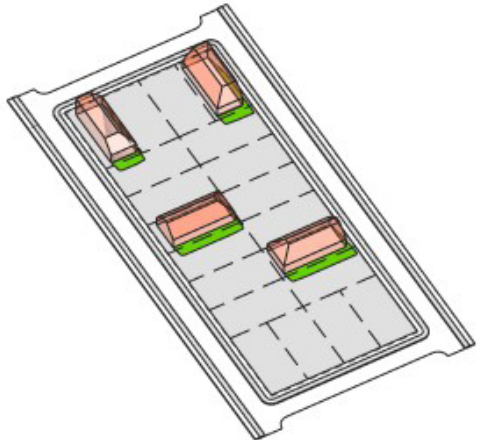
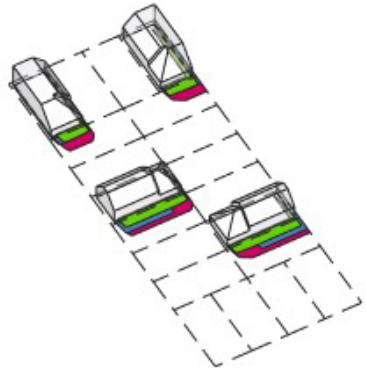
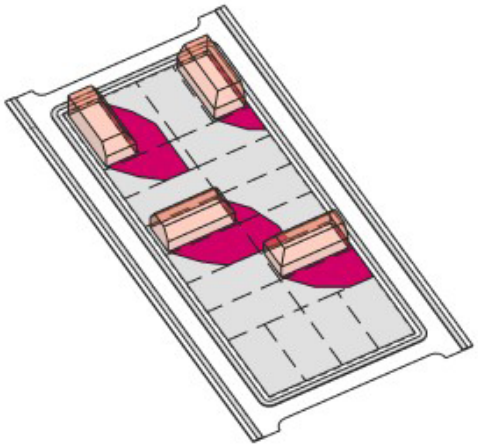
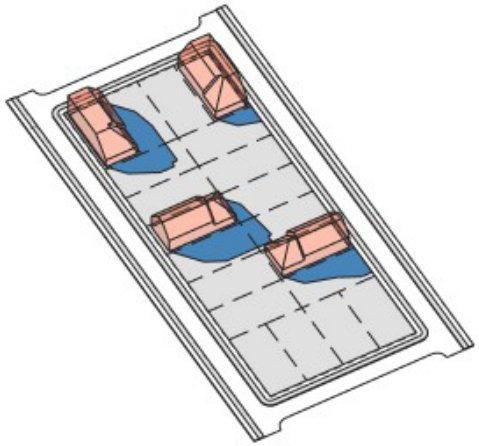
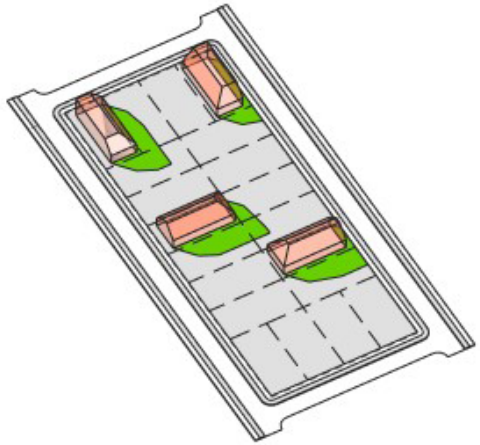
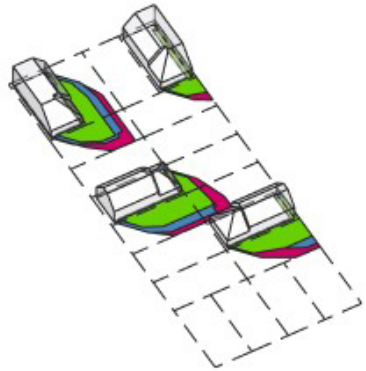
			
12:00 noon			

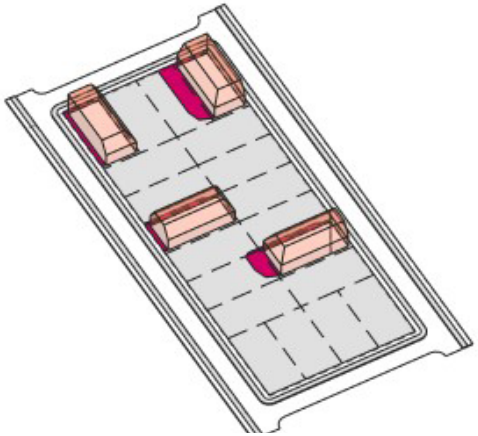
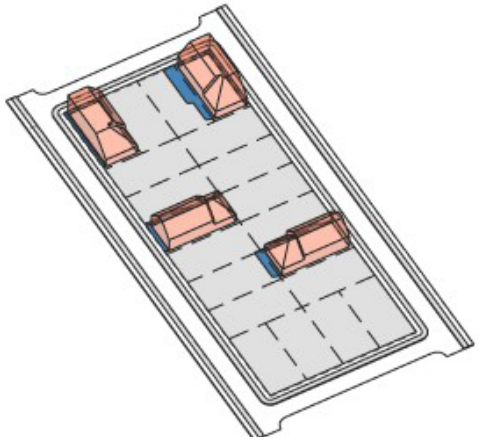
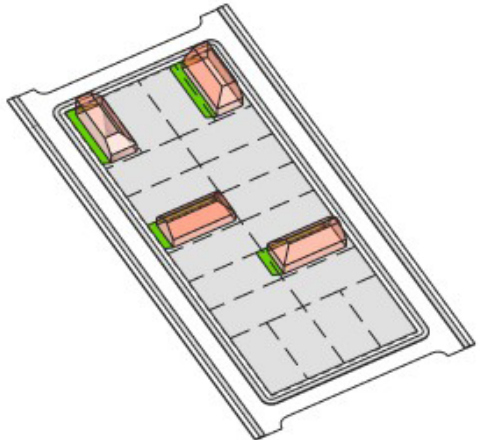
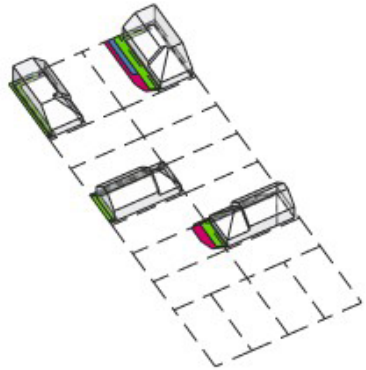
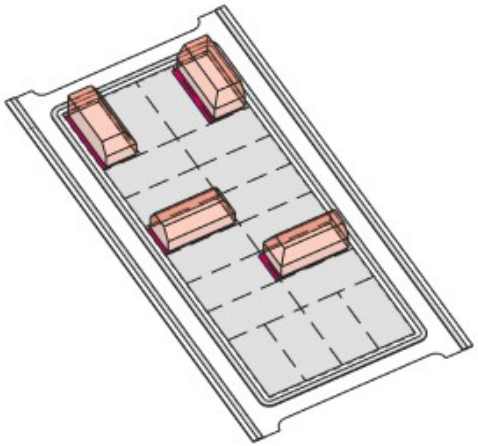
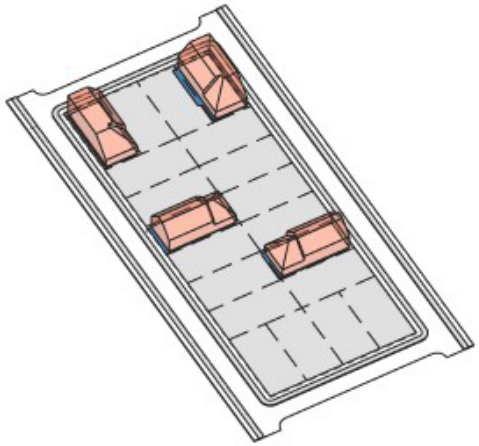
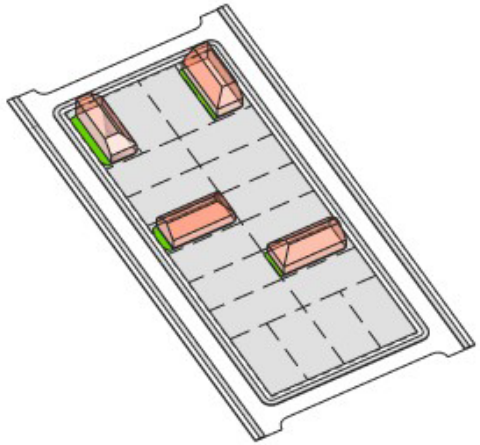
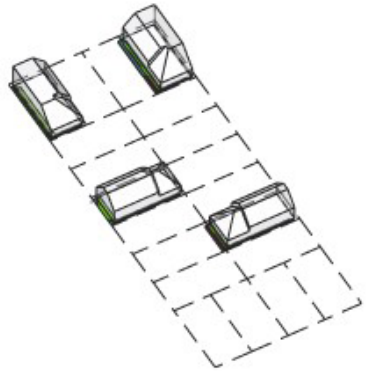
Shading Study: Block Orientation A

Spring Equinox
23 September

MDRS	PCI	Op.DP	Combined
			
2:00pm			
			
4:00pm			

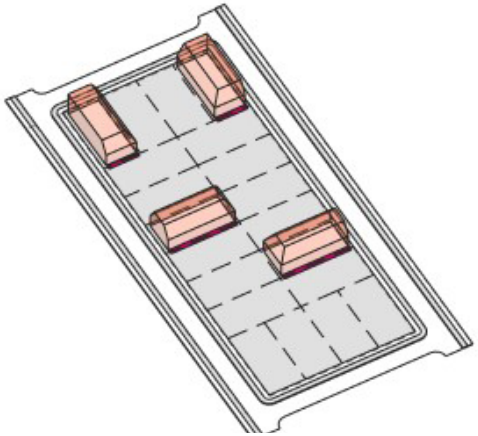
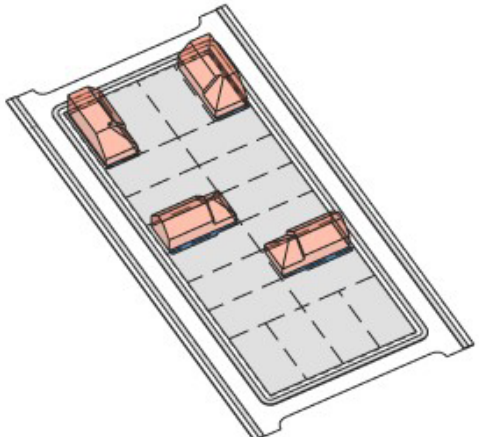
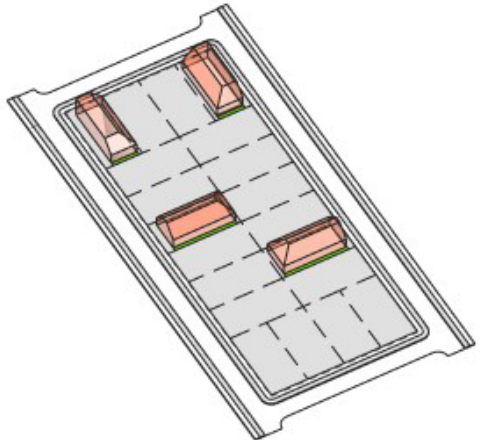
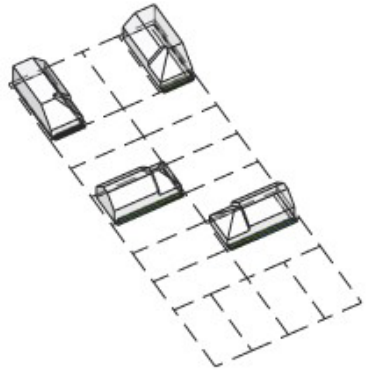
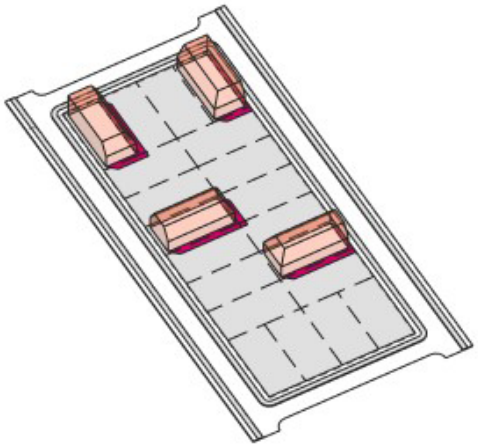
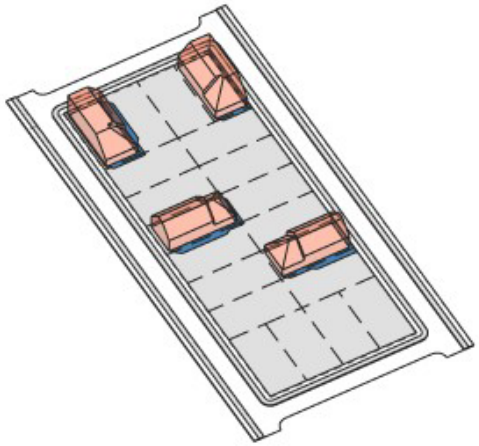
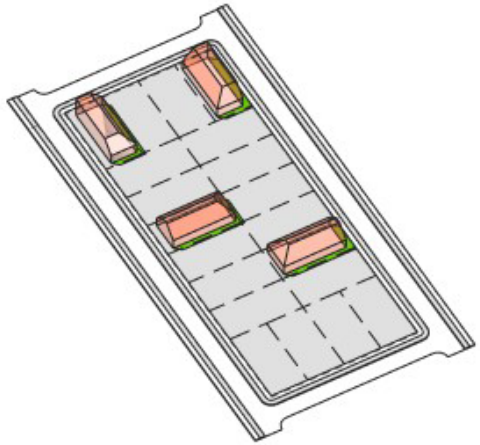
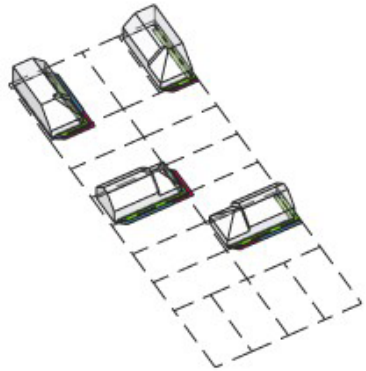
Shading Study: Block Orientation A

Summer Solstice
22 December

MDRS	PCI	Op.DP	Combined
			
10:00am			
			
12:00 noon			

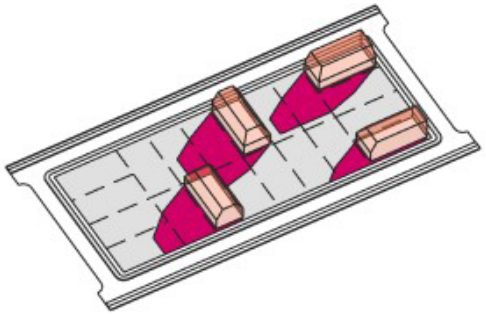
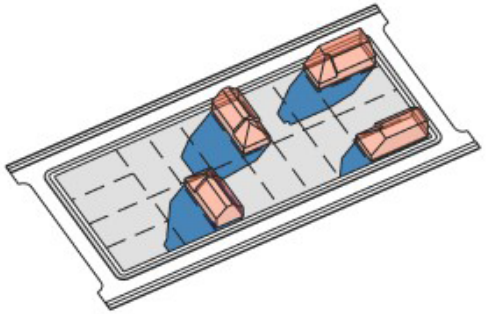
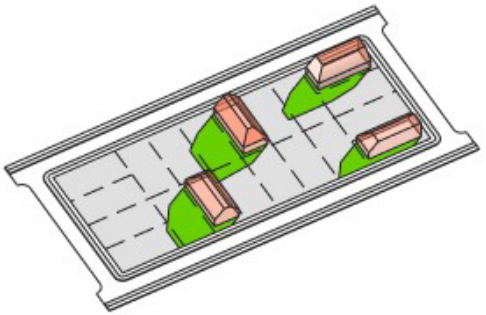
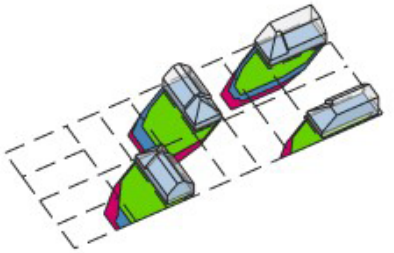
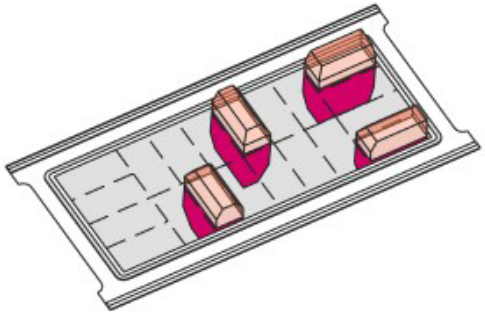
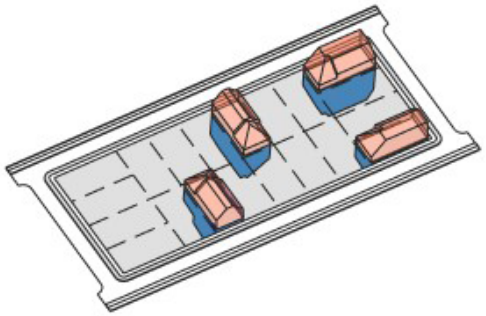
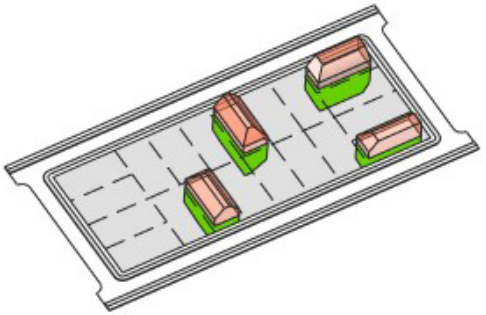
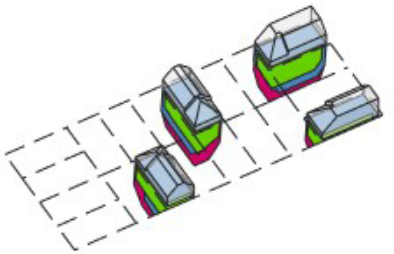
Shading Study: Block Orientation A

Summer Solstice
22 December

MDRS	PCI	Op.DP	Combined
			
2:00pm			
			
4:00pm			

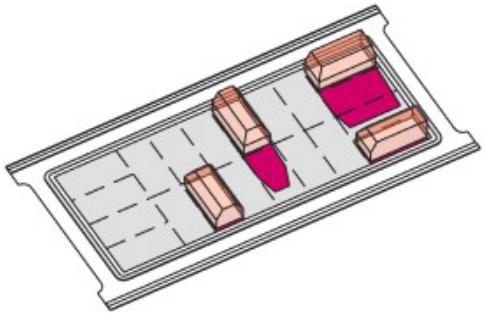
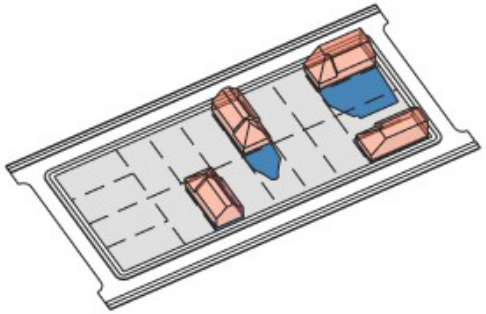
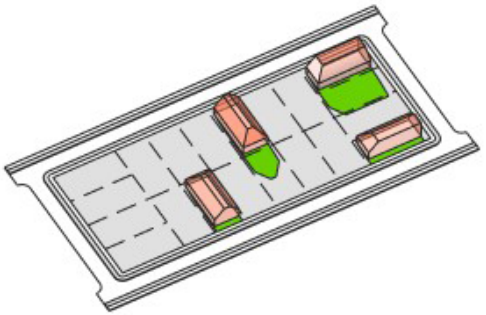
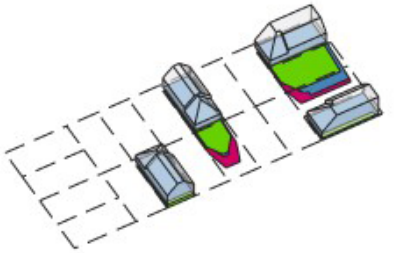
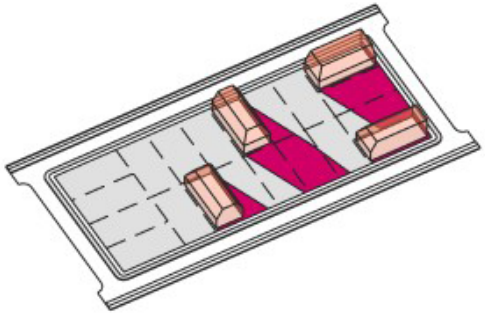
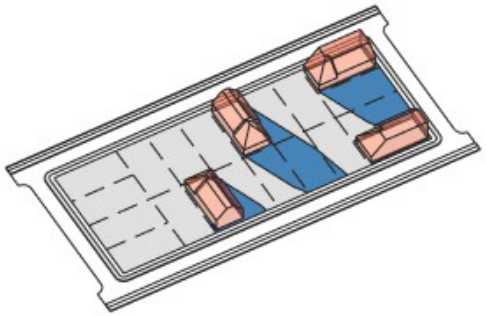
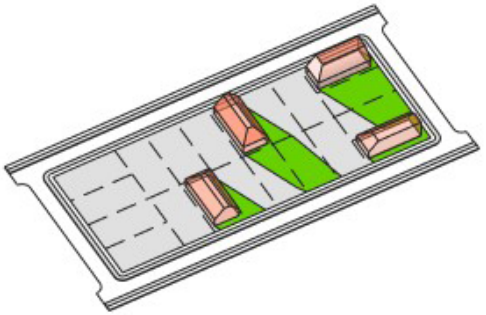
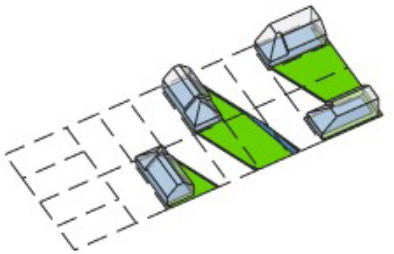
Shading Study: Block Orientation B

Winter Solstice
21 June

MDRS	PCI	Op.DP	Combined
			
10:00am			
			
12:00 noon			

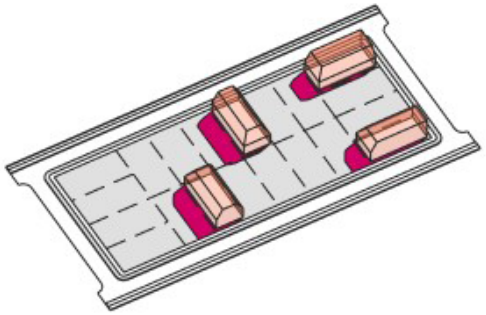
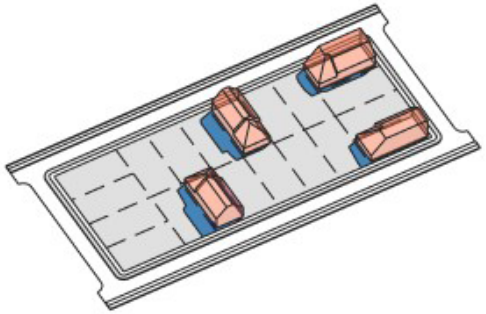
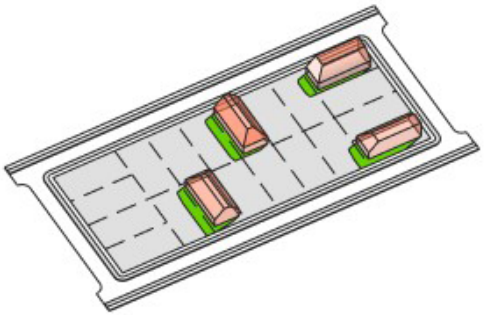
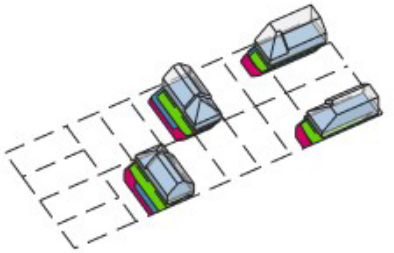
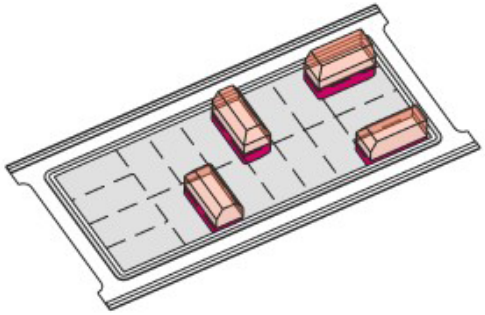
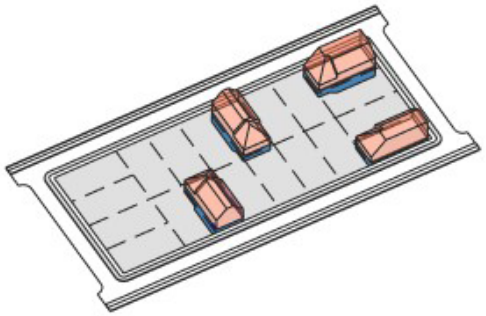
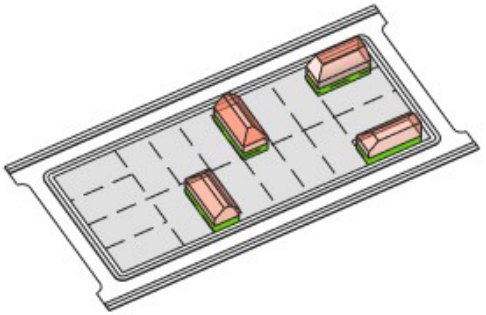
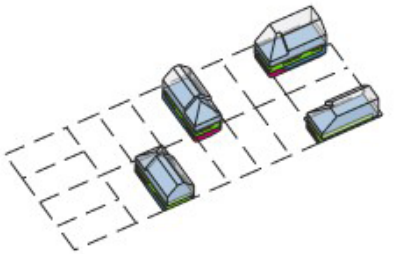
Shading Study: Block Orientation B

Winter Solstice
21 June

	MDRS	PCI	Op.DP	Combined
2:00pm				
4:00pm				

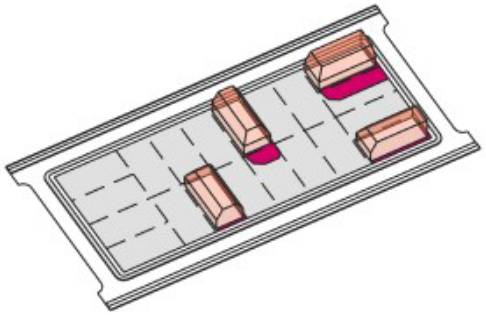
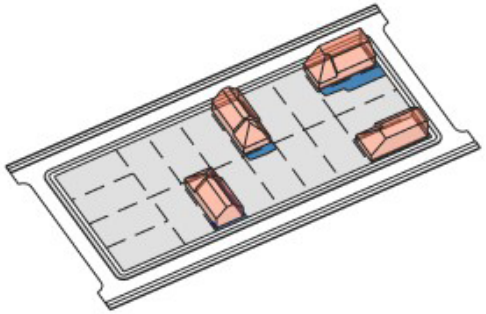
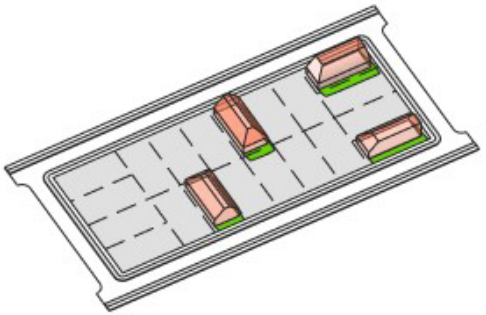
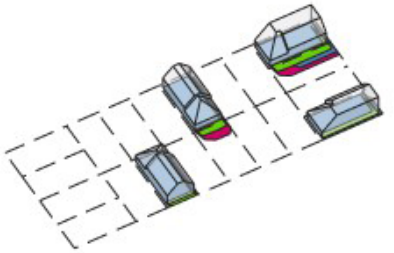
Shading Study: Block Orientation B

Spring Equinox
23 September

MDRS	PCI	Op.DP	Combined
			
10:00am			
			
12:00 noon			

Shading Study: Block Orientation B

Spring Equinox
23 September

MDRS	PCI	Op.DP	Combined
			
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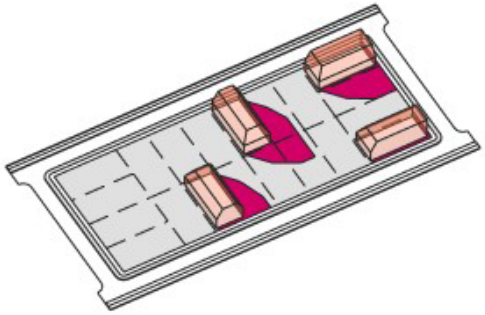	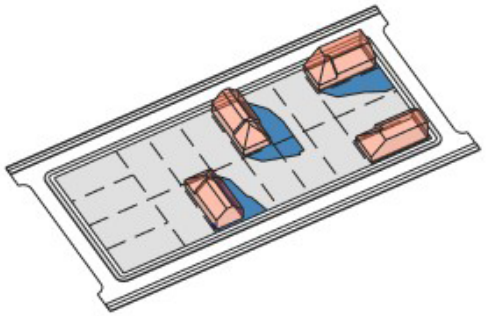	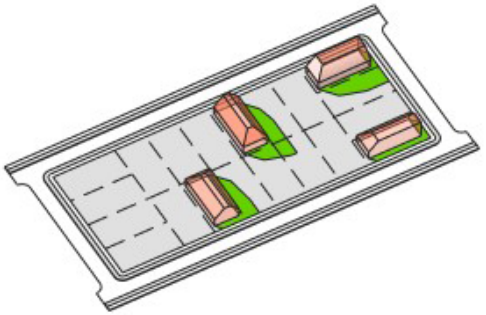	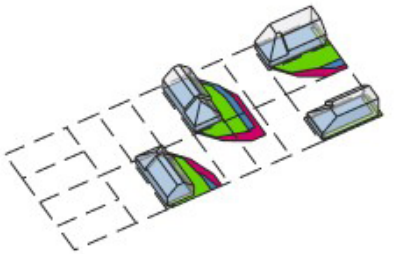
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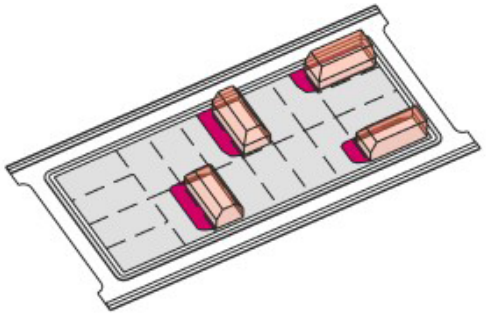
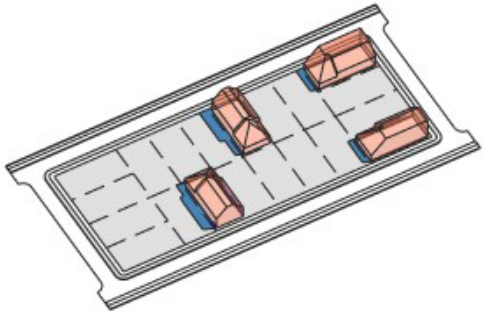
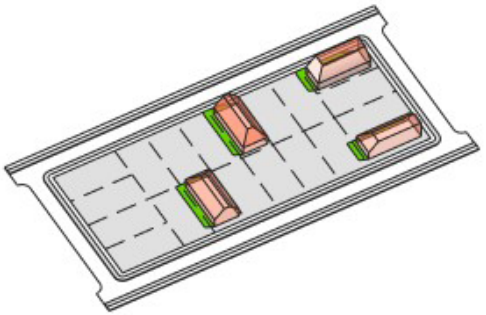
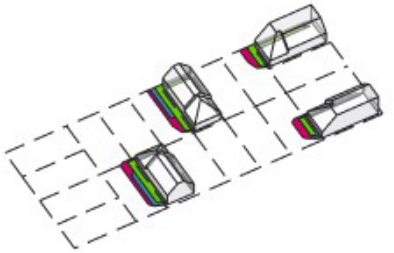
Shading Study: Block Orientation B

Summer Solstice
22 December

MDRS	PCI	Op.DP	Combined
			
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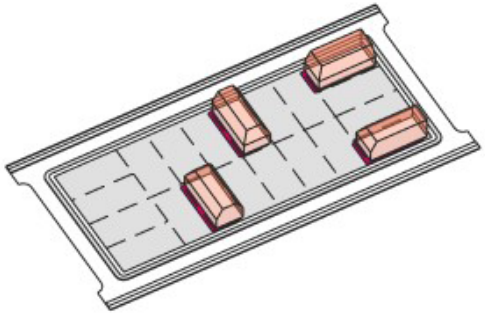	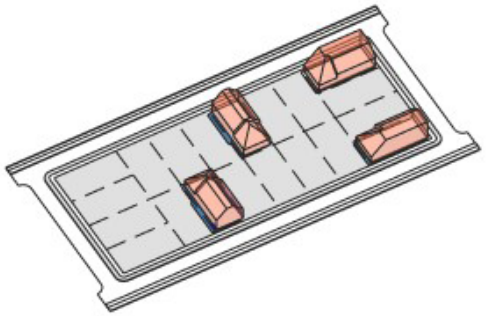	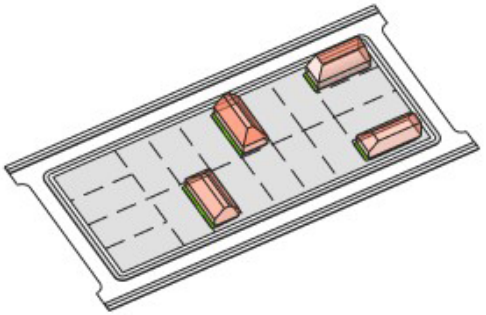	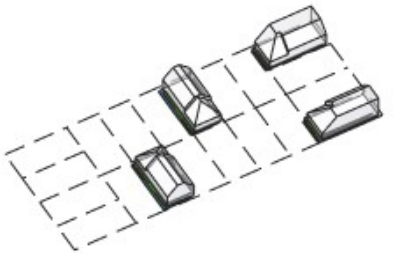
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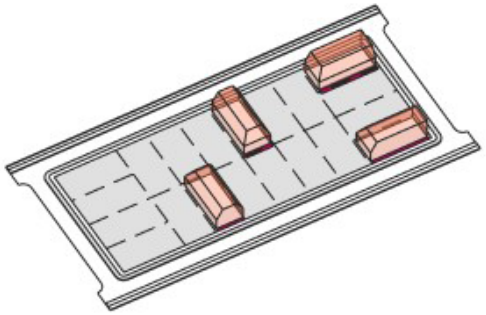
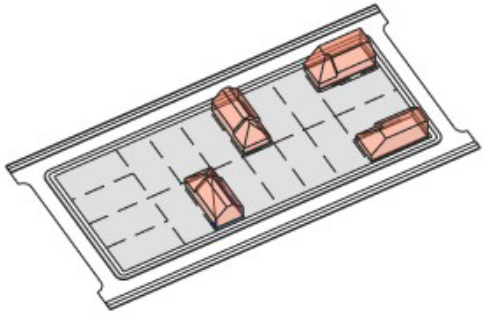
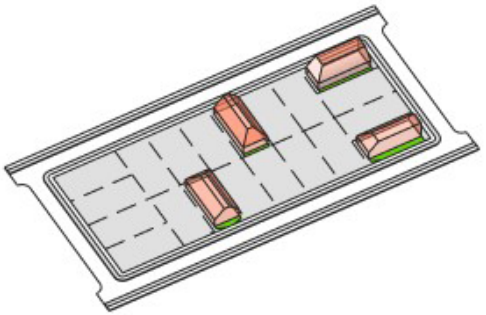
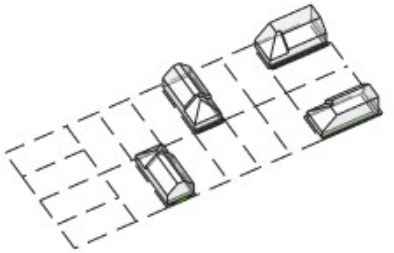
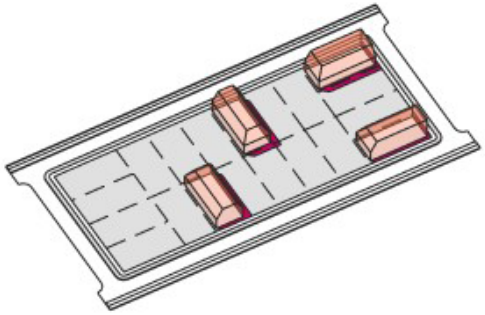
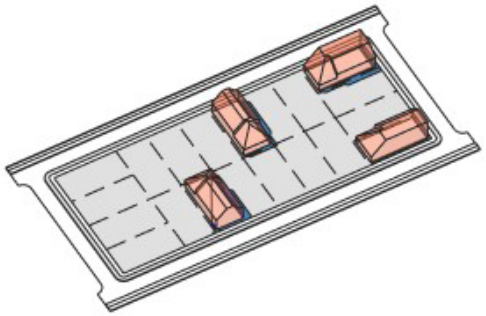
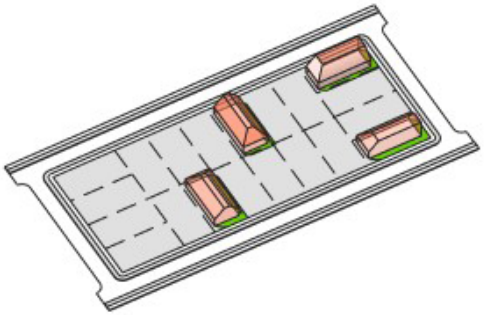
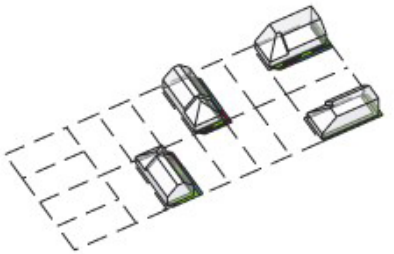
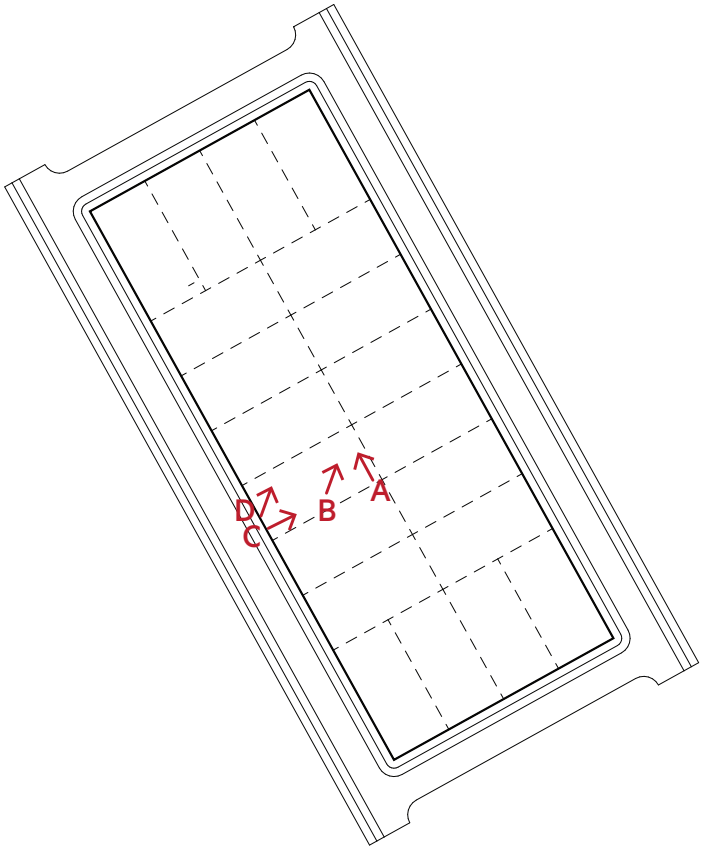
Shading Study: Block Orientation B

Summer Solstice
22 December

	MDRS	PCI	Op.DP	Combined
2:00pm				
4:00pm				

Visual Effect Testing (Envelopes)

Four representative views compare the visual impact of the MDRS envelope to the PCI envelope on a selected typical lot.

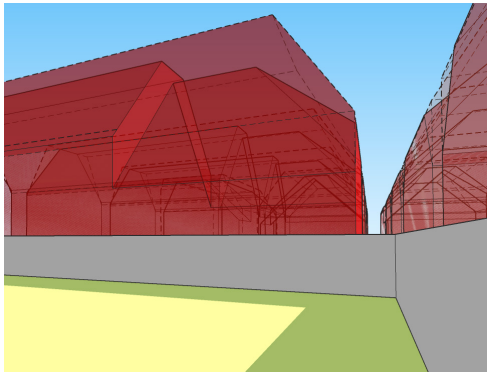


A – View from rear corner.
B – View from side boundary, 2/3rds down.
C – View from front corner.
D – View from front centre into the site.

- A 1.8m fence illustrates boundary location.
- Shading at midday at the winter solstice illustrates the 3D form of the envelopes.

Summary of combined views:

A



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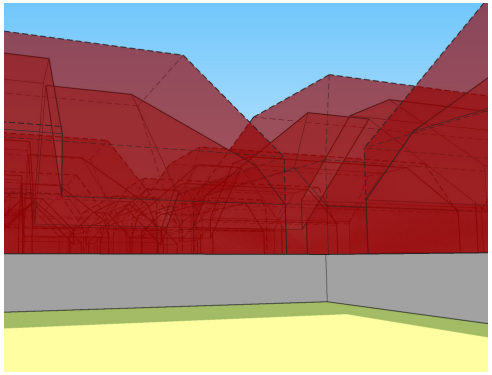
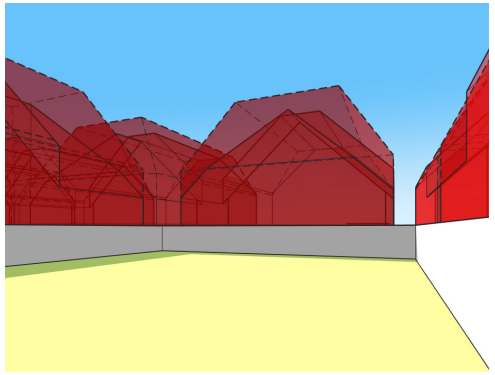


C



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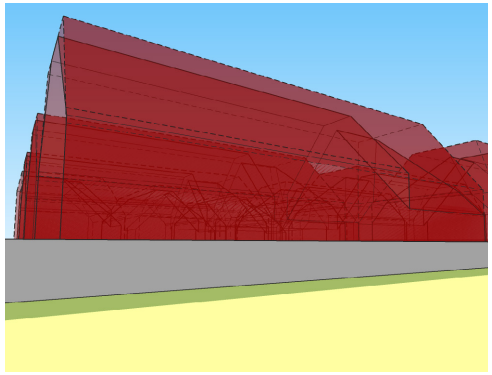
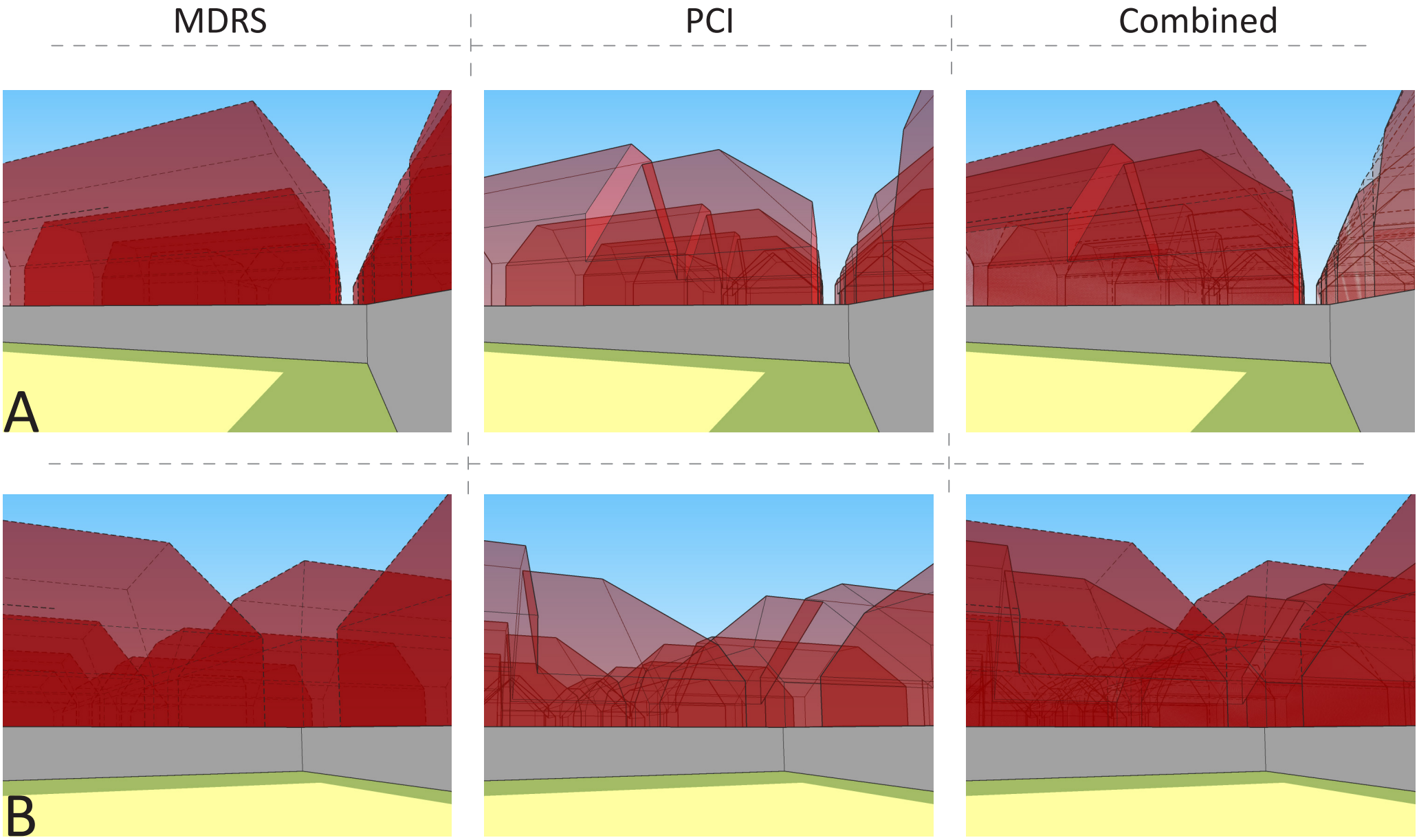
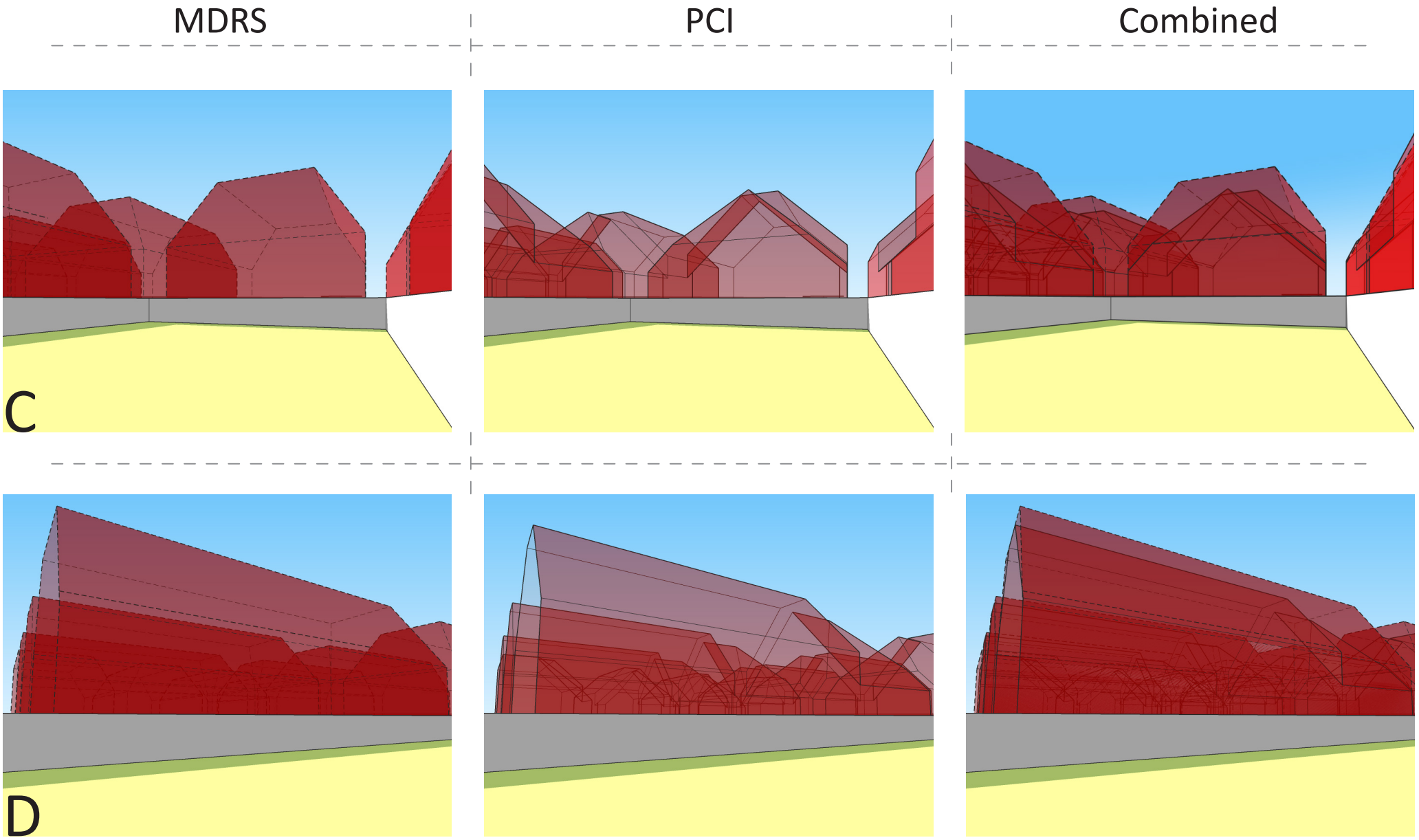


3. Visual Effect (Envelopes)



3. Visual Effect (Envelopes)



Urban Design Memo #7

To	PNCC attention Simon Mori (PNCC), Sarah Jenkin (Navigatrix)
From	Graeme McIndoe (McIndoe Urban Ltd)
Date	21 August 2024
Subject	**Lot testing**

1 Scope

Site planning and design studies for the potential development of three residential units on a range of typical lots has been undertaken. This is to determine if 'permitted' development on these lots can allow for vehicle access and turning on site in accordance with transport standards. In doing so, this study also tests and verifies the viability of the package of building form, location and access standards.

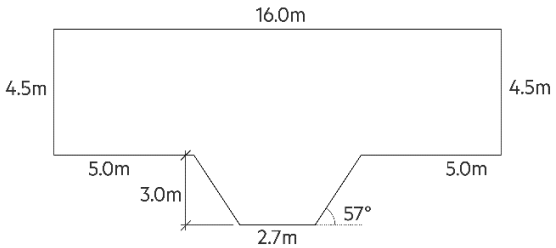
2 Methodology

2.1 Process

1 Representative lots were identified in discussion with PNCC;
2 These lots were tested for three residential units with reference to a vehicle manoeuvring template and the proposed District Plan standards;
3 The proposed standards relevant to building placement, bulk and form have been applied to ensure that 'permitted' development is feasible;
4 Both site planning and indicative internal dwelling layouts were examined to ensure dimensions and configurations are realistic;
5 Design studies are described in plan and three dimensions and their areas and relation to key district plan standards analysed; and
6 General conclusions which apply to all development are made.

2.2 Vehicle manoeuvring template

The site planning used a simplified diagram for movement that accommodates typical tracking curves, as supplied by Harriet Fraser Traffic Engineering and Transportation Planning. We are confident that having applied this template, vehicle access will be readily achievable should more detailed tracking curves and software be applied.



2.3 Proposed MRZ PC(i) District Plan Standards applied

- Height maximum 11m
- Building coverage maximum 50%
- Permeable surfaces minimum 30%
- Front yard minimum 1.5m
- Side and rear yards minimum 1.0m
- Garage door setback min 5.5m from boundary and 0.5m from dwelling face
- Height in Relation to Boundary (HIRB)
  - 45° measured from a point of 5.0m above ground level for the greater distance of either 15m, or the first two-thirds of the site, from the boundary with a public road; and
  - 45° measured from a point of 2.8m above ground level for the remainder of the site
  - Rear site: 2.8m+45°
- Outdoor Living Space
  - If at ground, minimum 30m² which can accommodate a 4.5m diameter circle; or
  - Where provided above ground level, minimum area of 8m²; and
  - in both cases the space is located to the north, east or west of the residential unit.
- Outlook space
  6m X 4m from living, 3m X 3m from bedroom 1, 1m X 1m from other habitable rooms

2.4 Unit planning

The interiors have been indicatively planned to ensure that the placement, planning, orientation and dimensions of built forms, are realistic and therefore that the vehicle access and standard testing is also founded on real potential development on each lot.

The unit planning uses realistic room sizes and configurations, and these are placed to relate appropriately to the street and to the sun. Stairs have workable (NZBC) dimensions and suitable space is provided for service areas and bathrooms in appropriate locations. The design of elements including structure, walls, articulation of facades and placement of windows and doors has been considered but not shown. This gives confidence that should detailed building planning and design be undertaken, the building forms and dimensions developed in this testing would, following further design interrogation, be functionally viable.

3 Lot descriptions and observations from testing

3.1 Narrow Rectangular 'Mid-Block' Lot

Indicative development on a narrow rectangular lot

Typical narrow rectangular lot 16.3m X 42.5m, lot area 692.75m²

Site investigation outcome:

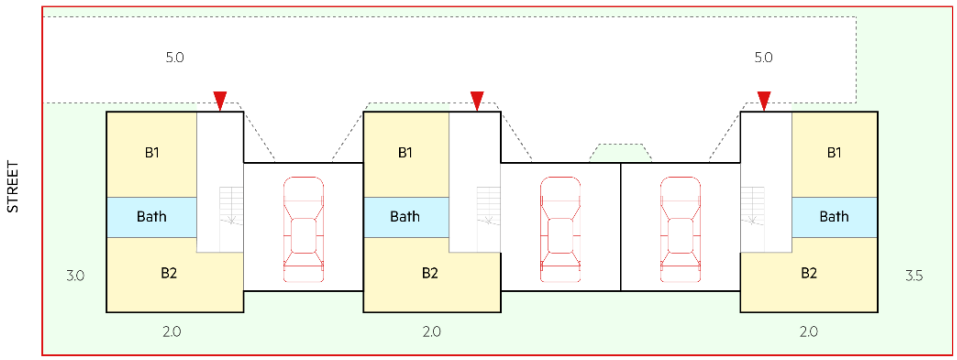
- Three, two storey units
- Three bedrooms, two bathrooms
- GFA 150.4m² for the two units closest to the street
- GFA 144m² for the rear unit (form modulated to comply with 2.8m+45°HIRB)
- One carpark space per unit, in built-in garage
- Vehicle manoeuvring on site readily achieved
- Outdoor living space with 8m² first floor balcony
- Permeable area 31%
- Building coverage 41%
- Outlook spaces achieved

Observations

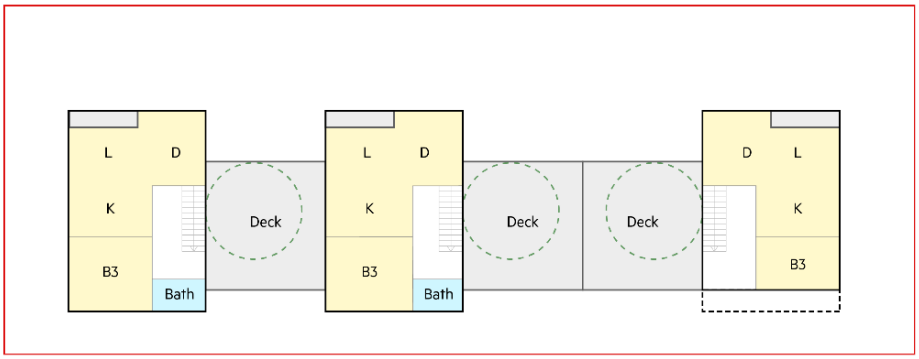
a. There are many other lots which are slightly wider with widths of 18m and 19m, and also longer, for example 45m. As the dimensions of the lots increase, even marginally, get larger, both vehicle access and adherence with standards is more readily achieved. Therefore, having tested a narrow lot and found that appropriate vehicle access to good quality development is achievable, those larger lots have not been investigated in detail.

b. The HIRB of 2.8m + 45° which applies at the rear third and rear boundary of the site begins to impinge on the location of building form. That notwithstanding, a well-planned and good sized two storey, three bedroom rear-unit is achievable as demonstrated in the plans below.

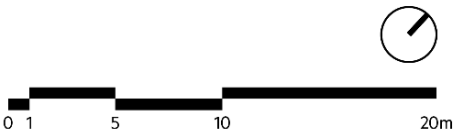
Narrow Rectangular Lot



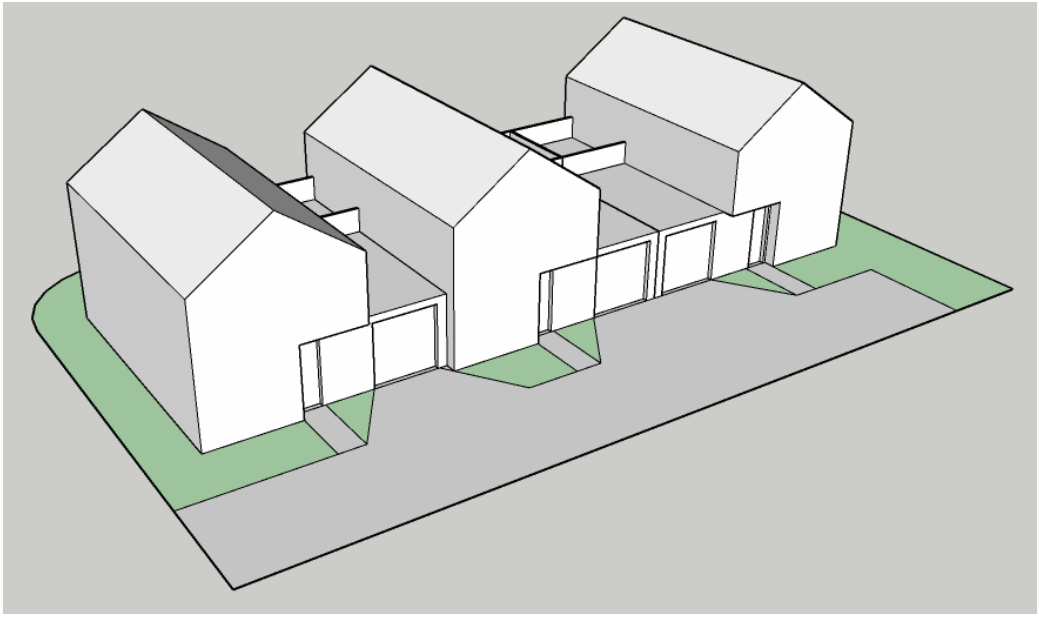
Site and ground floor plan



First floor plan



3.2 Corner Lot



Indicative development on sample corner lot

Sample corner lot 23m X 35m, lot area lot area 800m²

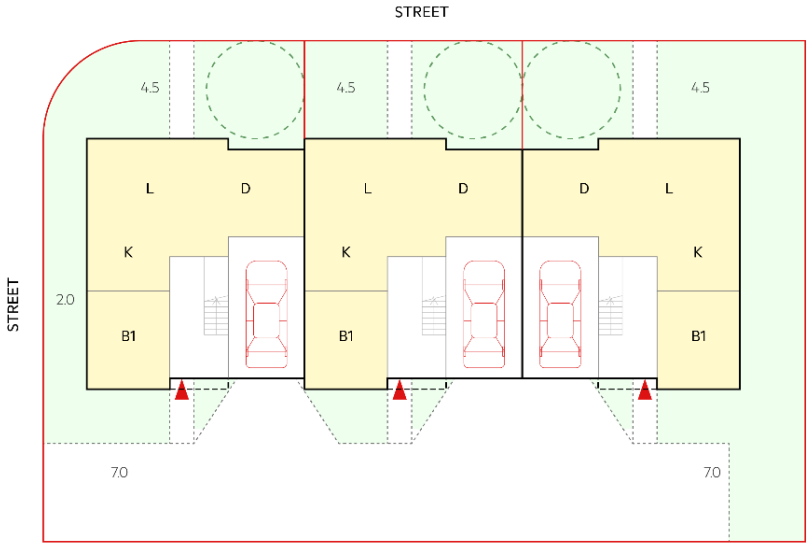
Site investigation outcome:

- Three two-storey units, each GFA 184.9m²
- Four bedrooms, 2 bathrooms
- One carpark space per unit, in built-in garage
- Vehicle manoeuvring on site readily achieved
- Outdoor living space at ground + 12m² roof deck over part of garage
- Permeable area 35%
- Building coverage 41%
- Outlook spaces achieved

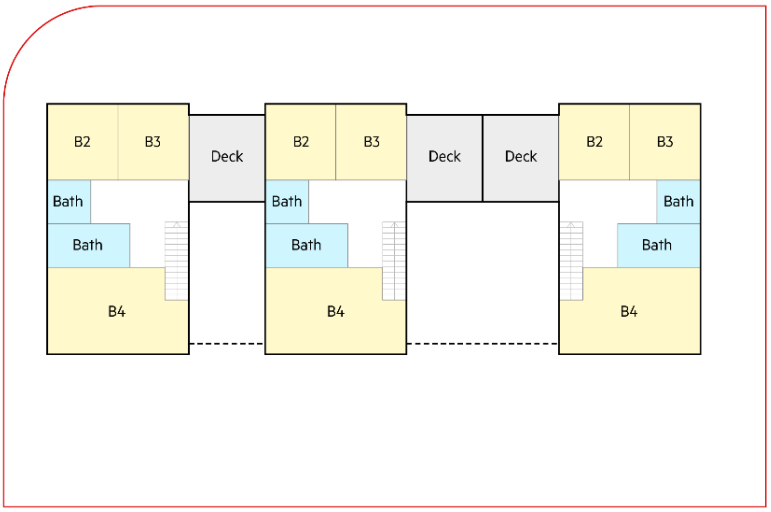
Observations

a. The 23m depth of this lot allows setback from the north boundary to accommodate outdoor living space and living room at ground, and vehicle access on the south side of the unit.
b. The proposed fencing standards allow for a proportion of high fencing should it be considered desirable to achieve greater privacy for those spaces at the street edge. However, the configuration also allows for each unit to have a roof deck set above its garage and located further back from the street. These decks would provide residents with a choice of outdoor living space and are inherently private.
c. Considering the configuration drawn, a fifth large upstairs room opening out onto the north-facing rooftop deck could be added. At approximately 20m² this would give a GFA of approximately 206m². This space might be an upstairs north-facing living/family room, or a fifth large bedroom.

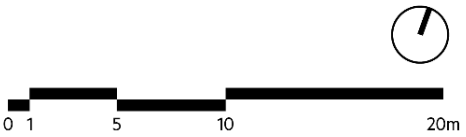
Corner Lot



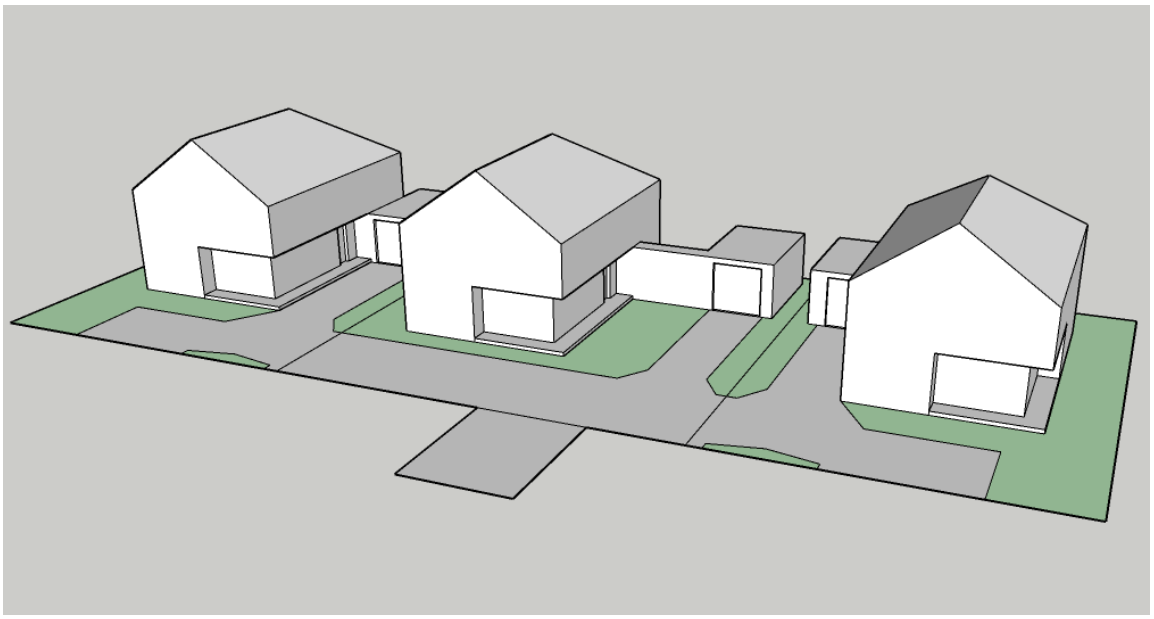
Site and ground floor plan



First floor plan



3.3 Rear Lot



Indicative development on sample rear lot

Sample rear lot 23m X 55m, lot area 1265m² (excl. access leg to street)

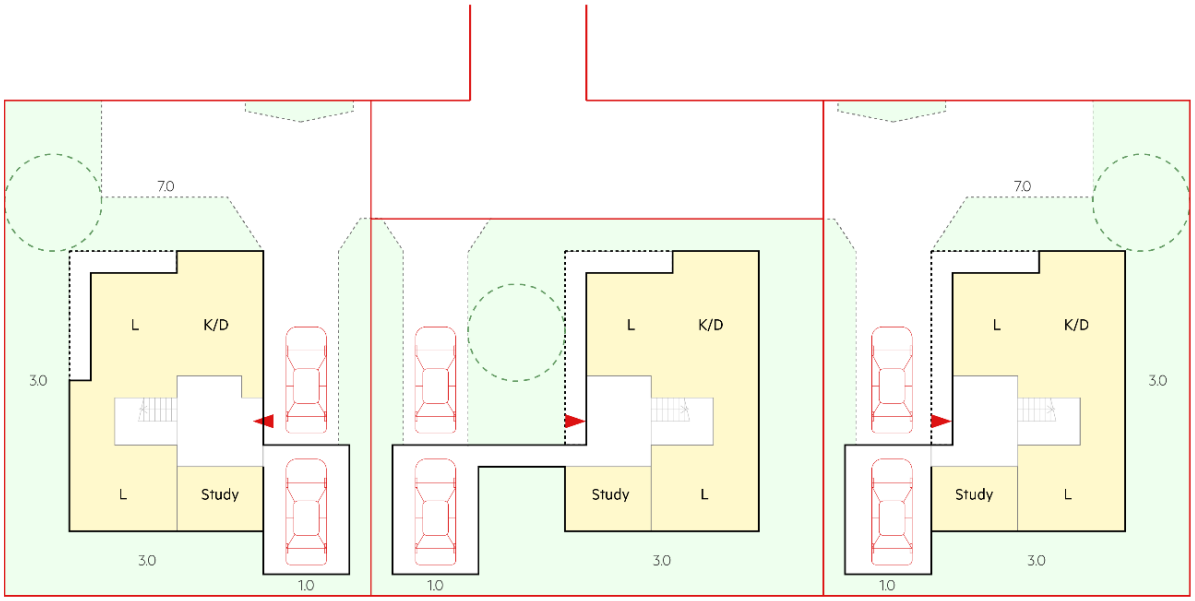
Site investigation outcome:

- Three two-storey units, two units at GFA 258m² and one unit at GFA 262m²
- Two storey forms placed to comply with 2.8m+45°HIRB
- Four bedrooms plus large study and three bathrooms
- Two main living areas at ground plus separate family room above
- Two carpark spaces per unit: one in built-in garage, one on private drive
- Vehicle manoeuvring on site readily achieved
- Outdoor living space at ground
- Permeable area 39%
- Building coverage 34%
- Outlook spaces achieved

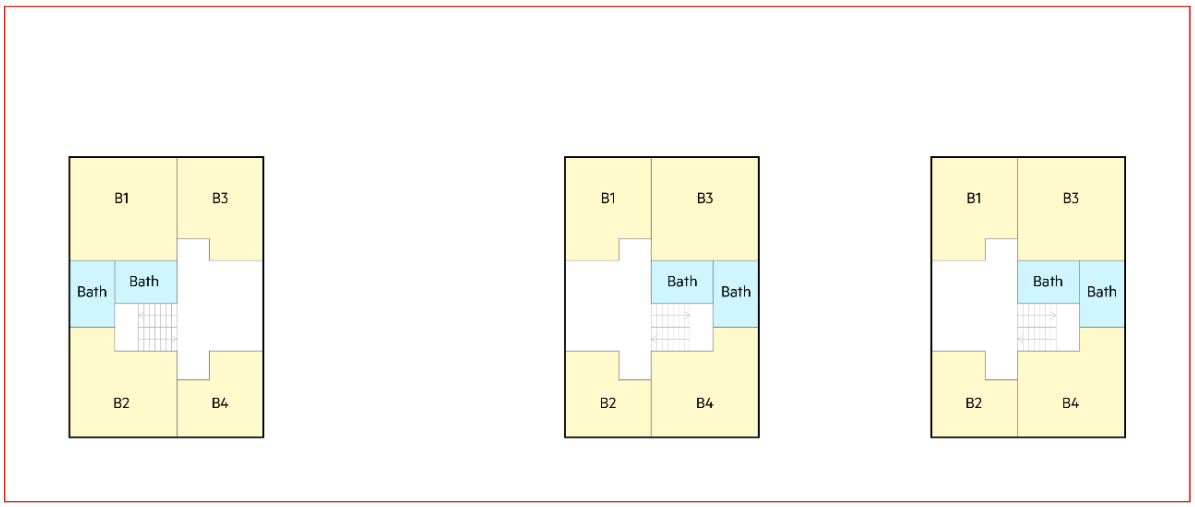
Observations

a. This test shows detached houses planned to comply with yards and HIRB on the new internal boundaries.
b. While only two storey development has been tested, these forms could readily be taken in part to three storeys.
c. This rear lot is large and would be a candidate for more than three units. Extrapolating from these investigations it is likely that five or six good quality units that meet the permitted standards and the required on-site manoeuvring could be accommodated on this lot.

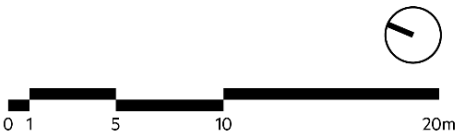
Rear Lot



Site and ground floor plan



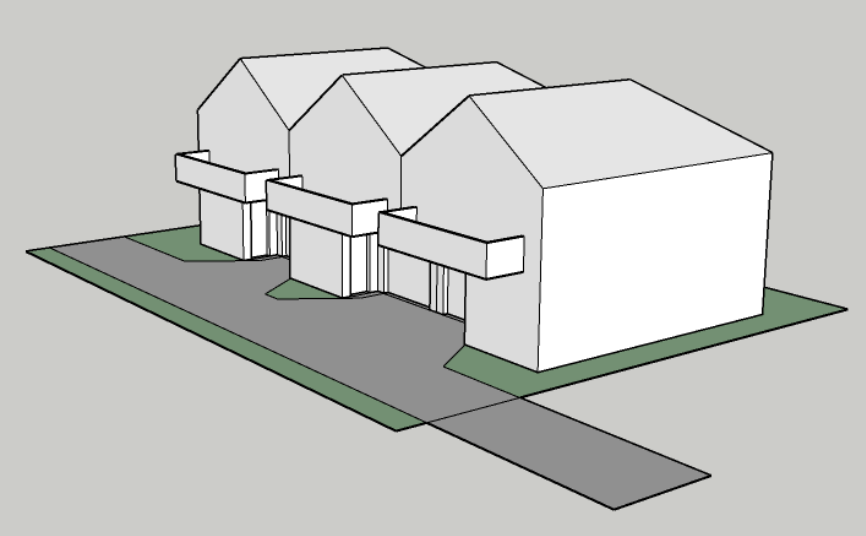
First floor plan



3.4 Small Lot

A small lot such as would be found in Kelvin Grove was investigated. This is 20m wide and 25m deep with a total area of 500m². A number of development configurations were tested.

Small Lot Option A *Access to parking via an on-site lane*



Indicative development on a small lot: Option A

Sample small lot 20m X 25m, lot area 500m²

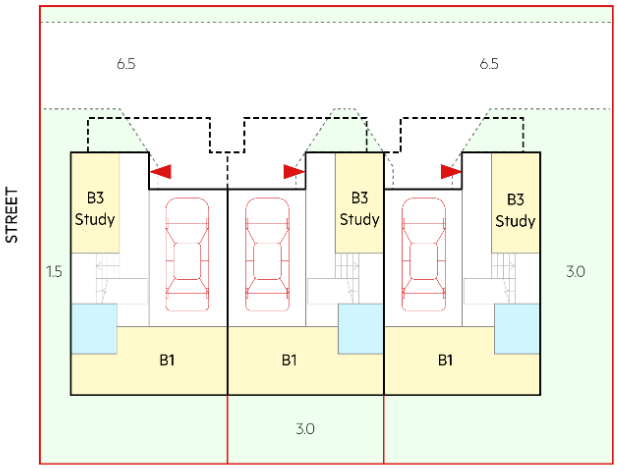
Site investigation outcome:

- Three two-storey units, each GFA 139.4m²
- Two bedrooms + small study/bed, two bathrooms
- One carpark space per unit in built-in garage
- Vehicle manoeuvring on site readily achieved
- Outdoor living space with 9.5m² first floor balcony
- Permeable area 35%
- Building coverage 40%

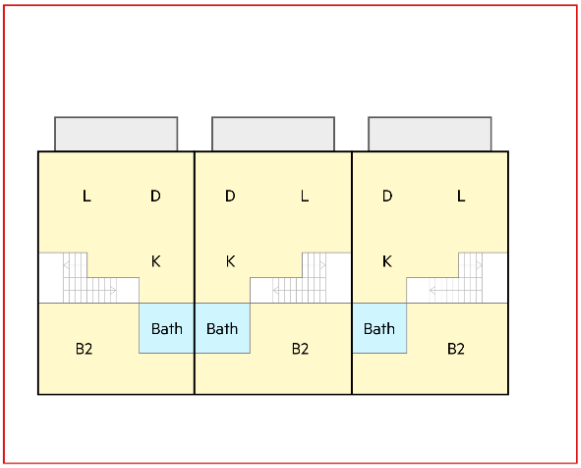
Observations

a. This size and shape of this lot leads to the emergence of compromises to the design and internal layout of three units on the lot when on site manoeuvring and parking are included. The development is acceptable, however should the site be narrower, it would become increasingly difficult to plan good quality residential units.

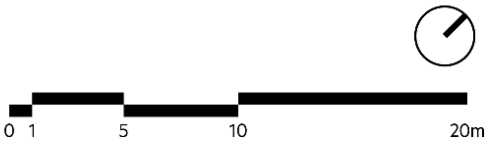
Small Lot (Option A)



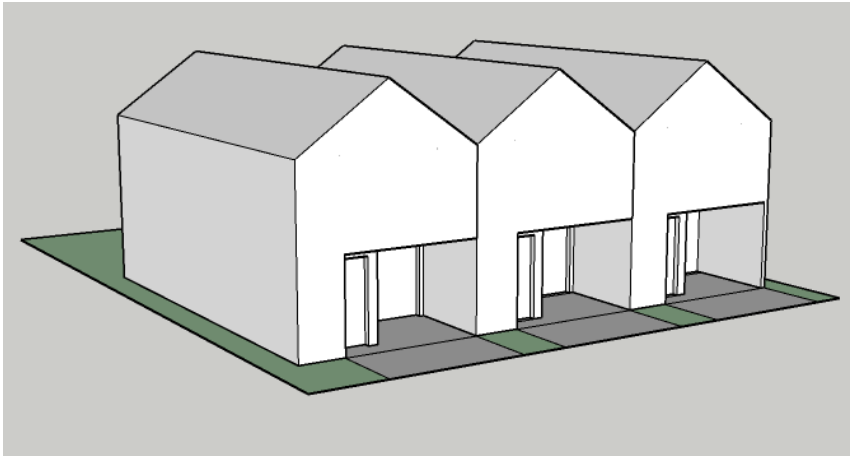
Site and ground floor plan



First floor plan



Small Lot Option B1 *Terraced street-facing units (2.5m frontage setback)*



Indicative development on a small lot: Option B1

Sample small lot 20m X 25m, lot area 500m²

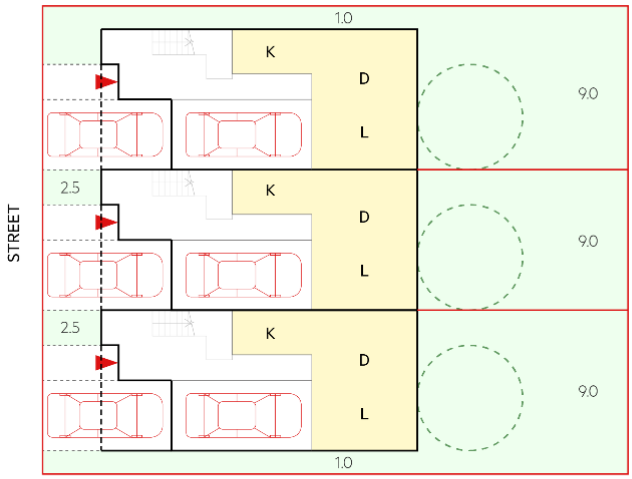
Site investigation outcome:

- Three two-storey units, each GFA 151.9m²
- Three bedrooms, two bathrooms
- Two carpark spaces per unit: one in built-in garage with door set back 5.5m from the street, one on private drive at the street edge
- Vehicle manoeuvring – reverse onto carriageway. Potentially suitable only for low traffic local secondary roads.
- Large private outdoor living space at ground located at rear
- Permeable area 45%
- Building coverage 43%

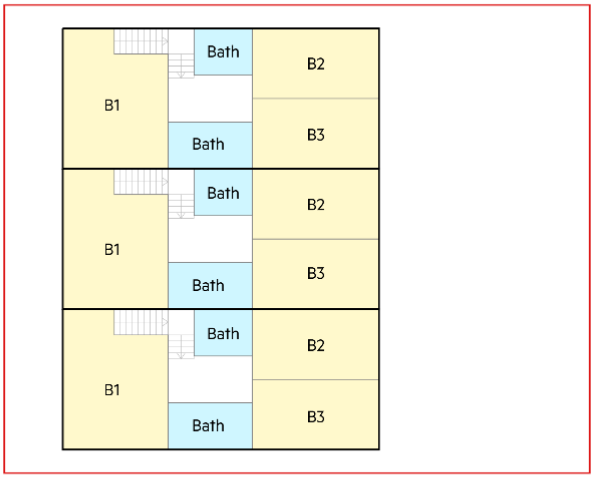
Observations on Options B1 and B2

a. Street facing terraces allow for better on-site conditions, but potentially compromise the frontage street environment, with a large number of crossings.
b. The garage door setback width standards ensure the street edge will not be dominated by garage doors but there will still be an obvious visual presence at the frontage.
c. Terraced development close to the street achieves a high amenity residential outcome including:
   - minimisation of vehicle manoeuvring (and hard surfacing) on site;
   - maximisation of private outdoor living space in the optimal location at the rear of the unit; and
   - maximisation of building site coverage.
d. Options B1 and the following Option B2 require vehicles to back out onto the street which depending on the type of street, may or may not be acceptable from a traffic perspective.
e. Multiple kerb crossings potentially compromise the street environment and experience for pedestrian and in particular any existing street trees. Our preliminary review of examples in other places found that should the minimum width of street facing units be controlled and there be a reasonably substantial frontage landscaping and/or street trees, this development might be accommodated without undue compromise to the street edge environment.

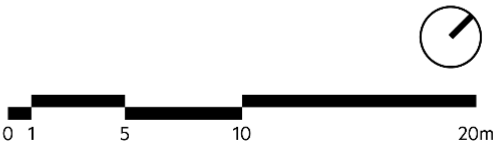
Small Lot (Option B1 – 2.5m frontage setback)



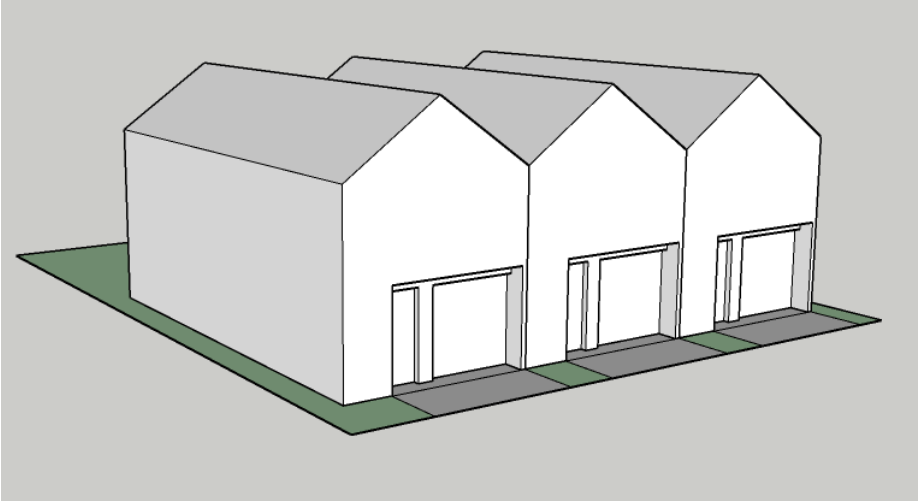
Site and ground floor plan



First floor plan



Small Lot Option B2 *Terraced street-facing units (2.0m frontage setback)*



Indicative development on small lot: Option B2

Sample small lot 20m X 25m, lot area 500m²

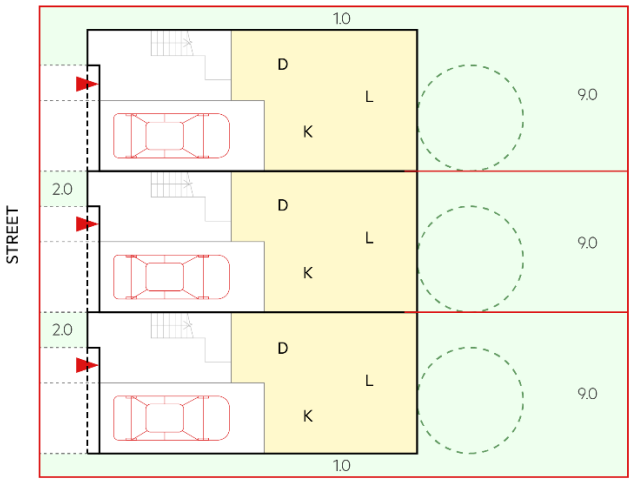
Site investigation outcome:

- Three two-storey units, each GFA 165.8m²
- Three bedrooms, two bathrooms
- One carpark space per unit in built-in garage with door set 2m back from the street
- Vehicle manoeuvring – reverse onto carriageway. Potentially suitable only for low traffic local roads
- Large private outdoor living space at ground located at rear
- Permeable area 46%
- Building coverage 49%

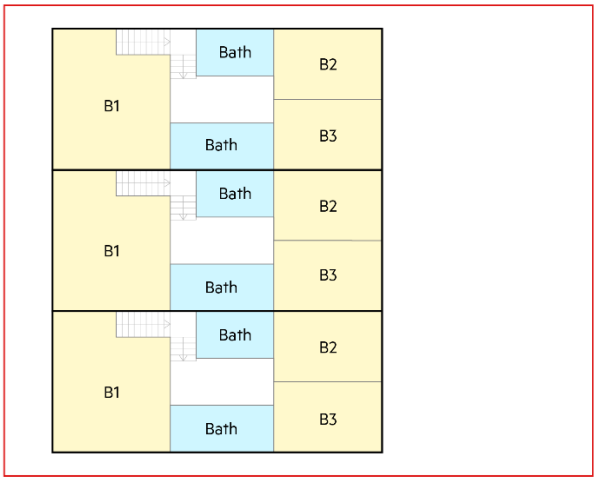
Additional observations for Option B2

a. Option B2 tests the situation where the apron in front of the garage door is 2.5m to allow for required exit sightlines. This complies with the proposed front yard standard which sets the face of the building a minimum of 1.5m back from the street boundary (the actual setback in this test is 2.0m) and the garage door standard being set back not less than a further 0.5m from that.
b. This configuration most readily allows maximisation of the development potential in combination with optimisation of the extent and quality of private open space at the rear of the site.
c. The garage setback is deliberately shallow so that the risk of a person parking in front of the garage and across the footpath is low. However, that cannot be entirely ruled out should a driver choose to ignore rules and conventions.
d. If this approach were to be considered for incorporation into the district plan, it is recommended that the garage door setback be no less and no more than 2.5m from the street boundary, or 5.5m minimum.

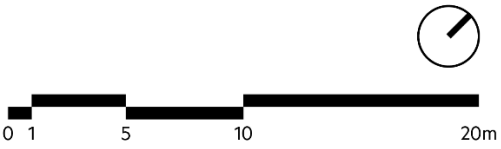
Small Lot (Option B2 – 2.0m frontage setback)



Site and ground floor plan



First floor plan



4 Discussion

On-site vehicle manoeuvring and turning

1. It was possible to readily achieve complying vehicle access and turning on site on all lots tested while providing three two-storey units on each lot in accordance with the proposed district plan standards.

2. Providing for vehicle access and compliance with all permitted standards is more readily achieved on longer and/or wider lots than those tested. Because development and vehicle turning was viable on the sample lots tested, larger lots which had been identified were not tested with design studies.

Dwelling size and configuration on lots tested

3. The indicative dwellings all have reasonable and realistic floor areas, room sizes, layouts, orientation and internal circulation, and the testing optimises rather than maximises development on site. Subject to relation to the HIRB standard, a third storey or additional area at first floor level could be added to the forms shown on several of these lots. However, that would lead to very large units which, depending on location and market conditions, could be too large to be economically viable.

4. There would be variation in layout with different lot orientations. However, having carried out these detailed investigations and considered other orientations we are confident that access and compliance with standards would also be achievable on these lots should their orientations vary. That opinion is informed by similar detailed planning and form studies we have carried out for Waimakariri District Council. Those studies considered the application of the MDRS on a representative range of lot types, sizes and orientations, and tested potential development form and GFA on each of those lots.

Summary of size and configuration testing

Lot	***GFA of each unit***	***Number ofbeds per unit***	***Vehicle turning on site***
Narrow rectangular lot	150.4/144 m²	Three bedrooms	yes
Corner lot	184.9 m²	Four bedrooms	yes
Rear lot	258/262 m²	Four beds + study + 3 living areas	yes
Small lot Option A	139.4 m²	Two bedrooms + small study/bed	yes
Small lot Option B1 (Street facing terraces)	151.9 m²	Three bedrooms	no
Small lot Option B2 (Street facing terraces)	165.8 m²	Three bedrooms	no

Permeability standard

5. On small lots, the 30% minimum permeable surface standard in combination with paved surfacing for vehicle access becomes a determining factor which restricts maximum building footprint. That in combination with the requirement for vehicle turning on site means that the permitted maximum 50% building coverage was not achieved in the lot testing where there was vehicle turning on site.

6. Where terraced development and garages face the street, it was possible to readily achieve the 30% permeability standard and approach 50% site coverage. This can be seen with the Small Lot, Options B1 and B2 investigations which achieved site coverages of 43% and 49% respectively. The limitation on building coverage for terraced development relates to the maximum practicable depth of a good quality housing unit, and the application of the more stringent HIRB at the rear of the site.

Boundary setbacks

7. In undertaking this site planning and design testing it is common that that there will be a 3.0m wall setback from rear and side lot boundaries. This is because of the range of standards that must be considered together including:
    a. allowing two storeys with 2.8m+45° rear boundary or rear lot HIRB (which requires a setback of 3.0m);
    b. achieving a 3.0m outlook space for main bedrooms; and
    c. achieving the required 30% permeable area.

8. These typical setbacks notwithstanding, the proposed minimum 1.0m side and rear boundary setback standard remains highly desirable. It allows site planning flexibility, being necessary to allow two storey development close to the side boundary (refer Small lot, Options B1 and B2) and also lower parts of buildings including accessory buildings (refer rear lot test).

Location of outdoor living space

9. The combination of 6m outlook space requirement from living areas means that for development on narrow lots it is likely that the outdoor living area will be at first floor level. This configuration retains green (and permeable surfaced) open space at ground, just that it is not the 'complying' outdoor living space.

10. The combination of 6m outlook space requirement from the main living area and a 7.0m garage door setback to allow vehicle turning means that unless the site is very wide (for example at least 23m wide as per the north-facing corner lot tested in this study), it is likely that the living room outlook space will be at an upper floor level and oriented over the driveway. However, this is provided for in the proposed standards with an 8m² balcony accessed from an upper-level living area, and the testing demonstrates that this achieves very good residential amenity outcomes.

Number of crossings per lot

11. Except for terraced housing facing the street all lots were readily planned with one kerb crossing per unit.

12. Small lot terraced house Options B1 and B2 allow for high amenity on site. However, due to three crossings, depending on the context and whether it includes essential street side parking and/or street trees, this configuration may potentially compromise the local street environment. Conversely, in some contexts this may be entirely in keeping, and a positive means of achieving good quality housing intensification. For example, there are multiple recent local/NZ examples of terraced development with garage doors facing the street. These can be seen at Hobsonville Point in Auckland and at Kenepuru Landing in Porirua.

13. If this front-access configuration with multiple crossings and reversing to the street is considered it would be best suited to development on a low-speed local street or lane, particularly in comprehensive development where the design of street structure, public realm and buildings development benefit from integrated design and development.

END

Urban Design Memo #2

To	PNCC attention Michael Duindam, Sam Dowse, Dave Charnley
From	Graeme McIndoe
Date	3 October 2022
Subject	**Defining a 'Well-functioning Urban Environment'**

Scope

This is to address the following question:

- What is a well-functioning urban environment for the Palmerston North context.

1 Definition of a well-functioning environment

PNCC Question
What is a well-functioning urban environment for the Palmerston North context?

Answering this question requires considering two scales of environment, the neighbourhood environment and the on-site living environment as there are different considerations for each. In researching these two scales:

- The attributes of a well-functioning neighbourhood are informed by reference to The Value of Urban Design: The economic, environmental and social benefits of urban design (MfE 2005).
- The attributes of a well-functioning on-site living environment are informed by a survey of well-being indicators in the Built Environment, the summary of which is in section 2 below.

The attributes of 'well-functioning' focus on what has to this point been known as urban amenity. Technical matters such as engineering, or environmental matters (eg water management) contribute but are not considered here. Italicised text under each attribute below identifies where district plan standards that might apply to building design assist in delivering the intended qualities.

1.1 Attributes of a well-functioning neighbourhood environment

- Good neighbourhood connections allowing convenient and easy access to other people and a variety of different living and working activities, local services and community facilities.
  Contributed to by facilitating high intensity in and around well-serviced centres and sub-centres and with walkable access to primary schools and local parks. This relates to the extent of the MRZ.
- Concentrations of population and activity in and around well-serviced centres and sub-centres
  Contributed to by facilitating high intensity in and around well-serviced centres and sub-centres. This relates to the extent of the MRZ.
- High quality public realm and streetscape quality

Contributed to by the visual and aesthetic qualities of the building that from the street including, ensuring visual interest and avoiding blank walls, and the extent of landscape elements at the street edge.

- Access to nature and green open space
  Contributed to by green open space and landscape elements in large multi-unit developments.
- Streetscape quality
  Contributed to by the visual qualities and aesthetic of building frontages
- Safety in the public realm
  Contributed to by informal surveillance from dwellings over the streets and public spaces around, and good visibility at the points of vehicle connection to the street to minimise conflicts between pedestrians and vehicles crossing the footpath. This relates to both façade and front boundary design.
- Air quality
- Walkability, as linked to physical exercise and a range of associated health benefits.

1.2 Attributes of a well-functioning on-site living environment

- Visual and acoustic privacy
  Contributed to by the relative placement of windows, including potential to overlook the private open spaces of neighbouring dwellings.
- Visual and physical access to open and natural space
  Contributed to by providing for private outdoor areas and reasonable outlook from dwellings
- Good daylighting
  Contributed to by HIRB and space around buildings. Minimum daylight is a Building Code matter.
- Adequate access to sunlight
  Contributed to by height control, HIRB, orientation of buildings, space around buildings and the exposure of that space to sun.
- Safety and security
  Contributed to by ensuring dwellings overlook the street and internal spaces within multi-unit developments.
- Visual interest
  Contributed to by articulation of building form and avoidance of blank walls at frontages.
- Social interaction
  Contributed to by suitably located private outdoor areas, sized to at least allow people to gather around a table.

Matters primarily dealt with by the construction and services within a building and managed by the NZ Building Code:

- Thermal comfort
  Contributed to by access to sunlight in a lower North Island climate.
- Indoor air quality
- Acoustic privacy

2 Survey of Wellbeing Indicators in the Built Environment

Sources & Definitions

This survey draws from three main sources:

- *WELL v2 Pilot*: International WELL Building Institute (IWBI) assessment and certification framework (2021)
- *Health and Wellbeing in Homes*: UK Green Building Council (2016)
- *Value of Urban Design*: Ministry for the Environment (2005)

Also included are more abstract wellbeing indices employed by OECD, Statistics NZ and The Treasury.

There are two common ways of understanding and measuring wellbeing.

(i) As a composite of attributes using a suite of measurements.

(ii) As a concept in its own right, which is typically assessed by asking people about their perceptions.

Indices generally combine both definitions and approaches. An inclusive understanding is appropriate given that WHO interprets health broadly i.e., not "merely [as] the absence of ill-health" but as "a state of complete physical, mental and social wellbeing" (quoted in *Health and Wellbeing in Homes*; p.5).

Built Environment

Health and Wellbeing in Homes states that the built environment "plays a crucial enabling role" across all aspects of health and wellbeing (p.7). The three sources identify eleven key variables:

2.1 Building quality
2.2 Thermal Comfort and Internal Air Quality
2.3 Noise and Internal Acoustics
2.4 Daylight and Artificial Illumination
2.5 Sunlight
2.6 Visual Interest
2.7 Connection to External Spaces and Nature
2.8 Physical Activity
2.9 Social Interaction
2.10 Safety and Security
2.11 Density

A single built environment attribute may contribute to a range of different wellbeing outcomes. Examples include good daylight levels, good ventilation and access to open space, which all "have a simultaneous positive impact on mental wellbeing and physical health" (*Health and Wellbeing*; p.7). Likewise, walkability (itself an amalgam of mixed-use, proximity, connectivity, attractiveness and safety) is linked to physical exercise and a range of associated health benefits (*Value of Urban Design*; pp.67-68). Overall, the links between "tangible physical housing defects and poor health outcomes" are better documented than outcomes associated with less tangible conditions (*Housing as a Determinant of Health and Wellbeing*; pp.1-2).

2.1 Building Quality

The UK Green Building Council concludes that the "design and quality" of a home or neighbourhood are a "key contributor" to health and wellbeing (7). However, "quality" is measured by habitability or the need for repairs. Accordingly, this attribute is heavily determined by construction materials and details; factors that are not easily captured by RMA processes. The UK

Building Council identifies adaptability as a "building quality" factor. This attribute is more pertinent to planning controls. However, it receives little attention in the other sources.

2.2 Thermal Comfort and Internal Air Quality

These two variables are widely recognised contributors to physical health. Although they often act in combination, they do not always produce compatible outcomes. For example, affordable winter warmth is frequently achieved at the expense of natural ventilation. Wellbeing indices generally do a poor job of reconciling these two objectives.

Although both variables are readily quantified, Thermal Comfort is activity-dependent and varies from person to person. Ideally, individual building occupants have control over local temperature and ventilation. If personal choice cannot be accommodated, mechanical systems should be automated and constantly monitor conditions.

As with the more general concept of "Building Quality", Thermal Comfort and Internal Air Quality are heavily dependent on materials, construction methods and building services i.e., matters outside the scope of RMA processes. However, site layouts, façade orientations, floorplate dimensions and the design of openings are also key considerations. These attributes determine the degree of sun exposure and the availability of cross ventilation.

Wellbeing indices give less attention to thermal comfort in external spaces. However, the WELL v2 framework identifies sun, shade, heat stress and wind as relevant considerations.

2.3 Noise & Internal Acoustics

The physiological and psychological impacts of unwanted noise are well understood. They range from impaired concentration and poor sleep to a diminished sense of control over one's surroundings. Noise is easily quantified and measured. However, performance standards vary according to the type of space e.g., bedrooms should be quieter than circulation zones or living areas.

Although people value quiet neighbourhoods, some of the most intrusive noise is generated internally by neighbours in multi-unit developments.

Once again, there is a degree of tension between the desire to ventilate naturally and the need to exclude unwanted external noise.

2.4 Daylight and Artificial Illumination

Wellbeing indices attach great importance to daylight, which is treated as an inherently desirable attribute – not just as an economical substitute for artificial illumination. Significance goes well beyond adequate task lighting. The emerging field of "Circadian Design" reflects a growing appreciation of the importance of daily and seasonal cycles. Circadian Design aims to produce built environments where the natural tempo of light and dark is maintained. While this can be achieved with artificial means, daylight is the preferred method for modulating the colour and intensity of illumination.

Measuring daylight and prescribing daylight standards are relatively straightforward, using an amalgam of the intensity and extent of natural light within a building. For example, WELL v2 requires Spatial Daylight Autonomy (sDA) for at least 30% of the regularly occupied floor area.

More rigorous performance standards achieve a condition called "Enhanced Daylight Access". The WELL v2 framework also advocates natural illumination and views of nature within circulation spaces and other communal areas.

2.5 Sunlight

Sunlight does not feature prominently among wellbeing indices. The UK Green Building Council recognises that sunlight improves the "appearance and feel of a home". However, glare and unwanted heat gain are to be avoided. Curiously, most assessment frameworks pay more attention to shade than to sun.

Correcting this omission, BRANZ states that "building location, spatial arrangement, orientation [and] window placement" all contribute to the "energy efficiency, comfort and financial value of the building".

As well as promoting circadian rhythms, sunlight promotes Vitamin D production – necessary for healthy bones – as well as higher serotonin levels, which are associated with sleep hygiene and stable moods. Sun can assist the treatment of skin diseases. While too much UV radiation causes skin cancer, moderate levels of exposure may prevent illness.

Sun access appears to be factored into residential property prices. Motu Economic and Public Policy Research Trust have established a positive correlation between sunshine and property values – more especially in areas with cooler climates.

2.6 Visual Interest

Ideally, the visual environment produces neither boredom nor sensory overload. Although this is a relatively simple concept, it is difficult to measure much less specify an optimal level of visual complexity. WELL v2 employs "active facades" as an indicator of favourable complexity. According to this indicator, blank surfaces account for more than 15m (or 40%) of a given street frontage. The UK Green Building Council opts for more generic terminology, referring to "some variety of colour hues, saturation, contrast, light and texture" in order to achieve "balance, stress relief and [an enhanced] sense of wellbeing" (p.23).

2.7 Connection to External Spaces and Nature

External spaces and access to nature make a significant contribution to wellbeing. *Health and Wellbeing in Homes* describes the importance of natural elements in the following terms (p.39):

- "[Studies] show that contact with natural environments can be directly liked to people's health and wellbeing." (p.39)
- "Connection with nature can affect cortisol levels, pulse rates, blood pressure, glucose levels, and the serotonin-melatonin balance which in turn can affect mood and energy levels."(p.39)
- "In a cross sectional study in four European cities, it was found that more hours of visiting green spaces was linked to higher self-reported mental

health and vitality and lower levels of perceived stress, and for women, lower odds of depressive symptoms." (p.39)
- Studies have found that "access to a garden or green areas a short distance from a dwelling are associated with less stress, depression, and a lower likelihood of obesity". (p.39)

It is desirable to have a direct view of the sky, the ground or some other outdoor natural feature. In a work environment, WELL v2 suggests that 75% of all workstations should have a "nature view", which ideally contains vegetation. Views of roads and carpark are excluded from this calculation. Using another metric, WELL v2 suggests that the vertical viewing angle to ground or sky should be at least 30^{o}.

In large buildings, such extensive links to the outdoors may not be feasible. In this case, green walls, indoor plants, natural materials and even images of nature can supply the requisite connection. These elements will be more effective if they are daylit and associated with communal areas including major circulation routes.

Physical proximity to outdoor spaces is beneficial, even if there is no direct visual connection. This applies to neighbourhoods as well as individual buildings. At the neighbourhood scale, the most common Wellbeing indicator is proximity to parks, nature reserves, waterfronts and other natural spaces.

Gardens and allotments have additional value as sites for food production. Some Wellbeing indices categorize such amenities separately as part of a "Food Environment".

2.8 Physical activity

Facilitating physical activity and providing healthy foods helps to reduce risk of respiratory disease, developmental disorders, obesity and chronic illnesses. Physical activity also helps to promote mental health and improves social interactions between individual members of society.

Research shows that in places with direct pathways connecting homes with multiple destinations, people are more likely to engage in moderate physical activity for 30 minutes or more per day. The number of people who get regular exercise (3 days a week) increases by 25 per cent in neighbourhoods with parks, trails, and playgrounds.

Physical activity will be facilitated by enjoyable circulation spaces, dedicated activity spaces on site, and access to diverse activities in an interconnected neighbourhood. Streets and other routes within such a neighbourhood will be safe, attractive and suitable for active modes of movement.

2.9 Social Interaction

According to the UK Green Building Council: "Social interaction is a key factor in determining both the physical and the mental health and wellbeing of an individual" (p.12). Later, the Council states: "The quantity and quality of social connections (e.g. talking and listening to family or strangers) correlate with reported wellbeing as well as physical health" (p.17). Social contact is particularly important for children. They need to interact with their peers in play spaces and other outdoor venues.

As part of its Wellbeing assessment, the OECD uses self-reported measures of time spent in social interactions together with the respondents' degree of satisfaction with social relationships. Stats NZ and The Treasury use a similar indicator based on self-reporting.

Social Interaction correlates with physical activity, because face-to-face contact is more likely in an environment that encourages walking and other active transport modes. *Health and Wellbeing in Homes* concludes that pleasant well-defined open spaces, pathways and low-speed streets "help to avoid loneliness and illness by encouraging walking and play and this adds to the communal value of the neighbourhood" (39). In a similar vein, *The Value of Urban Design* associates a high-quality public realm and distinctive local character with increased participation in community and cultural activities (2, 4, 67).

2.10 Safety and Security

A 2016 survey of UK homeowners and renters found that safety and security are the most important attributes of a dwelling and its neighbourhood (*Health and Wellbeing in Homes*; p.57). Perceptions of safety can be more significant than actual incidents involving threat or harm. As a result, both Stats NZ and The Treasury use a self-reported measure of people's fear of being victimised in their own community.

Feeling safe is a prerequisite for several other contributors to Wellbeing. The UK Green Building Council notes that "creating a safe secure environment is the key feature to promote physical activity" (p.43). Likewise, *The Value of Urban Design* associates personal safety with increased vitality in the public realm (pp.3-4, 19, 67).

2.11 Density

The relationship between density and wellbeing remains contentious. Although density can be used to measure crowding, the UK Green Building Council prefers to describe density as a "cross cutting" attribute that has both positive and negative consequences.

On the one hand, density promotes public transport, physical activity, social interaction and improved environmental outcomes. On the other hand, high-density housing "can be detrimental for wellbeing, in part because of a lack of privacy and natural space" (*Health and Wellbeing in Homes*; p.39). Elsewhere, the UK Green Building Council states that overcrowding is "detrimental" to social interactions and family relationships. Referring to high-density housing, the Council acknowledges the "challenge" of providing adequate access to "sunlight, daylight, quiet and clear air" (p.17, 39).

The *Value of Urban Design* identifies another ambiguity. It is hard to "disentangle" the benefits of density from those that accrue to mixed-use development and other factors (p.67).

References

This survey has drawn material from the following publications:

- *Auckland Design Manual.* Auckland Council. http://www.aucklanddesignmanual.co.nz/sites-and-buildings/
- *Health and wellbeing in homes.* UK Green Building Council, 2016, London. https://www.ukgbc.org/wp-content/uploads/2017/12/Healthy-Homes-Full-Report.pdf
- "Housing as a social determinant of health and wellbeing: developing an empirically-informed realist theoretical framework." Rolfe, S., Garnham, L., Godwin, J. *et al.* In *BMC Public Health* 20, 1138 (2020). https://doi.org/10.1186/s12889-020-09224-0
- *How's Life? 2020: Measuring Well-being*. OECD Publishing, Paris. *https://read.oecd-ilibrary.org/economics/how-s-life-2020_8c7ac95f-en#page1*
- *Indicators Aotearoa New Zealand – Ngā Tūtohu.* Stats NZ, Wellington, 2019. https://www.stats.govt.nz/indicators-and-snapshots/indicators-aotearoa-new-zealand-nga-tutohu-aotearoa/
- *Measurement of and target-setting for well-being: an initiative by the WHO Regional Office for Europe Second meeting of the expert group Paris, France, 25-26 June 2021.* WHO Regional Office for Europe, 1998. https://www.euro.who.int/data/assets/pdf file/0009/181449/e96732.pdf
- *Measuring wellbeing – Dashboard.* The Treasury, Wellington, 2018. [*Updated 2019.*] https://www.treasury.govt.nz/information-and-services/nz-economy/higher-living-standards/measuring-wellbeing-lsf-dashboard
- *Site Analysis.* BRANZ. http://www.level.org.nz/site-analysis/sun/
- *The Value of Urban Design: The economic, environmental and social benefits of urban design.* McIndoe, G. et al. Ministry for the Environment, Wellington, 2005. https://environment.govt.nz/assets/Publications/Files/value-of-urban-design-full-report-jun05_0.pdf
- *WELL v2 pilot, Q3 2021*. International WELL Building Institute (IWBI) https://v2.wellcertified.com/v/en/concepts

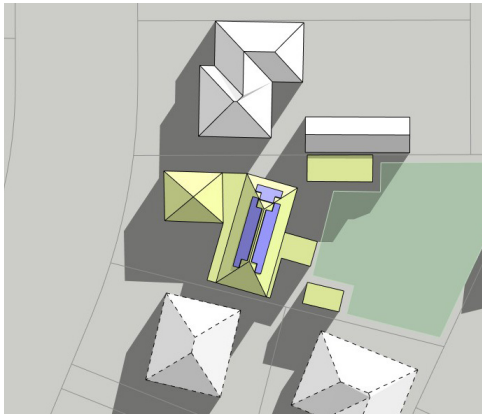
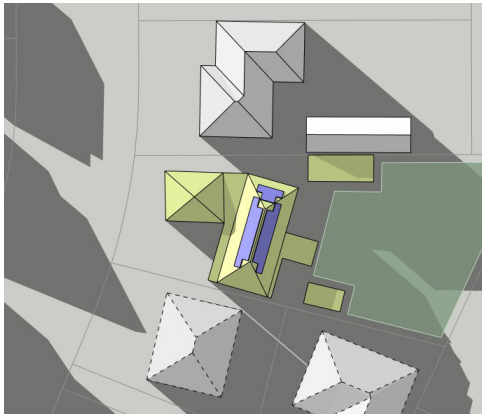
End.

Attachment E

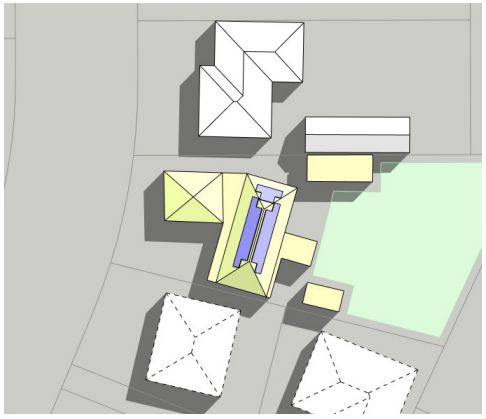
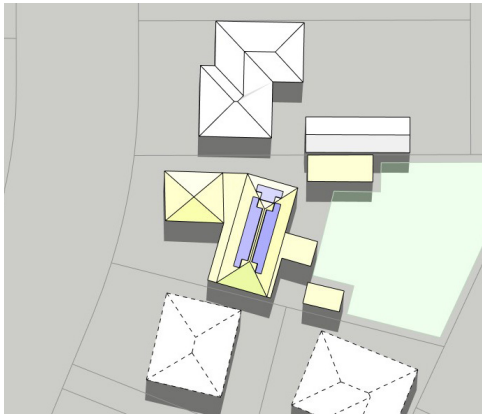
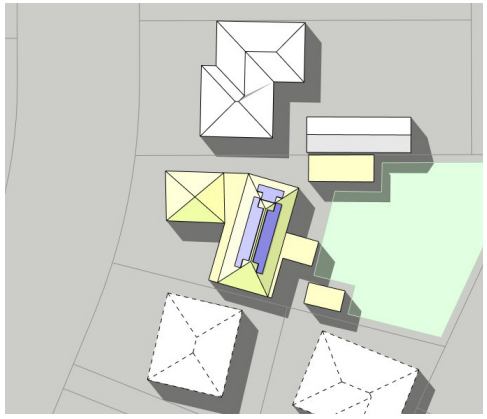
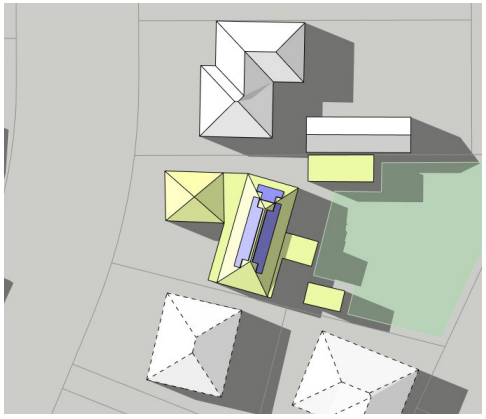
PLAN CHANGE 'I' - Submissions relevant to sunlight shading Jul 2025 McIndoe Urban 0m 500.0m

Shading Study: South city lot testing- Existing environment

Winter Solstice
21 June

10:00am	12:00 noon	2:00pm	4:00pm
			

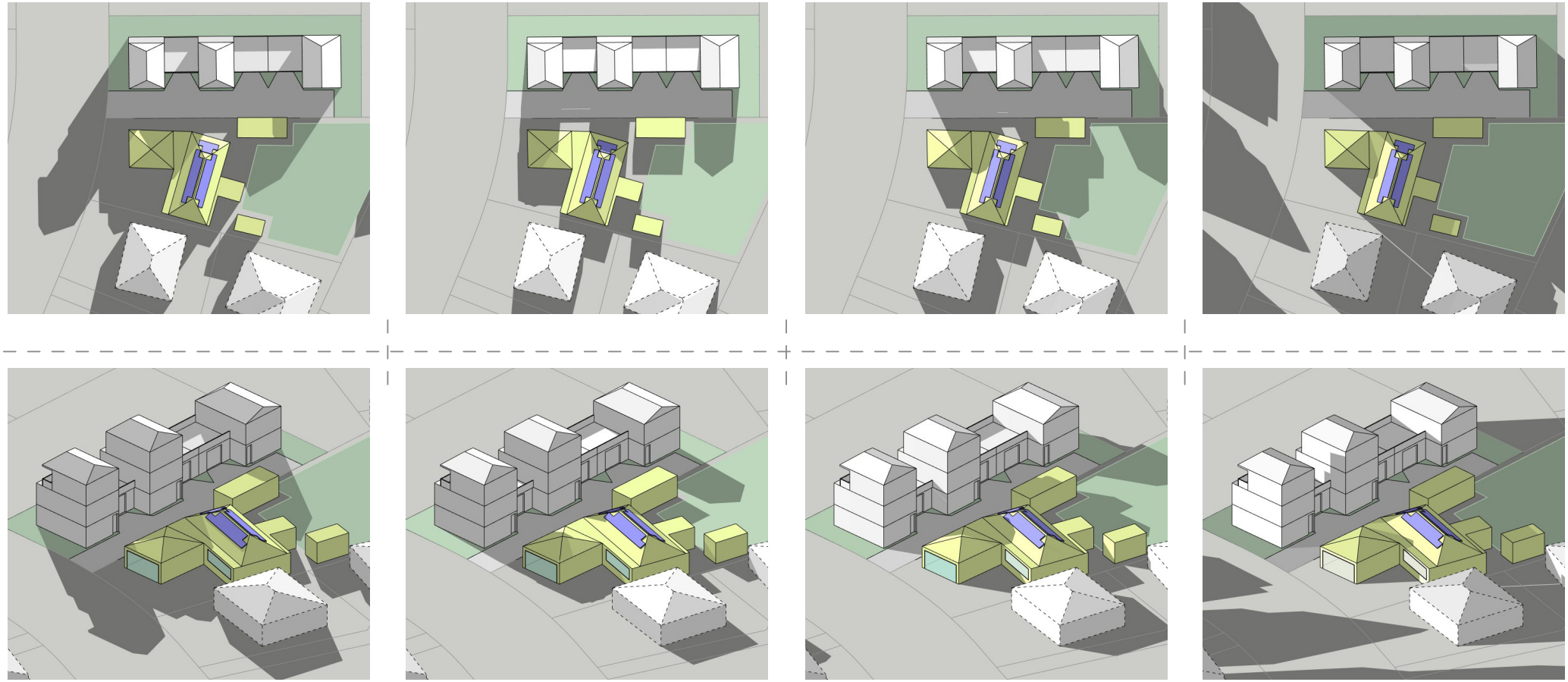
Spring Equinox
23 September

Shading Study: South city lot testing- PCI environment

Winter Solstice
21 June

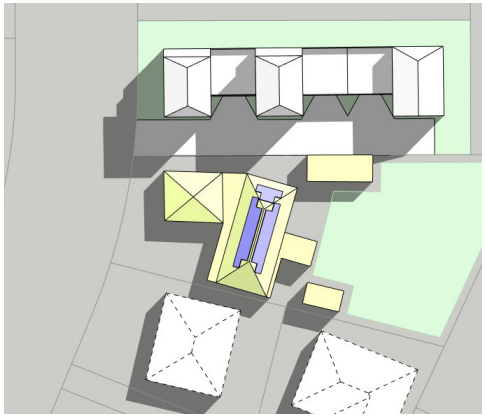
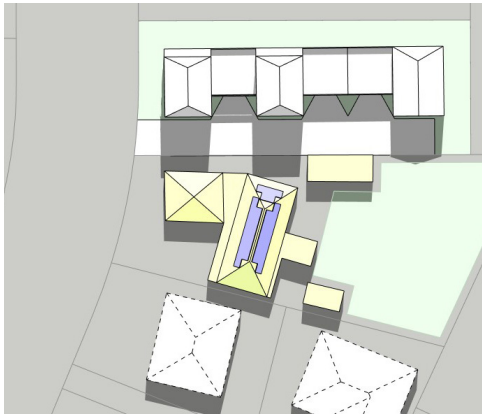
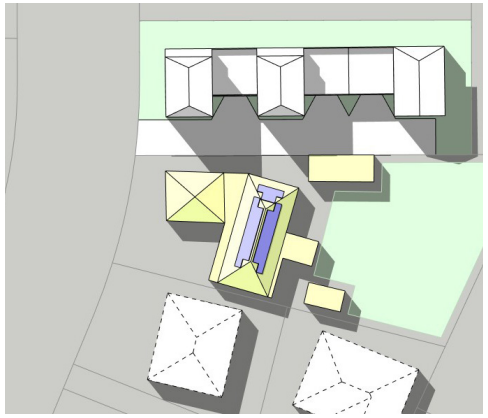
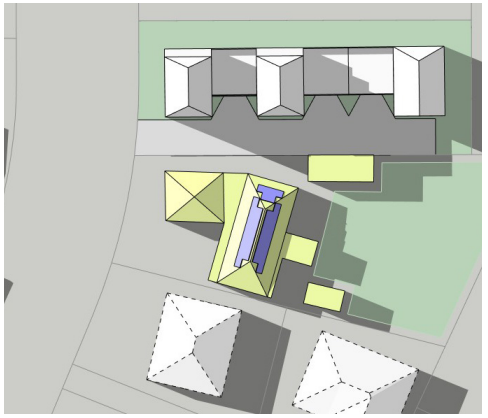
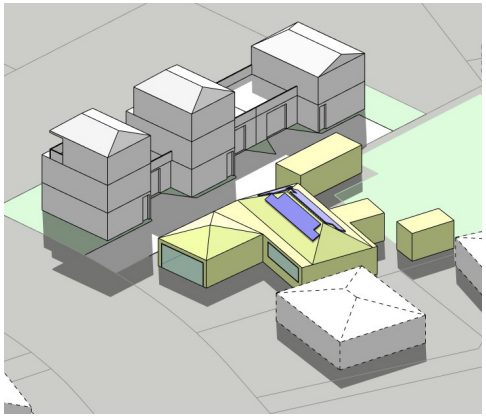
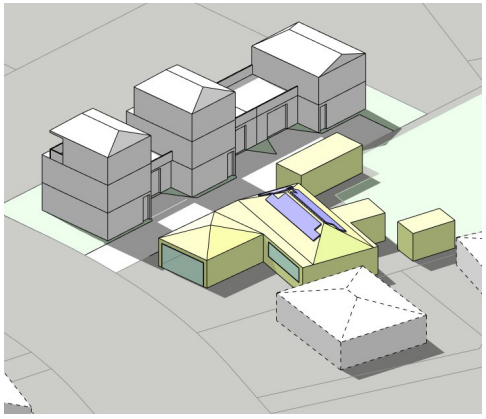
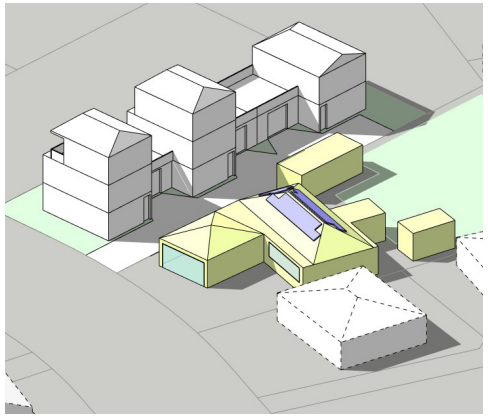
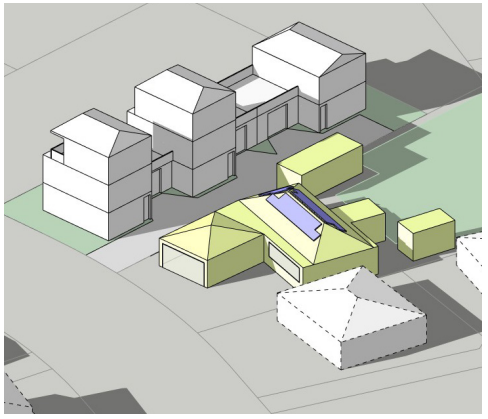
10:00am	12:00 noon	2:00pm	4:00pm



Shading Study: South city lot testing- PCI environment

Spring Equinox
23 September

10:00am | 12:00 noon | 2:00pm | 4:00pm

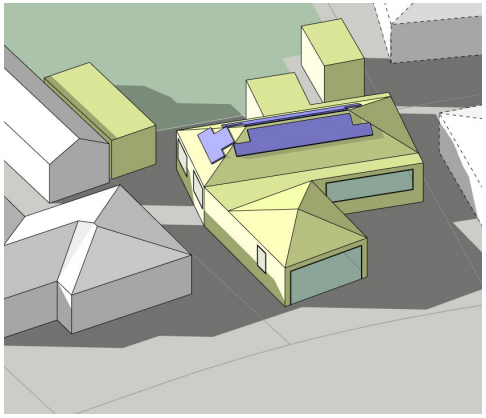
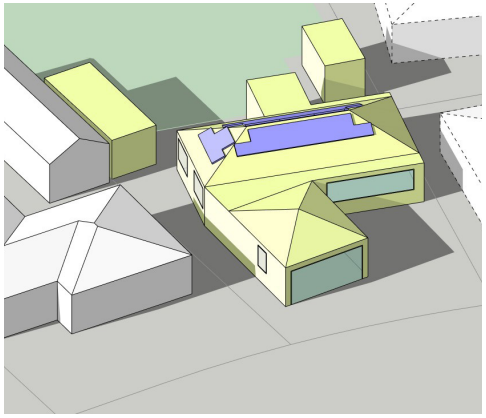
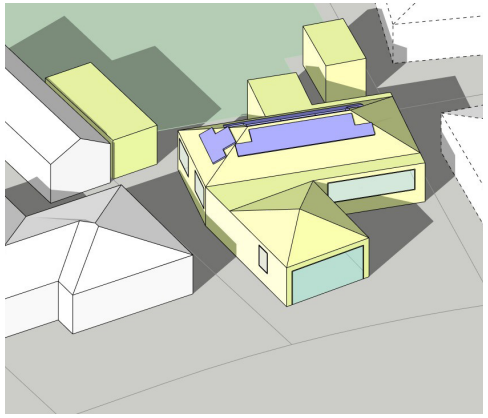
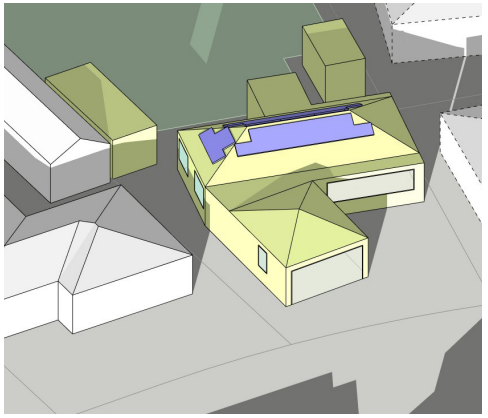
Shading Study: South city lot testing

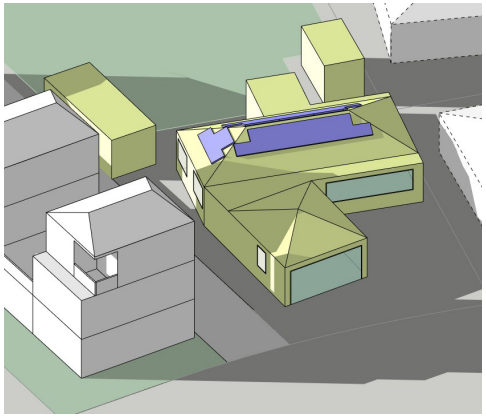
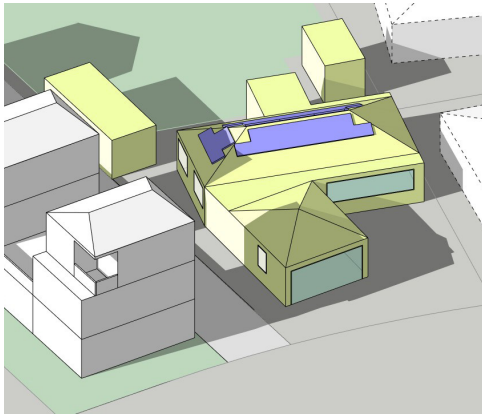
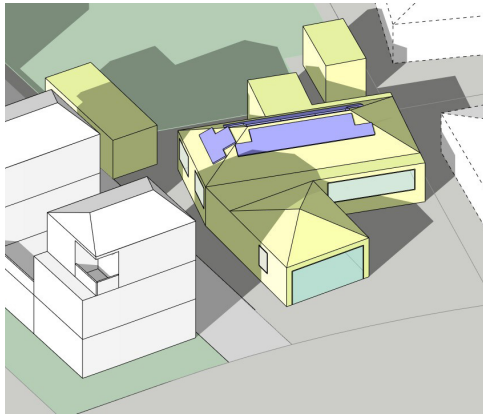
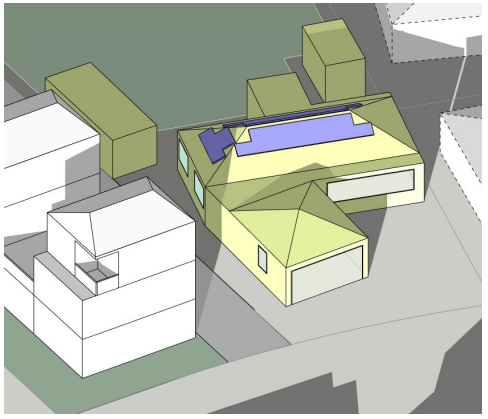
3D test to indicate shade on vertical surfaces

Winter Solstice
21 June

10:00am	12:00 noon	2:00pm	4:00pm

Existing environment

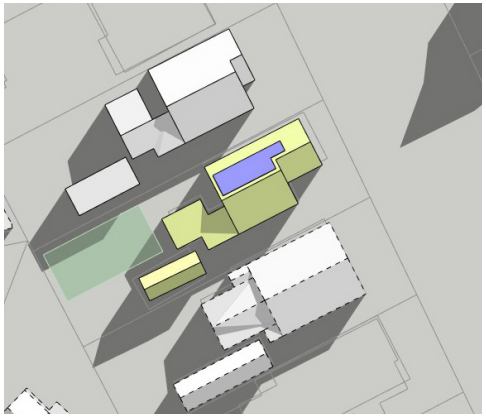
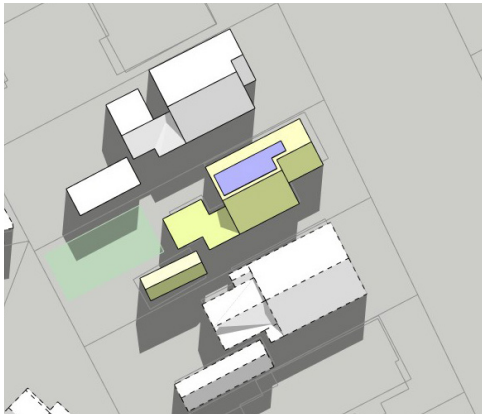





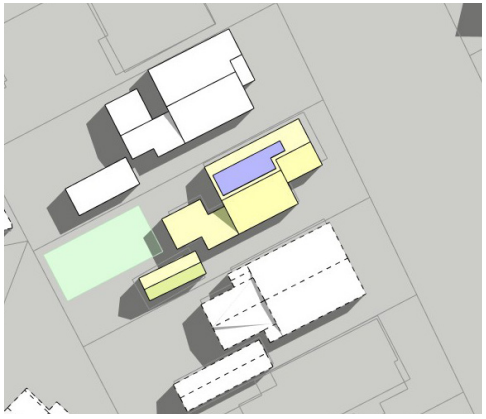
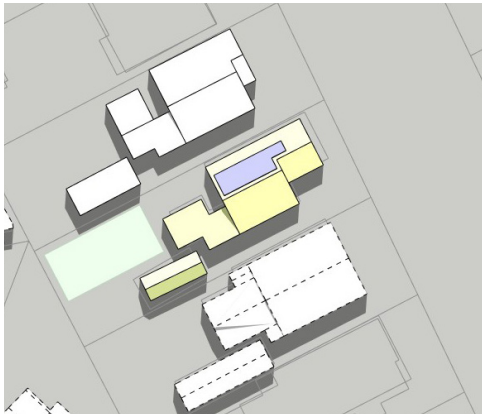
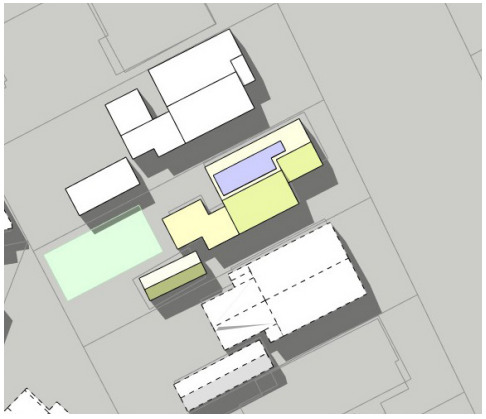
PCI environment

Shading Study: North city lot testing- Existing environment

Winter Solstice
21 June

10:00am	12:00 noon	2:00pm	4:00pm
			

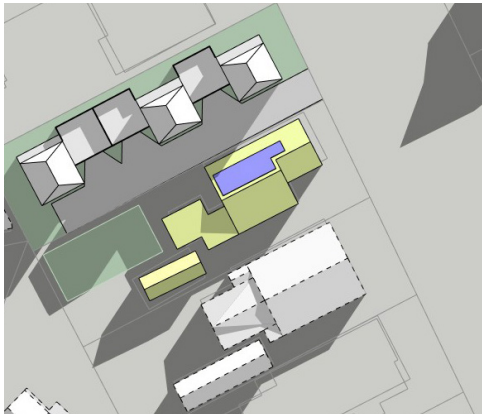
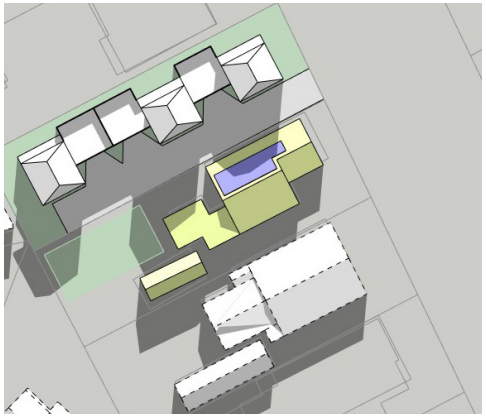
Spring Equinox
23 September

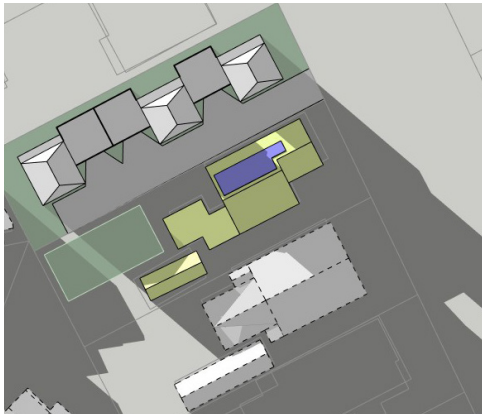
			

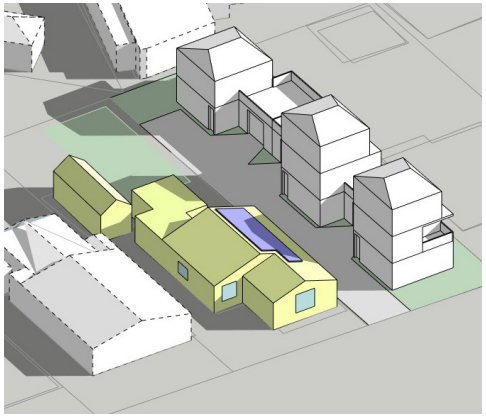
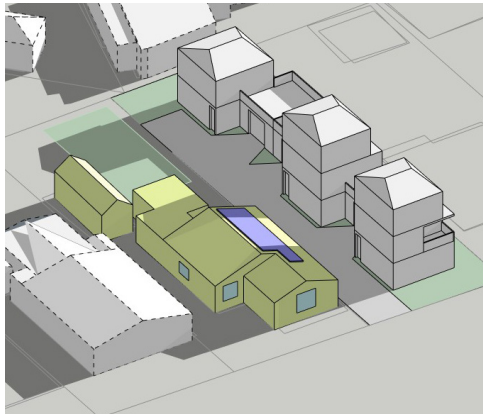
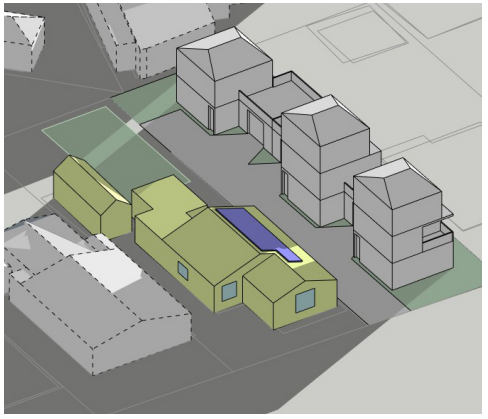
Shading Study: North city lot testing- PCI environment

Winter Solstice
21 June

10:00am	12:00 noon	2:00pm	4:00pm

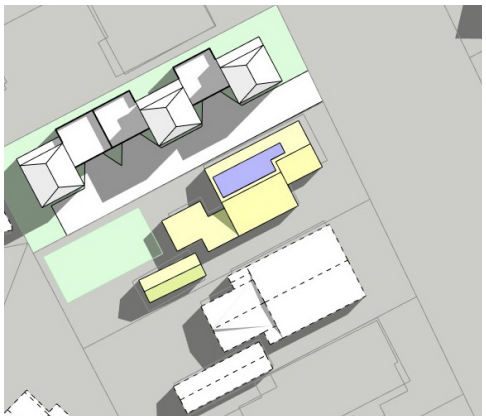
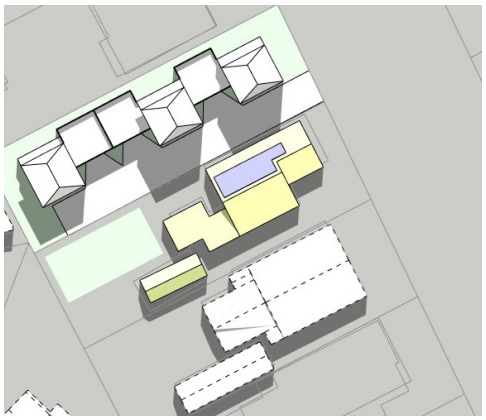


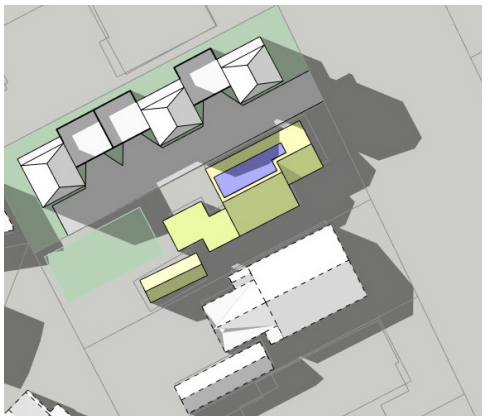
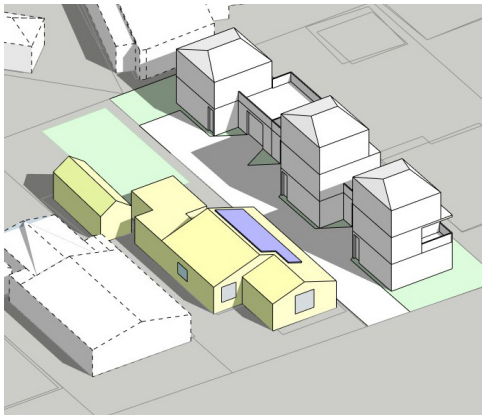
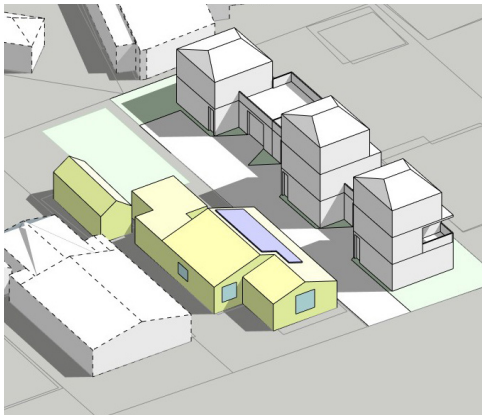




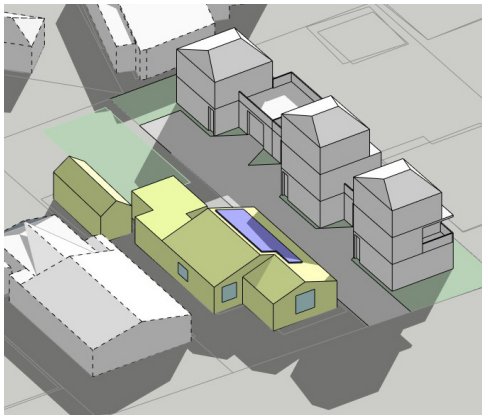
Shading Study: North city lot testing- PCI environment

Spring Equinox
23 September

10:00am	12:00 noon	2:00pm	4:00pm



Shading Study: North city lot testing

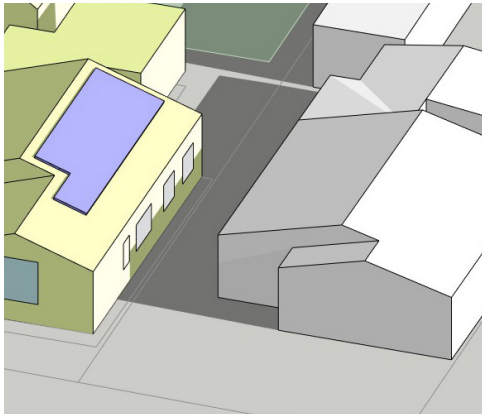
3D test to indicate shade on vertical surfaces

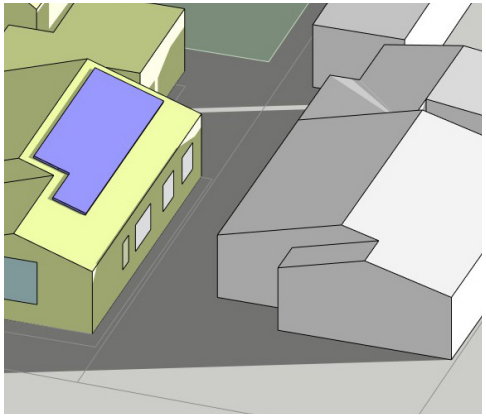
Winter Solstice
21 June

2:00 pm

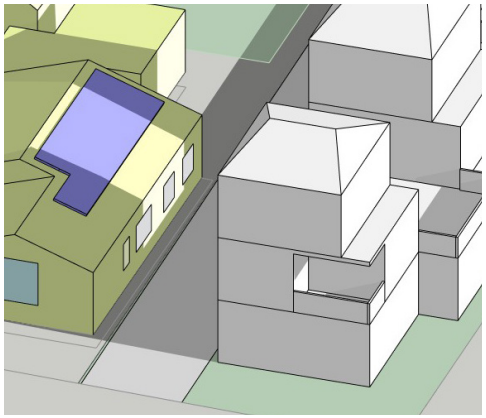
4:00pm

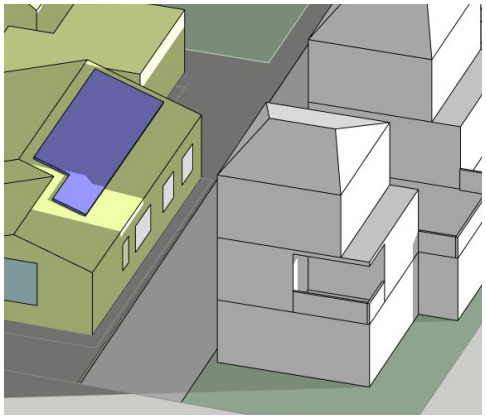
Existing environment

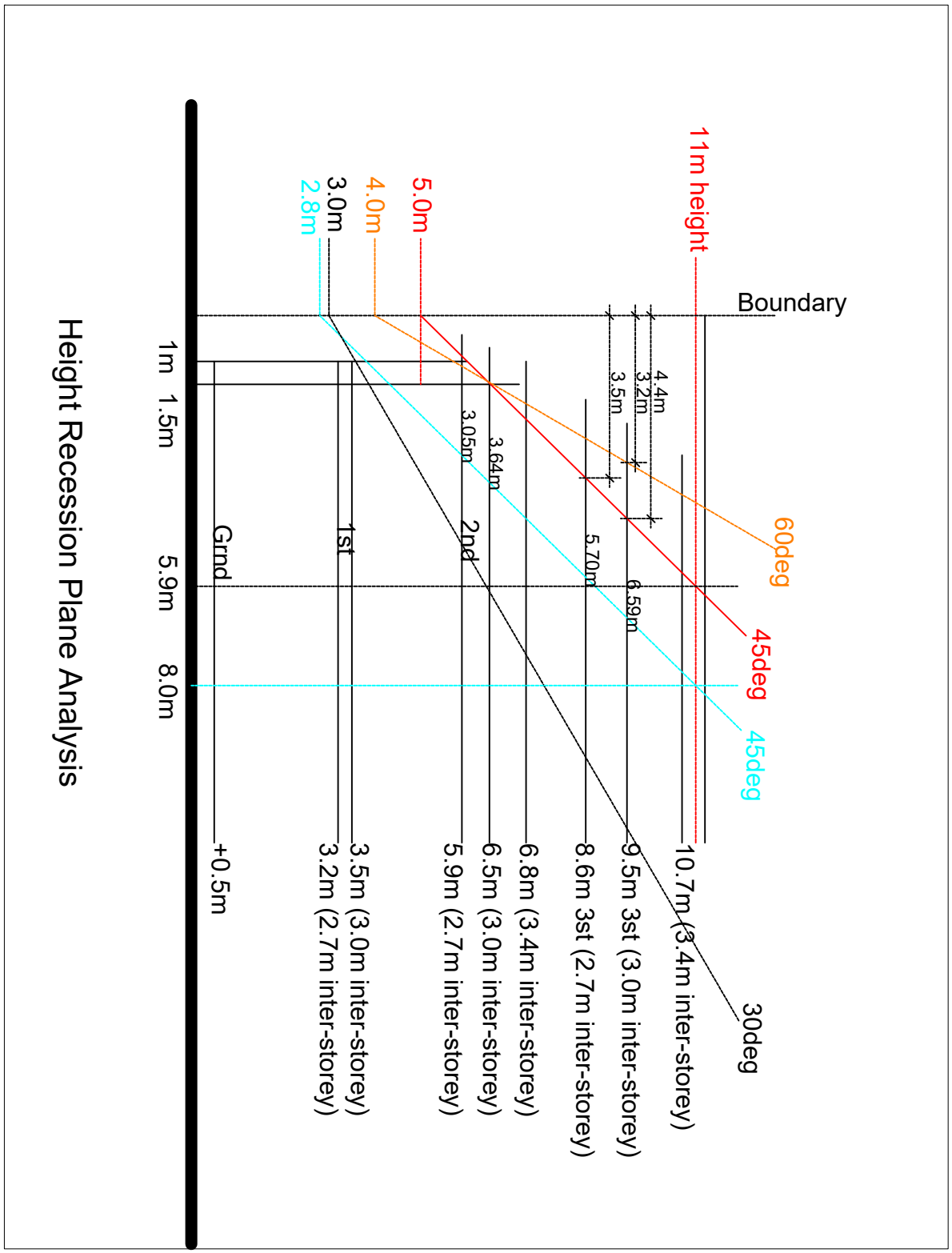




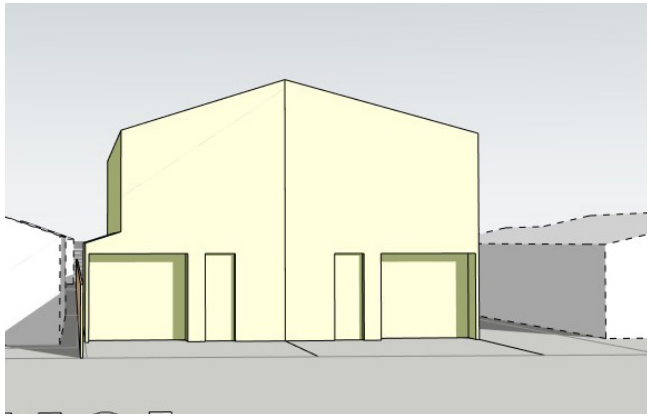
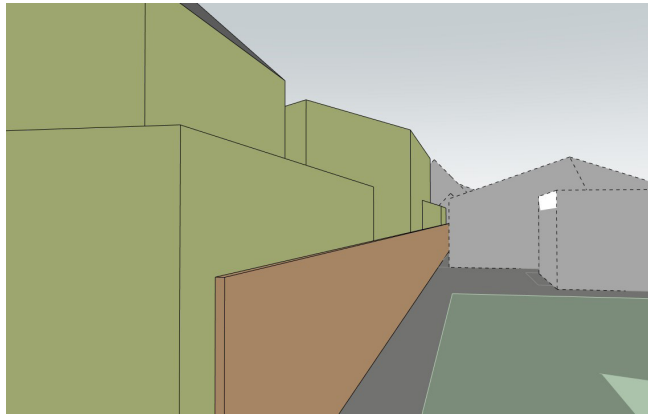
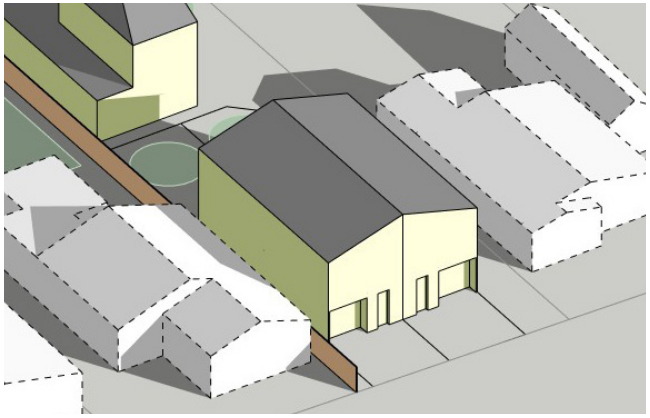
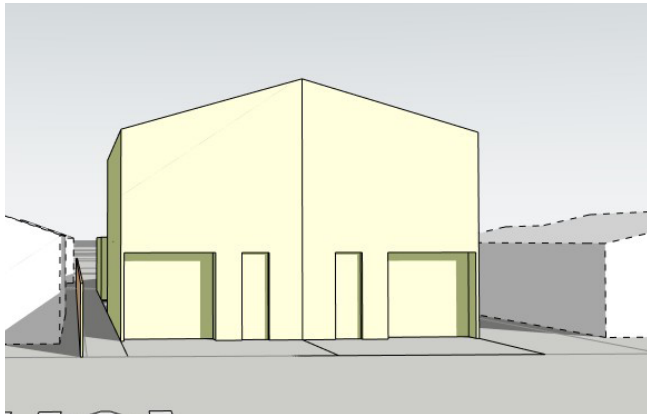
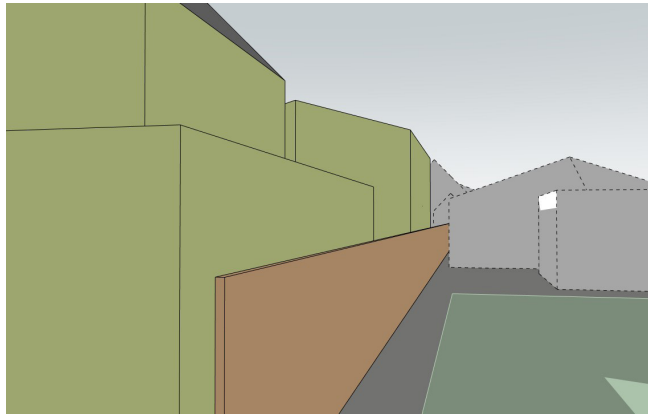
PCI environment






Height Recession Plane Analysis
1m
1.5m
5.9m
8.0m
Grnd
1st
2nd
Boundary
11m height
5.0m
4.0m
3.0m
2.8m
60deg
45deg
45deg
30deg
4.4m
3.2m
3.5m
3.64m
3.05m
5.70m
6.59m
10.7m (3.4m inter-storey)
9.5m 3st (3.0m inter-storey)
8.6m 3st (2.7m inter-storey)
6.8m (3.4m inter-storey)
6.5m (3.0m inter-storey)
5.9m (2.7m inter-storey)
3.5m (3.0m inter-storey)
3.2m (2.7m inter-storey)
+0.5m

Integrated Garage Setback Testing - Visual effects

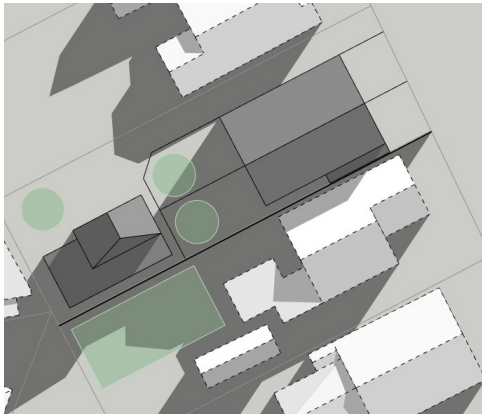
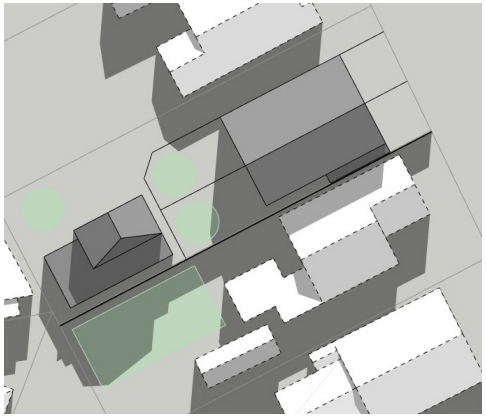
Context	Street View	Rear View
No Setback		
		
1m Setback		
		

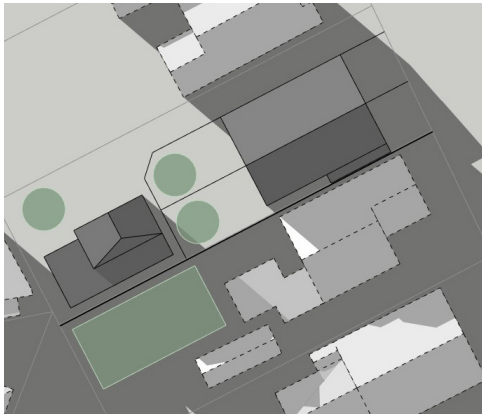
Integrated Garage Setback Testing - Visual effects

Winter Solstice
21 June

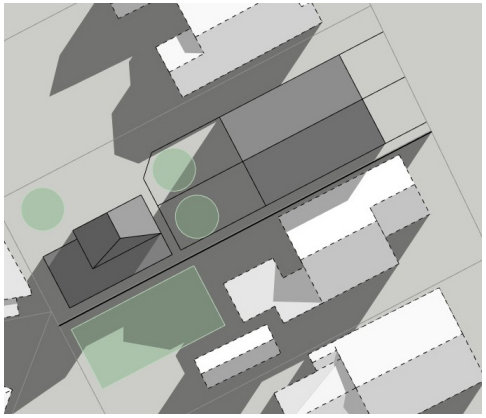
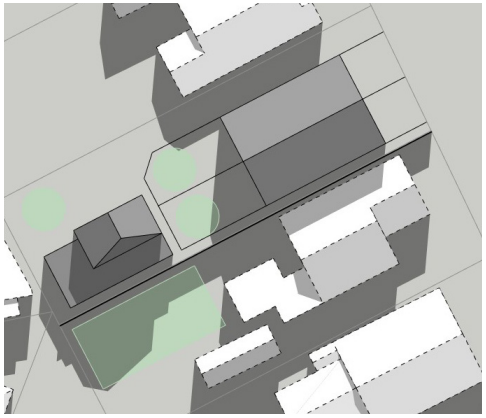
10:00am	12:00 noon	2:00pm	4:00pm

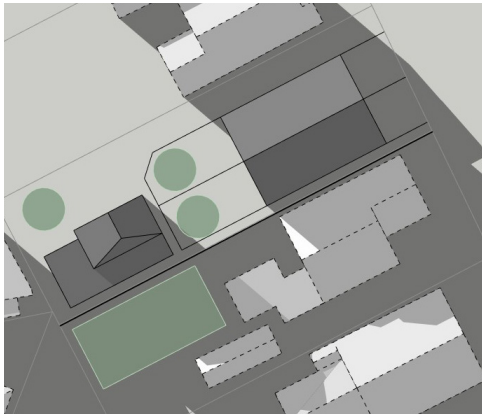
No Setback



1m Setback

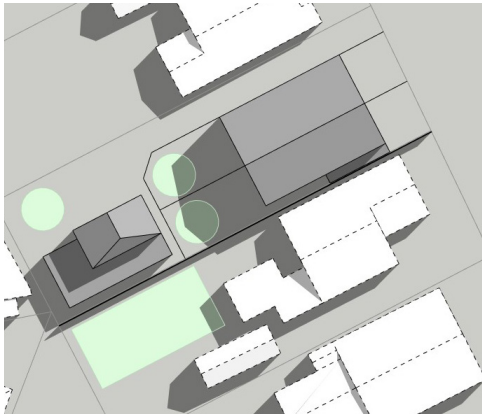
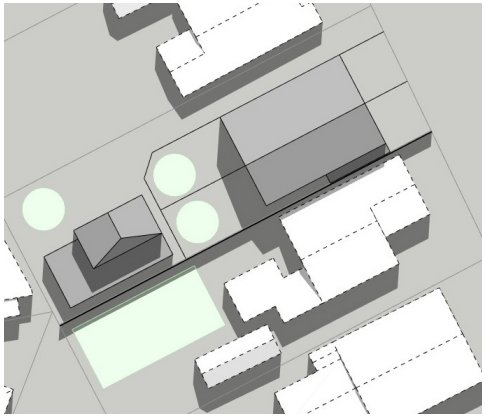
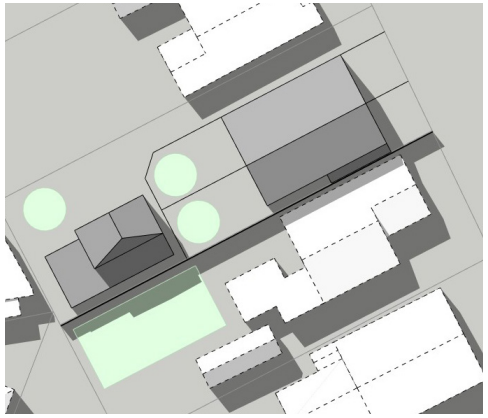
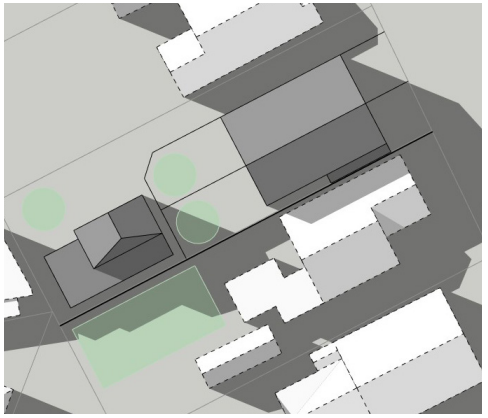


Integrated Garage Setback Testing - Visual effects

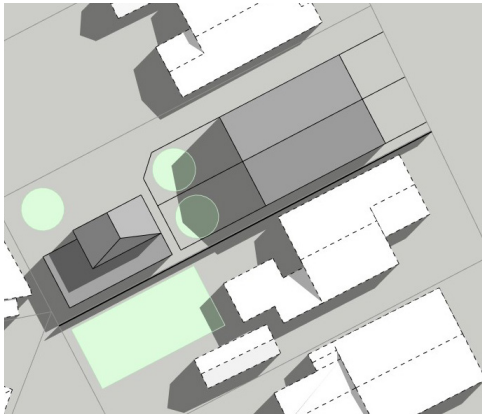
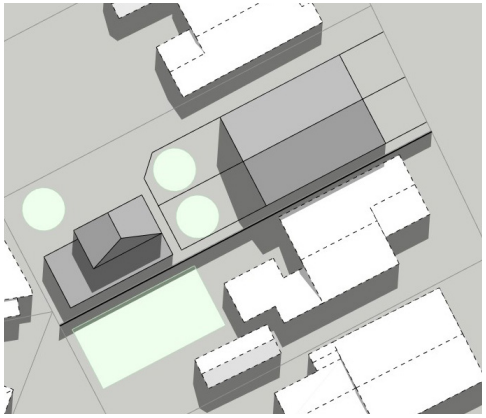
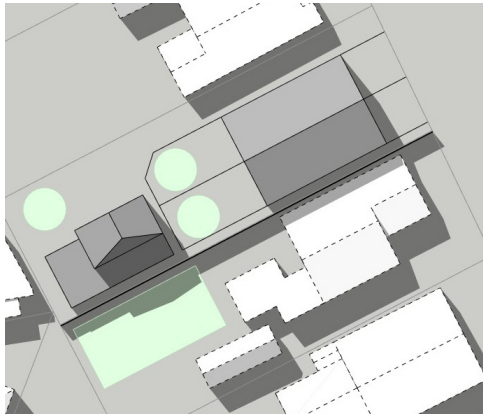
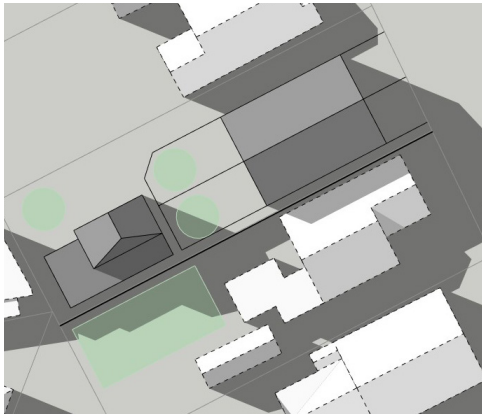
Spring Equinox
23 September

10:00am	12:00 noon	2:00pm	4:00pm

No Setback

1m Setback

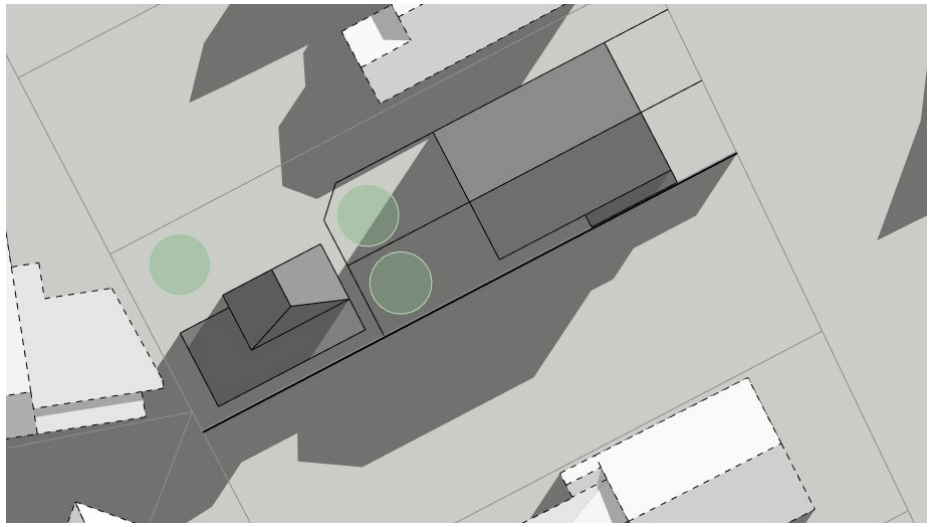





Integrated Garage Setback Testing - Visual effects

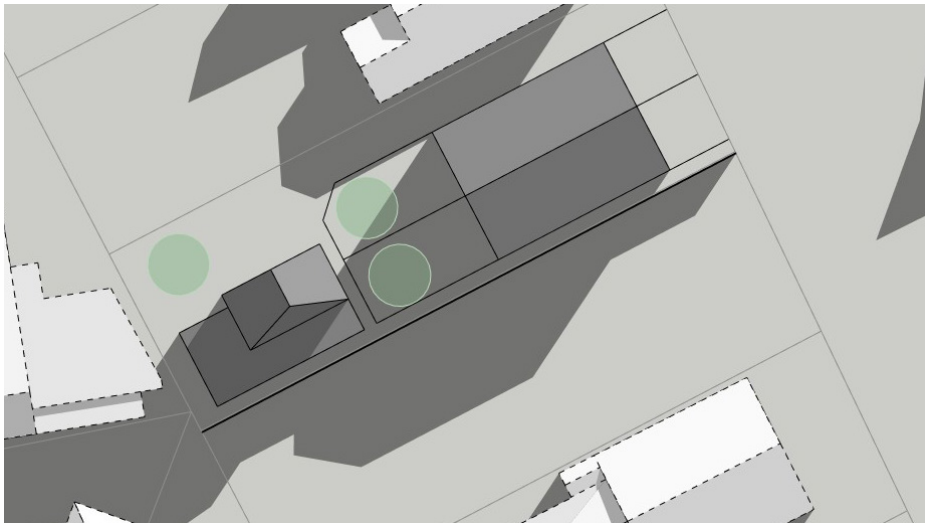
Alternative test with neighbouring buidling removed to indicate extent of shade on ground

Winter Solstice
21 June 10:00am

No Setback



Setback

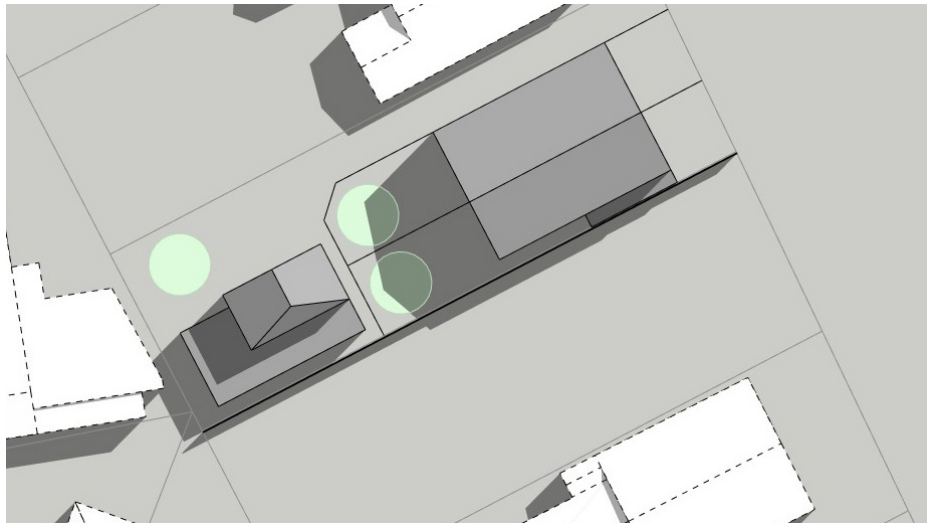


Integrated Garage Setback Testing - Visual effects

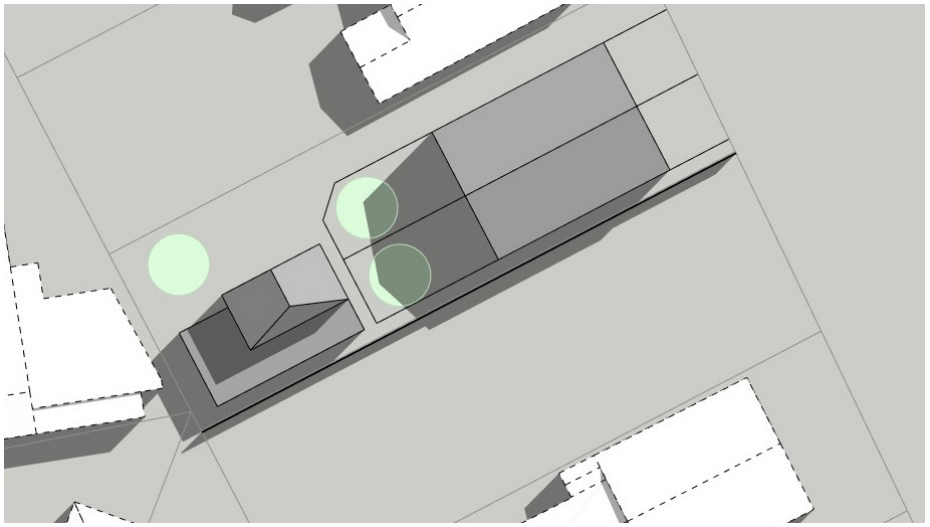
Alternative test with neighbouring buidling removed to indicate extent of shade on ground

Spring Equinox
23 September 10:00am

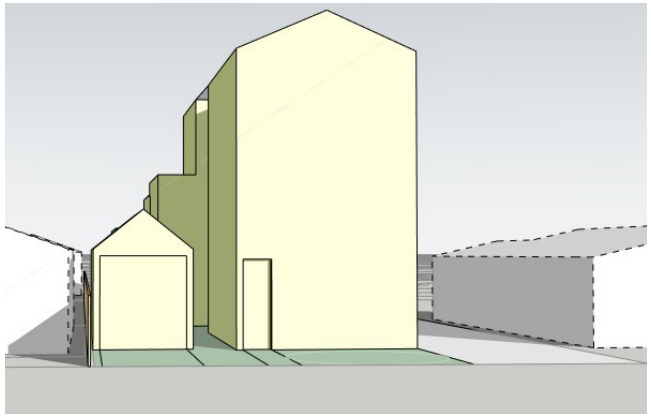
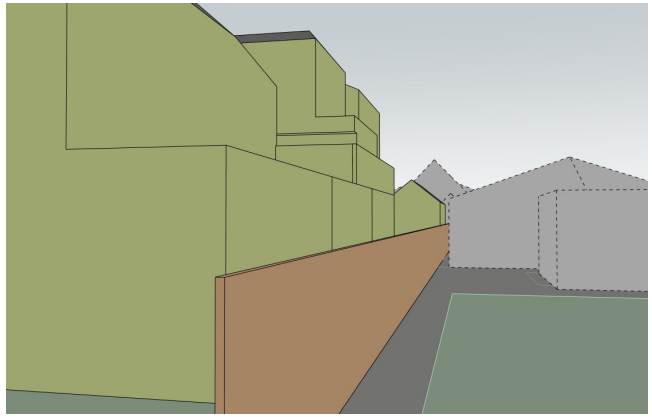
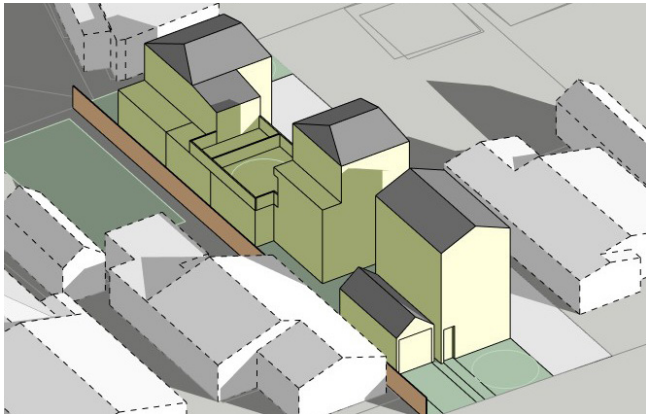
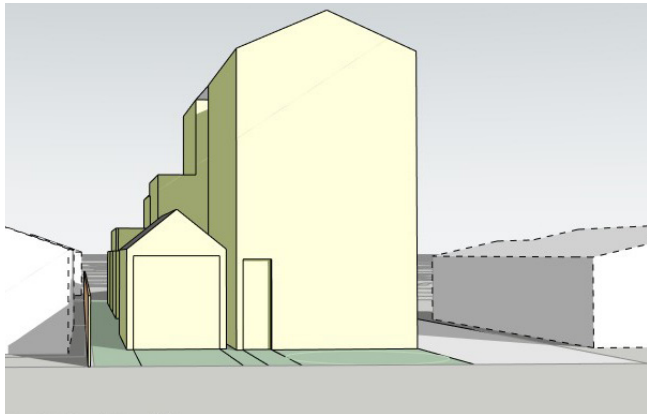
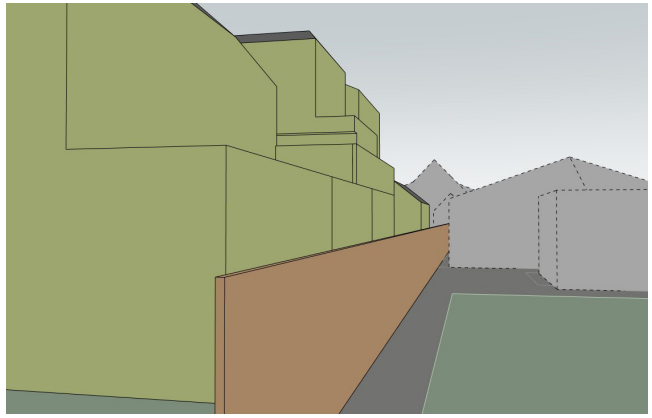
No Setback



Setback



Detached Garage Setback Testing - Visual effects

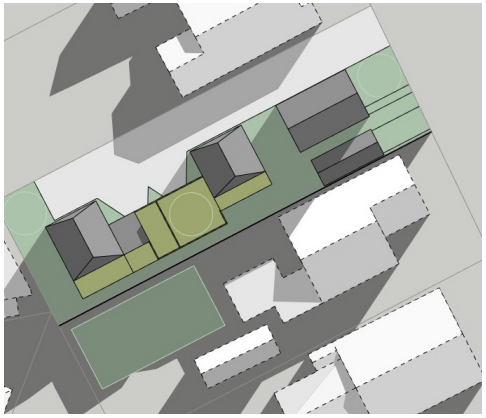
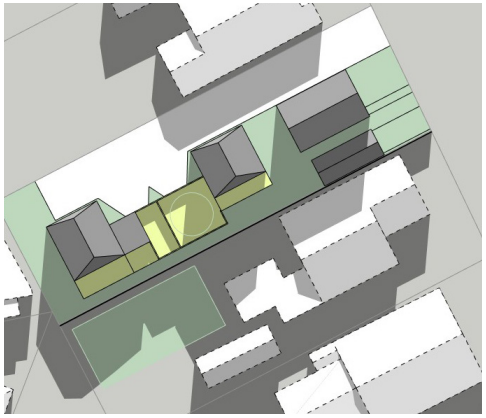
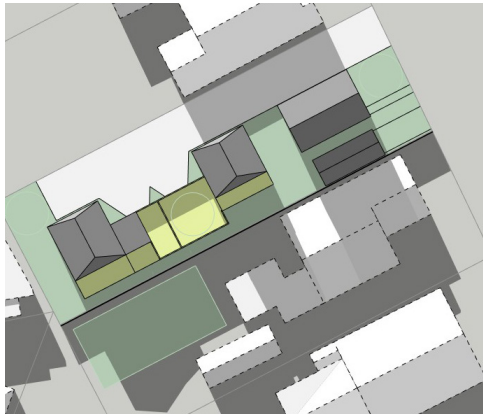
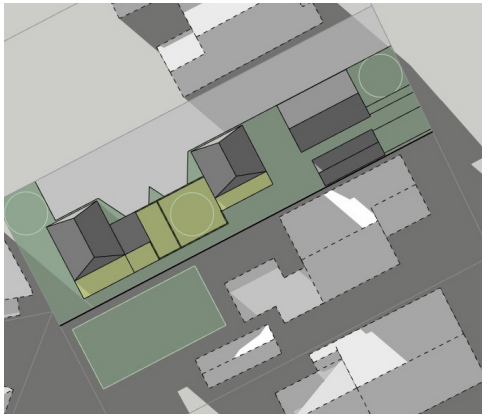
Context	Street View	Rear View
No Setback		
		
1m Setback		
		

Detached Garage Setback Testing - Shading effects

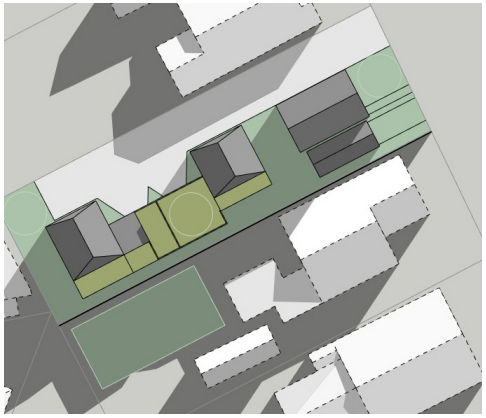
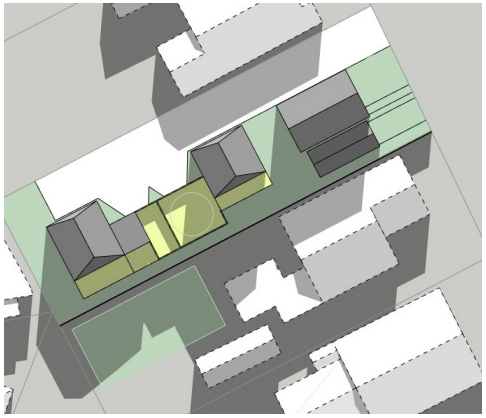
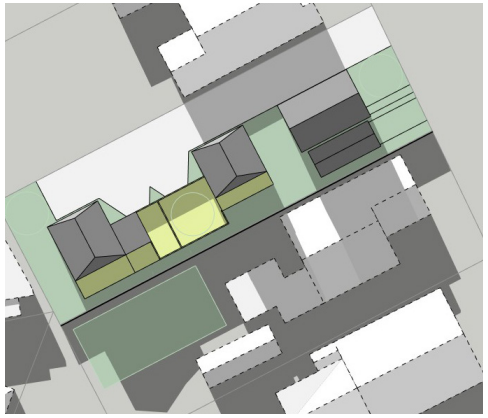
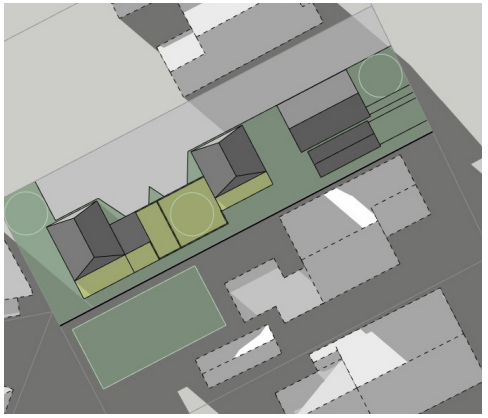
Winter Solstice
21 June

10:00am	12:00 noon	2:00pm	4:00pm

No Setback

1m Setback

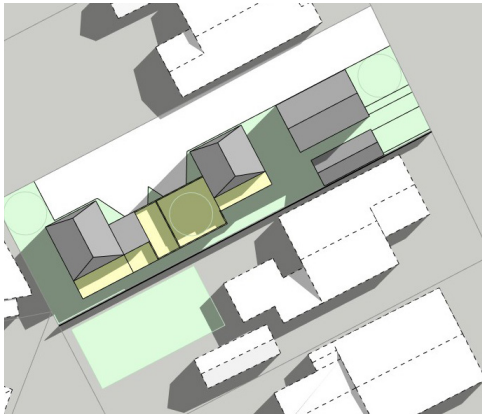
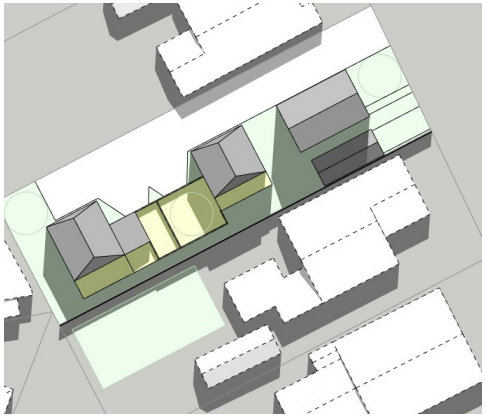





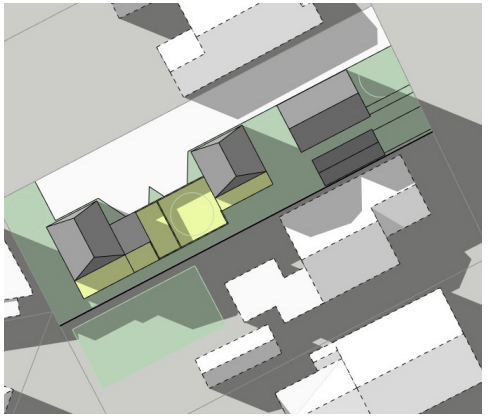
Detached Garage Setback Testing - Shading effects

Spring Equinox
23 September

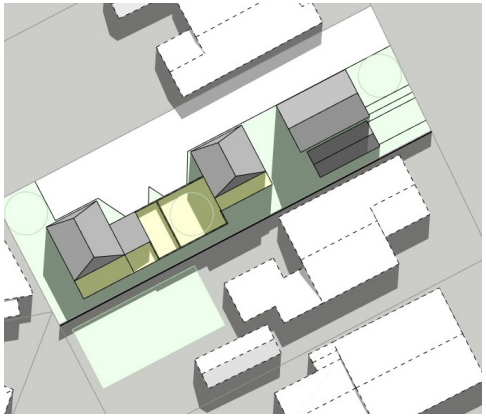
10:00am	12:00 noon	2:00pm	4:00pm

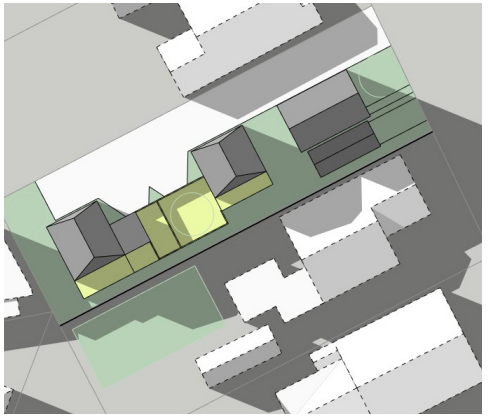
No Setback



1m Setback



Testing fence provisions

1.1m above *ground level* for 2/3 of the frontage width; and
1.8m above *ground level* for the remaining 1/3 of the frontage width.
Within 2.5 metres of any boundary adjoining a public *road*, any fence or standalone wall on a side boundary next to a vehicle *access leg** must be no more than 1.1 metre high