Life in Medium Density Housing
in Tāmaki Makaurau / Auckland

Chapter 7

Indoor environment

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Overview of the Life in Medium Density Housing in Tāmaki Makaurau / Auckland report

The *Life in Medium Density Housing in Tāmaki Makaurau / Auckland* study was undertaken by Auckland Council's Economic and Social Research and Evaluation team and Tāmaki Makaurau Design Ope (TMDO) in 2023.The primary purpose of the research was to investigate how Aucklanders are experiencing living in recently built medium density housing (MDH).

The results of this research will support everyone involved in the delivery of housing in Auckland (including Auckland Council, central government, developers) to improve future MDH, and ultimately the wellbeing of Aucklanders, through consenting processes, design guidance and land use planning. It will also enable better informed choices by Aucklanders looking to live in MDH.

This study involved a number of methods including a rapid literature review, geospatial analysis to identify recently developed MDH across the Auckland region, an online survey of 1337 participants living in MDH, analysis of the consented plans of 110 properties whose residents participated in the survey, and 20 in-depth in-home immersions which collectively provides a comprehensive view of how people experience their MDH.

This report is divided into 10 chapters and 13 appendices:

Main report:

- Chapter 1: Introduction
- Chapter 2: Legislation and policy context
- Chapter 3: Research method and sample
- Chapter 4: Indoor spaces for living
- Chapter 5: Storage, laundries and bathrooms
- Chapter 6: Outdoor living spaces
- Chapter 7: Indoor environment
- Chapter 8: Carparking and vehicle storage
- Chapter 9: Shared facilities
- Chapter 10: Discussion and recommendations

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- 3: Survey invitation letter and reminder postcard
- 4: Survey consent form
- 5: Survey questionnaire
- 6: Standalone houses excluded from the sample
- 7: Survey sample characteristics
- 8: In-home immersion screener survey
- 9: In-home immersion discussion guide
- 10: Design attributes for analysis of consented plans
- 11: Map of broad geographic study areas
- 12: Study limitations
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Each chapter is provided as a separate PDF and can be accessed on the Knowledge Auckland website. A summary report with key findings is also available on the Knowledge Auckland website.

Contents

Introduction to this chapter

This chapter discusses environmental factors inside the home. The sections of this chapter are arranged thematically. Each section begins with an overview of regulations and best practice guidance before describing the research results. Survey results are presented first, followed by findings from the in-home immersions. Consented plans tend to have little available information about the topics covered in this chapter and results from analysis of consented plans are briefly included in Section 5.3.

Section 1 discusses temperature, sunshine and shade, followed by Section 2 on ventilation and humidity. All these factors are inter-related and contribute to households' experiences of a comfortable temperature inside year-round. Section 3 focuses on visual privacy and Section 4 on sound and sound proofing (aural privacy). The in-home immersions revealed a strong relationship between privacy (visual and aural) and temperature regulation. Large windows allow a lot of heat and sunlight, which can be mitigated by closing blinds, which also increases privacy. Windows with small openings enable limited airflow and, while critical for heat management, when open, these windows have an impact on aural privacy.

Section 5 describes perceptions of safety and sense of community. Finally, Section 6 summarises the results presented in this chapter.

1 Temperature, sunshine and shade

This section discusses temperature, sunshine and shade in and around the home. Regulations and best practice guidelines are described first. Results from the survey and in-home immersions follow.

1.1 Regulations and best practice guidelines

Auckland Unitary Plan

The Auckland Unitary Plan (AUP) does not contain any standards specifically relating to dwelling temperature but does require the design of medium density housing (MDH) for four or more dwellings to consider "the extent to which dwellings optimise sunlight and daylight access based on orientation, function, window design and location and depth of the dwelling floor space".[1]

In terms of sunlight access, the AUP is primarily concerned with maintaining a reasonable standard of sunlight access to adjoining properties via the height in relation to boundary control. There are no assessment matters or standards relating to the management of temperature or provision of shade within the dwelling or outdoor living spaces.

Auckland Design Manual (ADM) and best practice guidance

The *Auckland Design Manual* (ADM) recommends that dwellings are comfortably heated and cooled by natural means and encourages the use of passive solar design principles to maximise the ability of the natural environment to heat and cool homes. [2] Mechanisms include insulation, double glazing, designing eaves and shading devices that allow for different sun angles, and thermal mass materials that store heat during the day and release it at night. Deep recessive eaves, mechanical louvres and other passive shading devices can help prevent overheating from the high summer sun on north-facing windows.

Similar guidance is provided in the *National Medium Density Design Guide* and *the Public Housing Design Guidance*,[3, 4] which recommend orientating the house and living areas to maximise solar gain for sunlight and warmth to improve energy efficiency. The National Medium Density Design Guide recommends that shading devices, such as deeper eaves, louvres and balconies, help maintain indoor comfort in the summer, while still allowing sunlight to heat rooms in the winter, reducing the need for heaters and air conditioners.[5]

Australian design guidance specifies a minimum number of hours of direct sunlight during winter into rooms, as well as considering the window type, size, glazing selection, orientation and placement to respond to the site context. The integration of shading and solar control devices into buildings, to

[1] E.g. Mixed Housing Urban Assessment Criterion H5.8.2(2)(e)(ii).
[2] *Auckland Design Manual*, Terraced Housing Design, Placing the Building, Section 3.6 Designing for Light and Sun, and Apartment Building Design, Placing the Building, Section 3.5, Designing for Light and Sun.
[3] Ministry for the Environment. (2023). *National Medium Density Design Guide,* Section 6(A).
[4] Ministry of Housing and Urban Development. (2023). *Public Housing Design Guidance,* Section 3.2.
[5] Ministry for the Environment. (2023). *National Medium Density Design Guide*, Section 6(B).

allow winter sun but shade summer sun, along with occupant control are also recommended for climates with variable weather.

The NSW *Apartment Design Guide* requires living rooms and private open spaces of at least 70 per cent of apartments to receive a minimum of 2-3 hours direct sunlight between 9am and 2-3pm at mid-winter, dependent on the geographic location.[6] It also recommends a number of design features to control sunlight access and glare during warmer months, including shading devices such as eaves, awnings, balconies, pergolas, external louvres, horizontal shading to north-facing windows and vertical-shading to east- and west-facing windows.[7]

The NSW *Low Rise Housing Diversity Design Guide* recommends solar and daylight access to dwellings based on dwelling orientation and room depth, with a minimum level of sunlight access to habitable rooms during winter (21 June) as a worst-case scenario for solar access. It also recommends:[8]

- eaves and awnings to provide shade for windows during summer
- reduced or adjustable shading to east- and west-facing windows
- mid- to light-coloured roofs which absorb less heat in summer
- using smart glass or other technologies on north and west elevations.

Section 35 monitoring

No specific analysis was undertaken of temperatures within the home. However, it was noted that significant retaining walls were reducing sunlight access into dwellings and outdoor spaces and that "amenity, sunlight access, privacy (visual and acoustic) and other factors that contribute to quality housing and the health and safety of residents within sites as well as adjoining sites, are being compromised in favour of housing yield in some developments".[9]

Design observations

The following design matters have been observed by the council's Tāmaki Makaurau Design Ope (Urban Design Unit) in their technical review and monitoring of resource consent applications for MDH:

- Anecdotal reports of overheating, particularly in upper floor bedrooms.
- Retrofitting of heat pump or air conditioning condenser units can compromise outdoor living courts or the external appearance of dwellings.
- Floor-to-ceiling glazing is increasingly common in bedrooms, which impacts temperature and privacy issues.
- Internal dwelling layout is manipulated to achieve compliance with AUP standards such as outlook, which can result in the largest glazing facing south over a driveway with poor solar gain and privacy.

[6] New South Wales Department of Planning and Environment. (2015). *Apartment Design Guide*, Part 4, Objective 4A-1.
[7] New South Wales Department of Planning and Environment. (2015). *Apartment Design Guide*, Part 4, Objective 4A-3.
[8] New South Wales Department of Planning and Environment. (2020). *Low Rise Housing Diversity Design Guide for complying development*, Section 3U, Design guidance 4, 5, 7 & 9.
[9] Auckland Council. (2022). *Auckland Unitary Plan Section 35 Monitoring*, B2.3 A quality built environment, page 119.

Figure 1: Three external air conditioning units attached to terraced house

Source: TMDO, Auckland Council.

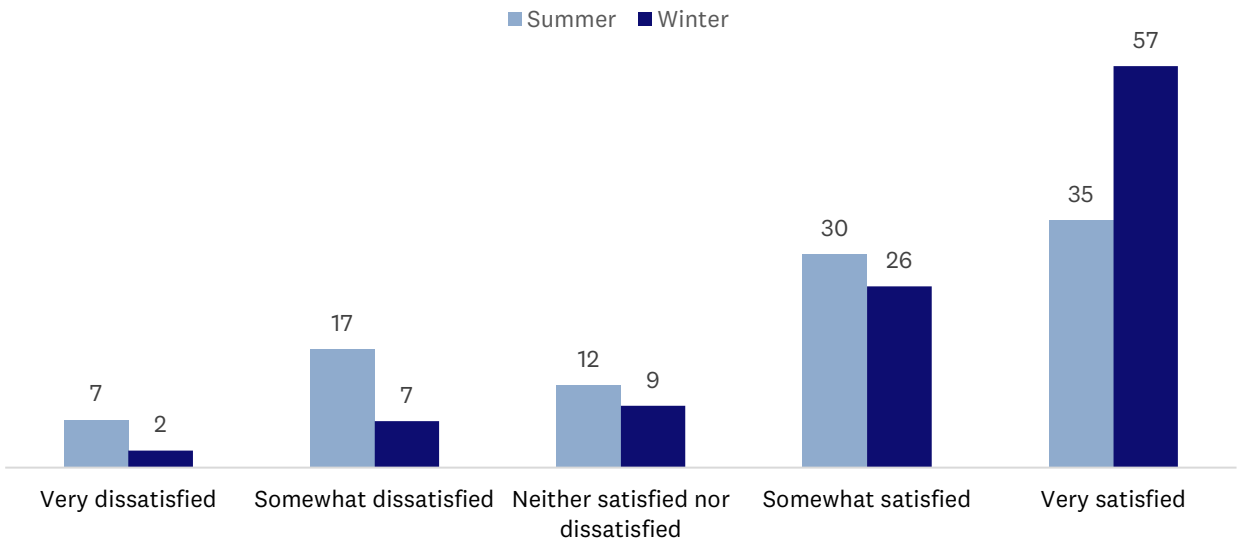
1.2 Survey results

Participants were asked to rate their level of satisfaction with five aspects related to the indoor environment in their home: temperature inside their home in summer, temperature inside their home in winter, shade in and around their home, airflow through their home (e.g. through windows, doors, ventilation system), and humidity. Results for the first three aspects are discussed below and results for airflow and humidity are discussed in Section 2.2 of this same chapter.

Satisfaction with the temperature inside their home

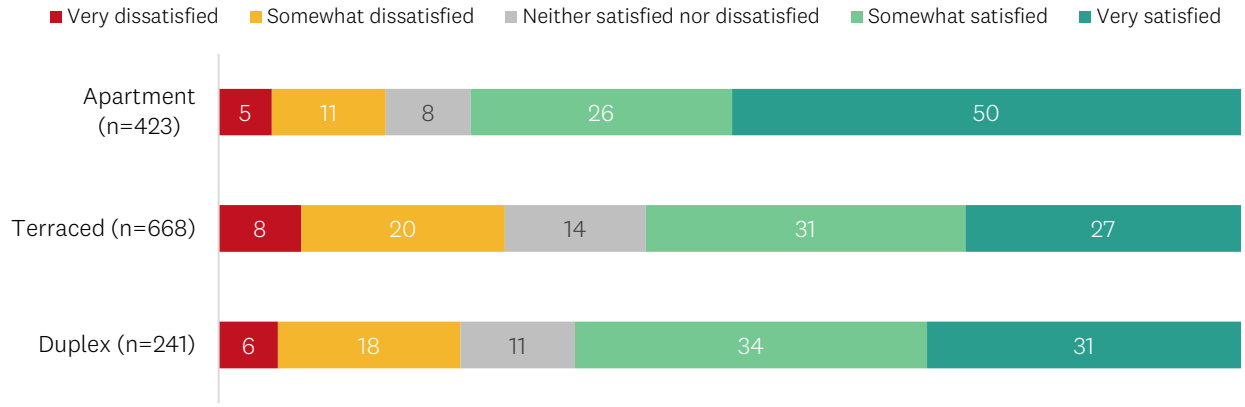
Participants' satisfaction with temperature inside their home in winter was higher than in summer – over half (57%) stated they were 'very satisfied' with the temperature in winter, compared with 35 per cent 'very satisfied' in summer (Figure 2).

Figure 2: Participant satisfaction with the temperature inside the home in summer and winter (n=1332) (%)



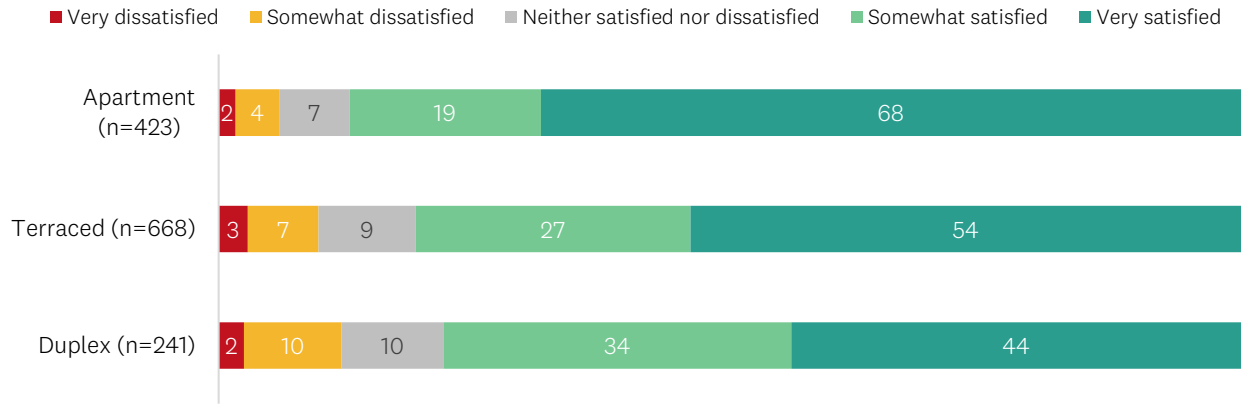
Satisfaction with temperature inside the home in summer varied across housing typologies. Those living in terraced houses (20%) or duplexes (18%) were more likely to have reported being 'somewhat dissatisfied' with the temperature inside their home in summer than those living in apartments (11%). Conversely, those in apartments were more likely to have reported being 'very satisfied' (50%) with the temperature inside their home than those living in terraced houses (27%) or duplexes (31%).

Figure 3: Participant satisfaction with temperature inside the home during summer, by typology (%)



Fewer differences in satisfaction with the temperature inside the home in winter are seen across the three housing typologies. The participants living in apartments are again more likely to have reported being 'very satisfied' (68%) with the temperature inside their home in winter than those living in terraced houses (54%) or duplexes (44%).

Figure 4: Participant satisfaction with the temperature inside the home in winter, by typology (%)



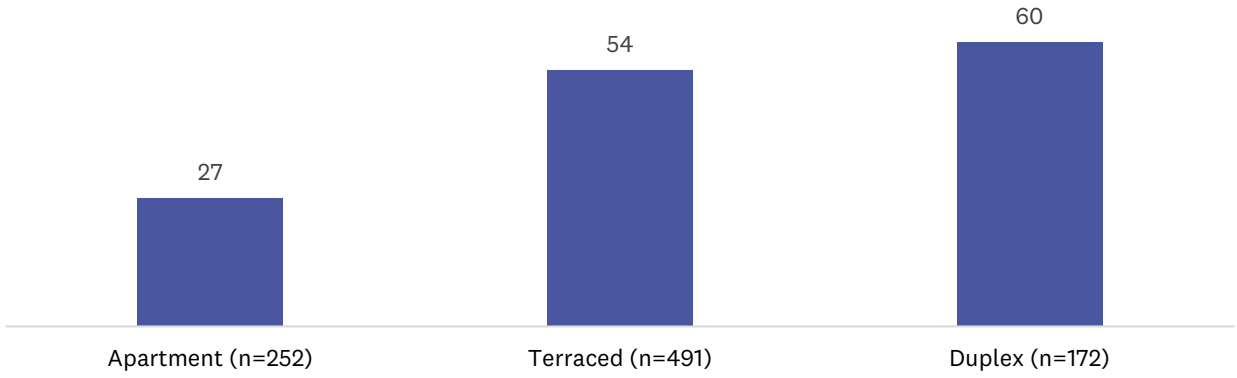
Modifications to improve temperature

Participants were asked to indicate whether they had made any changes to their home since they had moved in, from a list of six options which included 'improved temperature'.[10]

[10] Question 26 also asked participants whether they had made changes to the kitchen (Chapter 4); to improve privacy (discussed in this chapter); to increase storage, e.g. chest of drawers or storage cupboard (79% of participants who made a least one kind of change); permanently repurpose a room (13% of participants who made a least one kind of change); improve accessibility (3% of participants who made at least one change); or changes to anything else. Participants could also indicate that they intended to make changes or that they had made no changes and had no intention to. Just over three-quarters (78%) stated they had made at least one sort of change since they had moved in.

Of the participants in households that reported having made a change to their home, almost half (47%) had made changes to their home to improve temperature. Those living in terraced houses (54%) or duplexes (60%) were more likely to have made changes than those living in apartments (27%).

Figure 5: Household who have made changes to improve temperature (%)

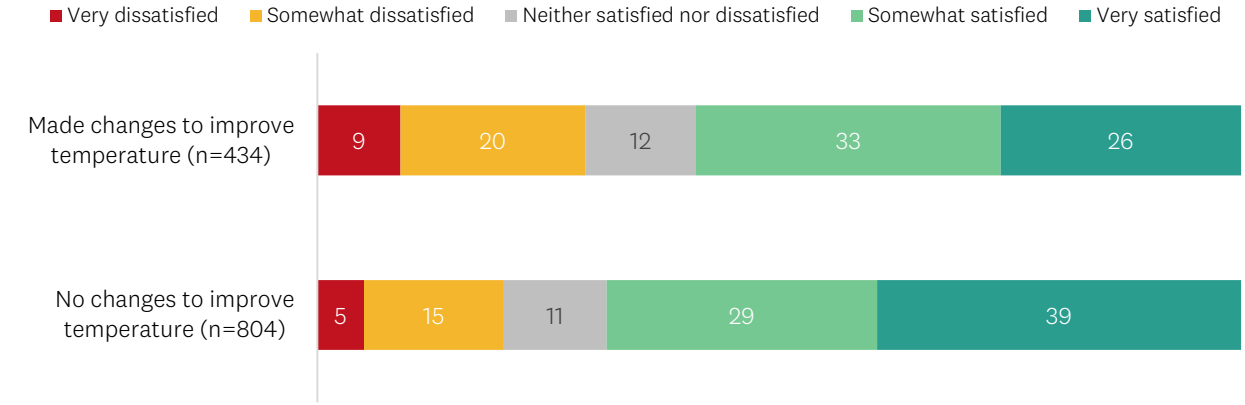


Note: Base is all properties where the participants reported having made at least one change to their home.

Those who had made changes to improve temperature in their home were significantly more likely to be owner-occupiers than renters. Of those who made changes to improve temperature, 94 per cent were owner-occupiers and the remaining 6 per cent renters.

The participants who had not made changes were more likely to have reported being 'very satisfied' (39%) compared with those who have made changes (26%).

Figure 6: Participant satisfaction with temperature inside the home in summer, by changes to improve temperature or not (%)



Several participants mentioned the changes they had made to improve temperature, in their comments about 'other' changes made to their home. Changes included installing window coverings and treatments, changing glazing and installing heat pumps:

> *Additional window blinds to filter sun and outdoor patio screen to manage weather.*
>
> *Installing window tint and indoor ventilation system.*
>
> *Added secondary glazing, for noise and temperature control.*

Installed 4 heat pumps.

The internal temperature was mentioned by 6 per cent of participants when describing what they dislike about their home. Many of these comments were about homes being too hot in summer.

Wasn't designed to stay cool in summer. Didn't come with a heat pump so we had to get one installed for much more than it would have cost during building. Council should make cooling and heating systems mandatory in new-build apartments.

Very hot in the bedrooms in the Summer, not enough ventilation upstairs.

It's a hot box. Upstairs is consistently between 25-32 degrees through summer. The heat is impossible to move upstairs. The aircon/heat pump is great downstairs but does nothing upstairs.

Eighteen per cent of participants said they like the temperature of their home, commenting that it was warm, well insulated or had double glazing. These positive comments about the home environment were often explained by the home being new.

It is newly built, double glazed, warm, airy, well positioned for sun.

I also love that it is super light and in the winter very warm.

Because it is new, it is both low maintenance and well heated. There is no mould and the temperature stay fairly regular; i.e. it stays reasonably cool in summer, and reasonably warm in winter.

The modern insulation, double glazing and heating and cooling.

The degree of sunshine was mentioned by 7 per cent of participants as something they like about their home.

Warm and gets good sunlight during winter.

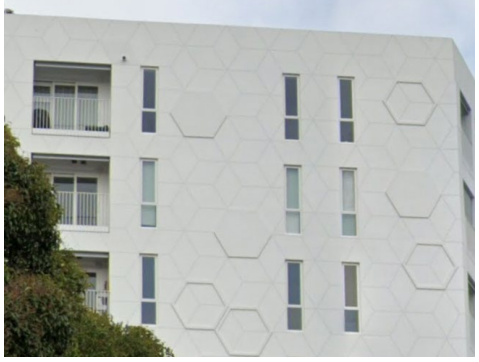
It's north facing and we get plenty of morning sun.

Lots of natural light.

One participant commented on the impact of sun exposure on the temperature inside their home:

My apartment faces west and the sun sometimes on sunsets hits directly towards my place with no place to hide, so I put my blinds fully down in the middle of the day.

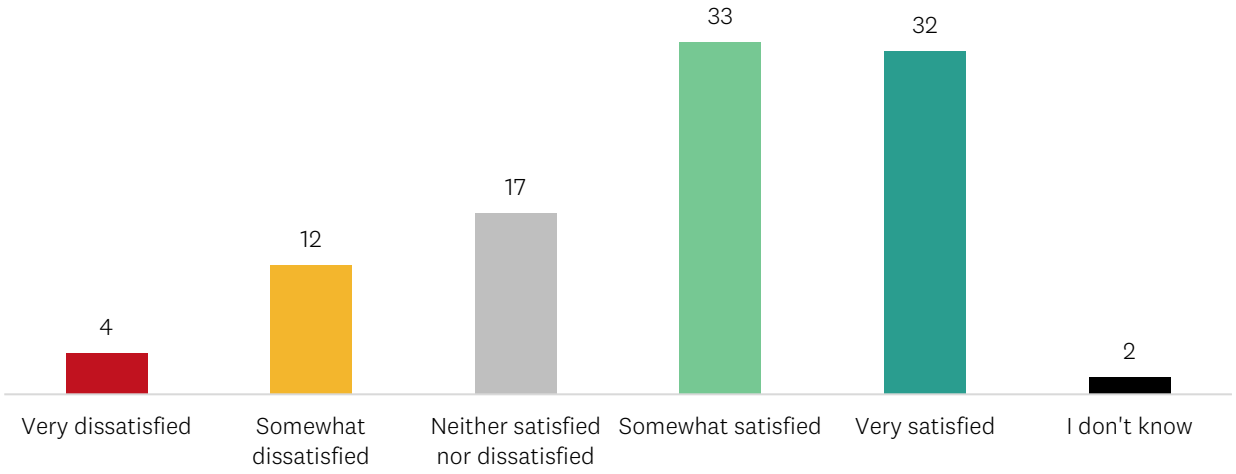
Figure 7: Apartment with blinds closed



Source: Google Maps

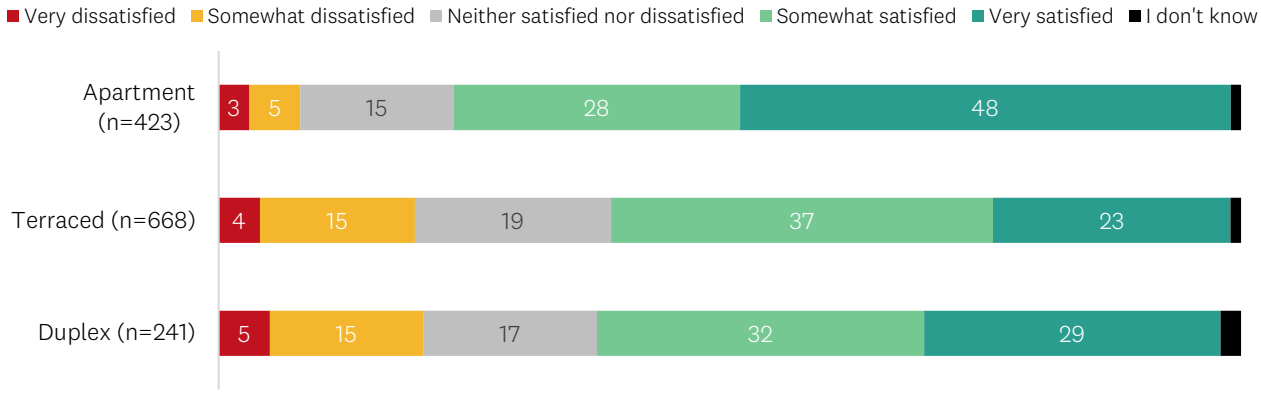
Participants were asked to rate their satisfaction with the amount of shade in and around their home. Two-thirds of participants reported being 'somewhat' or 'very' satisfied with the amount of shade.

Figure 8: Participant satisfaction with the amount of shade in and around the home (n=1332) (%)



The participants living in apartments were more likely to have reported being 'very satisfied' (48%) with the amount of shade in and around their home compared with those living in terraced houses (23%) or duplexes (29%). Conversely, those living in terraced houses (15%) or duplexes (15%) were more likely to have reported being 'somewhat dissatisfied' compared with those living in apartments (5%).

Figure 9: Participant satisfaction with the amount of shade in and around the home, by typology (%)



Some participants reported that they had made modifications to their outdoor living areas to improve the shade of this space. See Chapter 6: Outdoor living spaces for more information.

1.3 In-home immersions

As described in Chapter 3, Section 1.3, this study included 20 in-home immersions with participants who had completed a survey.

All participants were happy with the warmth and dryness of their homes in the winter, with one person commenting:

> *I love the double pane glass. It provides quiet. It provides warmth. We don't have to run a lot of heating in the winter … because it is a warm house.*

However, managing heat in summer was a challenge for households, particularly in the upper storeys of terraced houses and duplexes. When constructed, only three of the 14 terraced houses and duplexes in the in-home immersions had heat pump or air conditioning units on the ground floor, and none had units on the upper floors.

Participants attributed overheating to the size of windows, small window openings, and a lack of shade (e.g. lack of eaves). The bedroom in Figure 10 shows a window of a size with openings typical of the participating homes. The window takes up most of the exterior wall and two of the six panes open approximately 10cm wide. Figure 11 shows a large bedroom window with small openings. This participant had the curtains partially drawn in effort to increase privacy without preventing airflow.

Figure 10: Large bedroom window with two small window openings and a free standing fan

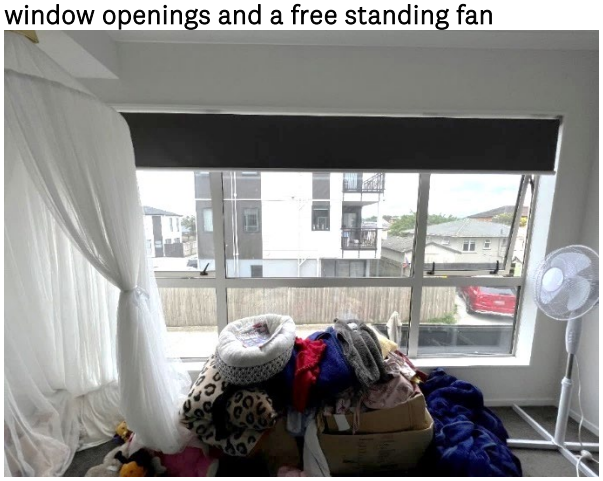


Figure 11: Curtains partially closed in upstairs bedroom

Some participants made modifications to their homes, and to how they lived in their home, in response to their homes being too hot in summer. This included keeping blinds closed during the day, and installing ceiling fans and additional air conditioning or heat pump units. Eight of the 14 households in terraced houses and duplexes had retrofitted a heat pump or air conditioning unit into the upper storey of their home, particularly in bedrooms, to cool the room so they could sleep comfortably at night. Other homes had free standing fans and portable air conditioning units in upper-storey rooms. Participants shared that the process of retrospectively installing a heat pump or air conditioning unit was expensive and difficult to do. One participant commented that it cost $7000 and it was not easy to get permission from the body corporate, as the air conditioning unit and ducting would be installed on the exterior of the building.

Figure 12: Heat pump unit installed in upstairs bedroom for cooling

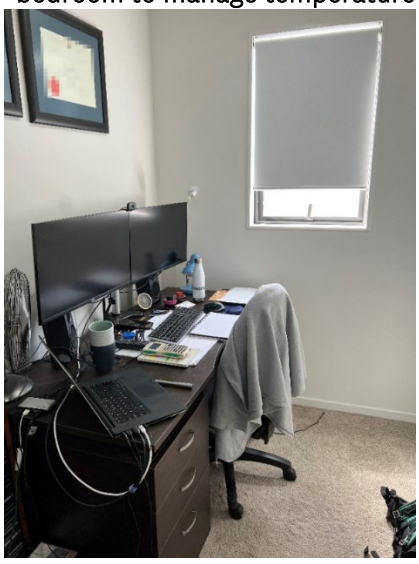
Figure 12: Closed blinds, ceiling fan and ducted air conditioning vents in spare bedroom

Figure 13: Closed blinds, ceiling fan and ducted air conditioning vents in spare bedroom

Figure 14: Heat pump unit installed in upstairs bedroom for cooling

Figure 15: Portable air conditioning unit in bedroom

Figure 17: Blind closed during the day in a spare bedroom to manage temperature



Retrofitting air conditioning units requires space for ducting, which for one household was placed inside a wardrobe, therefore reducing storage space (Figure 18).

Figure 16: Air conditioning duct in wardrobe

2 Ventilation and humidity

This section discusses ventilation and humidity in the home. Regulations and best practice guidelines are described first. Results from the survey and in-home immersions follow.

2.1 Regulations and best practice guidelines

Airflow or ventilation is the natural movement and change of fresh air in internal spaces created by using windows (or doors) that can be opened, to create a comfortable indoor environment. Cross-ventilation is the movement of air through an internal space (or spaces) between one external opening such as a window or door and another. Fresh air movement through a dwelling is important because it contributes to thermal comfort, increases passive cooling opportunities, and creates a comfortable and healthy indoor environment. Generally, as a dwelling gets deeper, effective airflow reduces.

Humidity is the concentration of water vapour in the air inside the dwelling and can affect both thermal comfort and indoor air quality. High humidity or damp air can encourage the growth of mould and bacteria, cause condensation on windows and walls, and result in odours in poorly ventilated spaces.

Auckland Unitary Plan

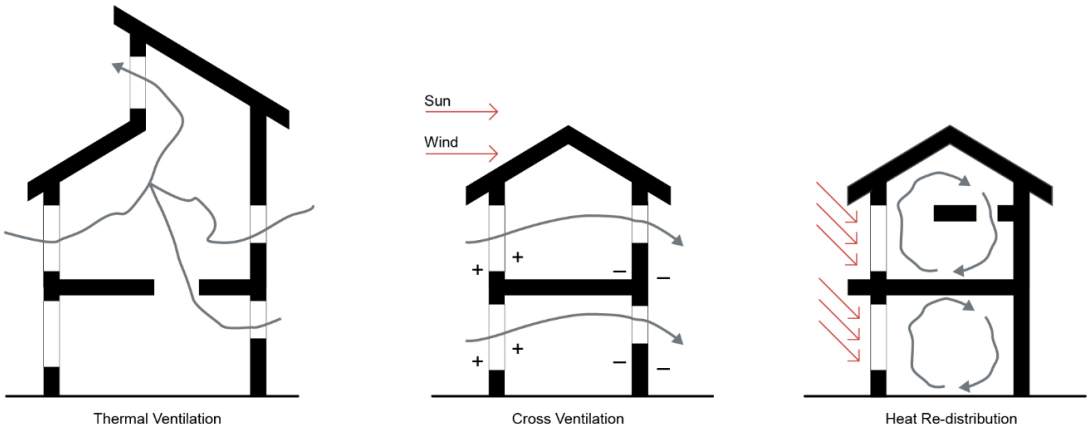
No specific standards relating to airflow/ventilation or humidity are contained in the AUP. However, a resource consent application for four or more medium density dwellings requires an assessment of the orientation and location of windows "to optimise privacy and encourage natural cross ventilation within the dwelling".[11]

Auckland Design Manual (ADM) and best practice guidance

The ADM recommends that sun, light and air movement through a dwelling is optimised, with windows on all external walls. Dual aspect homes will allow for the movement of air through the dwelling (cross ventilation) with windows and doors positioned to take advantage of cooling summer breezes, while avoiding prevailing winter winds.[12] It is more challenging in single aspect homes such as apartments (e.g. only one external wall) to provide opportunities for natural ventilation.

[11] E.g. Mixed Housing Urban Assessment Criterion H5.8.2(2)(e)(i).
[12] *Auckland Design Manual,* Terraced Housing Design, Section 7.5.2 Ventilating the house.

Figure 17: Ventilation and heat distribution through a dual aspect dwelling



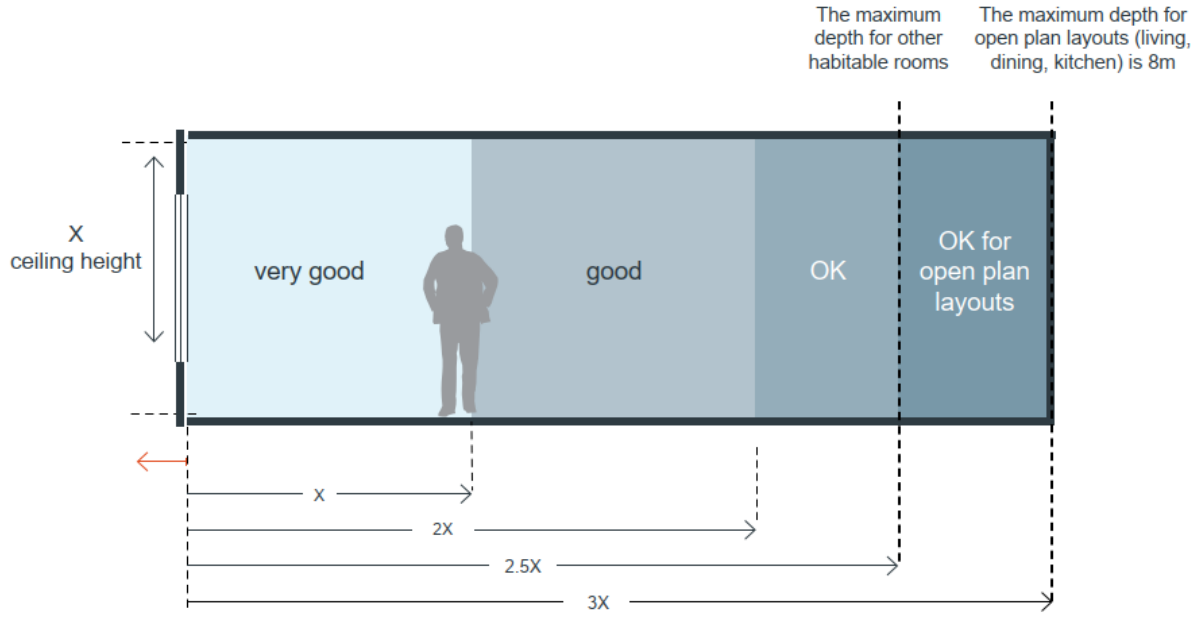
Source: *Auckland Design Manual*, Terraced Housing Design, Section 7.5.2 Ventilating the house.

The New South Wales Apartment Design Guide and Low Rise Housing Diversity Design Guide include similar recommendations, [13, 14] namely that:

- Buildings should include windows with an openable area equal to 5 per cent of the floor area to achieve sufficient ventilation.
- Buildings should maximise natural ventilation opportunities by the provision of adjustable windows with large effective openable areas, and a variety of window types such as awning windows and louvre windows to provide safety and flexibility.
- Ceiling fans should be installed to help create air movement.
- Ceiling heights of 2.7m are provided for habitable rooms to improve natural ventilation and daylight access.
- The depth of a single aspect apartment or terraced house relative to the ceiling height directly influences the quality of natural ventilation and daylight access. The maximum depth of open plan layouts that combine living, dining and kitchen spaces is 8m, as illustrated in Figure 20.

[13] New South Wales Department of Planning and Environment. (2015). *New South Wales Apartment Design Guide*, Objectives 4B.1-3 & 4C.1.
[14] New South Wales Department of Planning and Environment, (2020). *Low Rise Housing Diversity Design Guide for complying development*, Sections 31(3), (4), (5) & (9).

Figure 18: NSW guidance on dwelling depth relative to height



Source: New South Wales Department of Planning and Environment. (2015). *Apartment Design Guide*, Figure 4D.3.

The National Medium Density Design Guide recommends large opening windows on either side of the house for effective cross ventilation and passive cooling to reduce energy consumption and greenhouse gas emissions.[15] A minimum ceiling height of 2.7m is also recommended to improve cross ventilation.

Section 35 monitoring

No specific monitoring analysis was undertaken of airflow/ventilation and humidity.

Design observations

The following design matters have been observed by the council's Tāmaki Makaurau Design Ope (Urban Design Unit) in their technical review and monitoring of resource consent applications for MDH:

- Assessment of how effective the size and placement of windows and doors to encourage cross ventilation is not a major consideration at the resource consent stage.
- Single aspect terraced houses or apartments require more detailed consideration to ensure natural cross ventilation is provided for.

2.2 Survey results

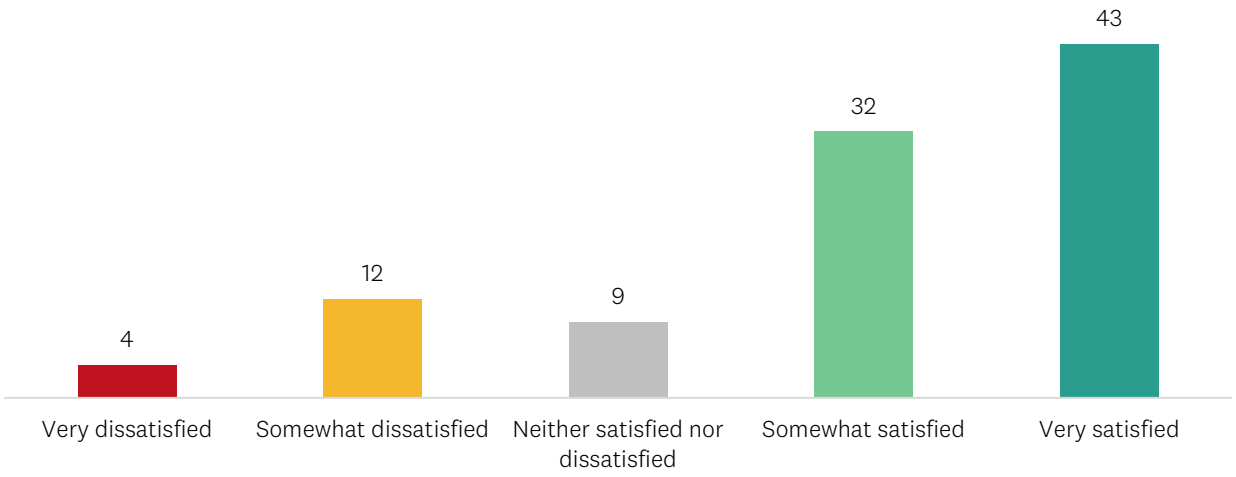
As mentioned in Section 1.2 above, the survey participants were asked to rate their level of satisfaction with five aspects related to the indoor environment in their home, including airflow through their home (e.g. through windows, doors, ventilation system) and humidity. Results for these aspects are discussed below.

[15] Ministry for the Environment, (2023). *National Medium Density Design Guide,* Section 6(c) and Rule of Thumb.

Airflow

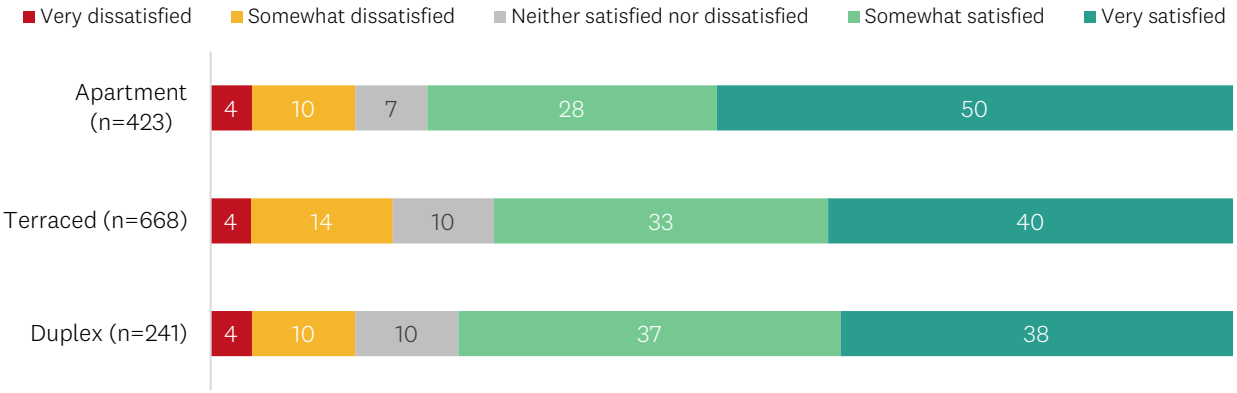
Overall, participants are satisfied with the airflow through their homes with 75 per cent reporting being 'somewhat' or 'very' satisfied.

Figure 19: Participants' rating of satisfaction with airflow through their home (n=1332) (%)



Small differences are seen in satisfaction with airflow across the three housing typologies. Those living in apartments were more likely to have reported being 'very satisfied' (50%) than those living in terraced houses (40%) or duplexes (38%).

Figure 20: Participant satisfaction with airflow through the home, by typology (%)

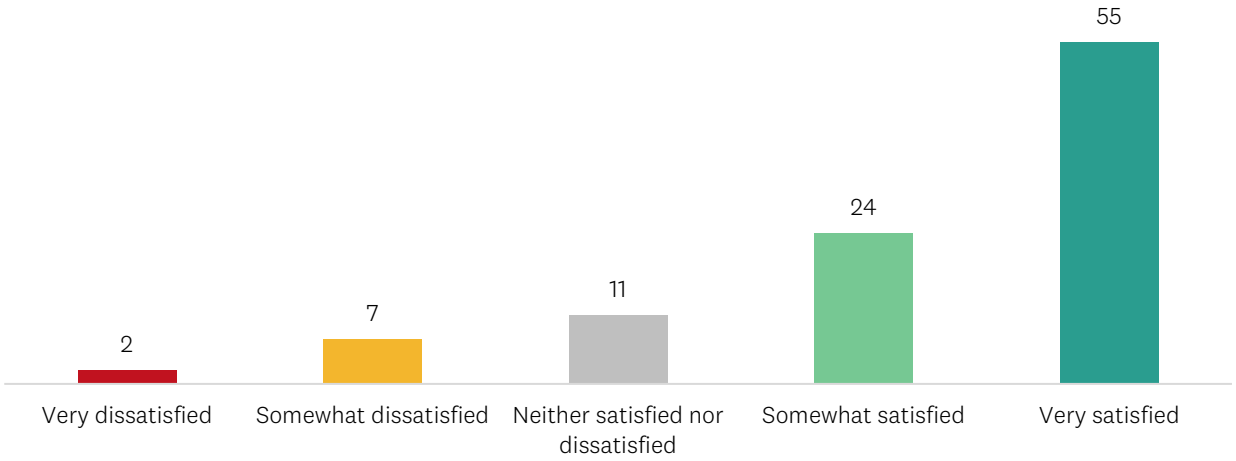


Airflow or ventilation issues were mentioned by a few participants when asked what they dislike about their home.

> *Difficulty getting through airflow for cooling in summer.*
>
> *Lack of air circulation. Can get stuffy.*
>
> *Lack of ventilation and natural airflow in the bedrooms.*

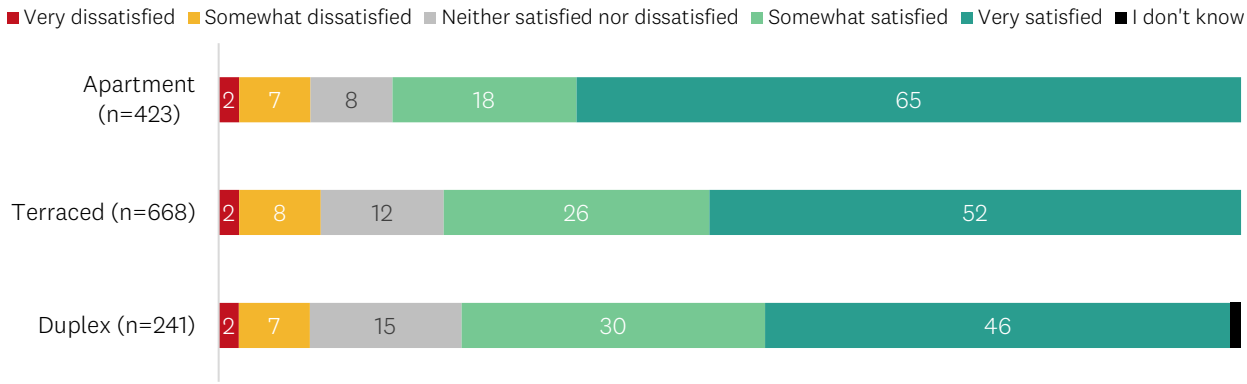
Participants reported high satisfaction with humidity inside their homes with 55 per cent of participants being 'very satisfied'.

Figure 21: Participant satisfaction with humidity inside the home (n=1332) (%)



Few differences in satisfaction with humidity are seen across the three housing typologies. Those living in apartments were more likely to have reported being 'very satisfied' (65%) than those living in terraced houses (52%) or duplexes (46%).

Figure 22: Participant satisfaction with humidity inside the home, by typology (%)



Liking that their home is dry or has good humidity was mentioned by 8 per cent of participants.

> *Temperature and humidity is good.*
>
> *It's dry, retains heat well.*
>
> *New, clean, warm, dry. No mould or drafts.*
>
> *It is a lot better than my previous house. House is not damp, insulation is very good.*

Thirteen participants reported making modifications to improve ventilation or manage humidity. This included installing ventilation systems, removing latches to open windows, and managing bathroom moisture.

> *Had an HRV put in for dampness.*
>
> *Shower domes on showers, removed safety latches on windows for more airflow.*

Added new better quality extractor fans to the 2 bathrooms as the previous ones weren't strong enough and I was concerned about moisture … and then will get 2 heat pumps installed (upstairs and downstairs to combat the heat of summer in west facing windows).

2.3 In-home immersions

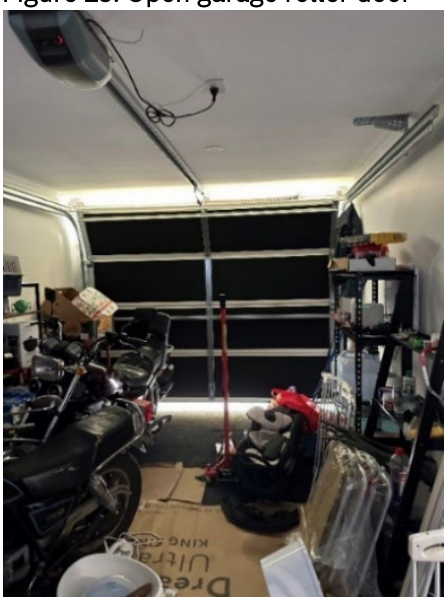
Achieving airflow through homes was challenging for many of the participants living in terraced houses and duplexes. Many attributed this to restrictions on how much windows could be opened,[16] and their need for windows to always remain open to support temperature regulation. In turn, this resulted in unintended consequences of odour, sound and rain entering the home (Figure 25).

Figure 23: Windows kept open for airflow can result in rain on windowsill

One household had created an intricate system to create airflow using open windows and keeping the garage roller door slightly open (Figure 26 and Figure 27).

Figure 24: Open window in laundry at back of garage

Figure 25: Open garage roller door



[16] New Zealand Building Code Acceptable Solution and Verification Methods F4/AS1.2.1.1 Safety from Falling requires a maximum window opening of 100mm where there is a possible height of fall from an open window which is more than 1000mm.

3 Visual privacy

This section discusses visual privacy within and around the home; i.e. households being able to use their homes and outdoor living spaces without being (or being perceived to be) overlooked or watched. Regulations and best practice guidelines are described first. Results from the survey and in-home immersions follow.

3.1 Regulations and best practice guidelines

Visual privacy is specific to the design and layout of each dwelling and site, and its relationship to surrounding properties and spaces. Privacy is also influenced by the type of activities undertaken in a space, how often they occur, and the privacy expectations of occupants.

Auckland Unitary Plan

The AUP requires the effects of development to be managed to provide adequate privacy both within a site and to adjacent neighbours. Standards to achieve this include:

- Alternative height in relation to boundary – "minimising overlooking and privacy effects to immediate neighbours"[17]
- Outlook – "ensuring a reasonable standard of visual privacy between habitable rooms of different buildings on the same or adjacent sites"[18]
- Front, side and rear fences and walls – "provide privacy for dwellings while enabling opportunities for passive surveillance of the street or adjoining public place".[19]

The need for privacy also needs to be balanced against the provision of passive surveillance or windows of active internal rooms overlooking the street and other public spaces. The AUP requires an assessment as to "the extent to which development achieves attractive and safe streets and public open space by providing doors, windows and/or balconies facing the street and public open spaces" as well as "windows being orientated and located to optimise privacy".[20, 21]

Auckland Design Manual (ADM) and best practice guidance

The ADM, New South Wales Apartment Design Guide and Low Rise Housing Diversity Design Guide all recommend a minimum back-to-back distance of 12m between dwellings,[22, 23, 24] with the NSW Apartment Design Guide also applying this setback to the edge of balconies.

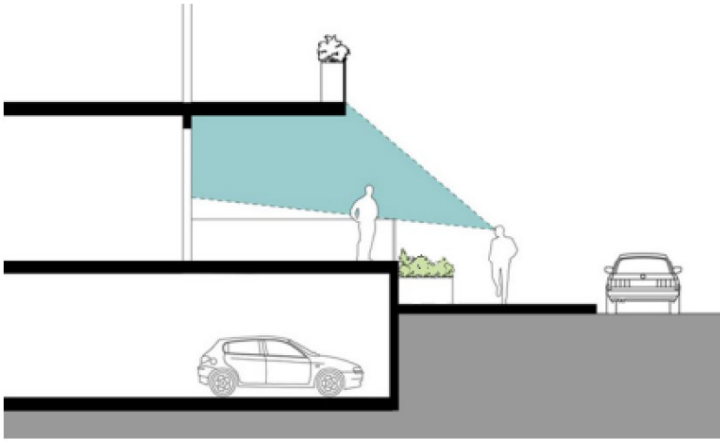
[17] E.g. Mixed Housing Urban Standard H5.6.6 Alternative height in relation to boundary, Purpose Statement.
[18] E.g. Mixed Housing Urban Standard H5.6.12 Outlook, Purpose Statement.
[19] E.g. Mixed Housing Urban Standard H5.6.15 Front, side and rear fences and walls, Purpose Statement.
[20] E.g. Mixed Housing Urban Assessment Criterion H5.8.2(2)(c)(i).
[21] E.g. Mixed Housing Urban Assessment Criterion H5.8.2(2)(e)(i).
[22] *Auckland Design Manual*, Terraced Housing Design, Section 3.4 Building separation and outlook.
[23] New South Wales Department of Planning and Environment. (2015*). Apartment Design Guid*e, Objective 3F-1.
[24] New South Wales Department of Planning and Environment. (2020). *Low Rise Housing Diversity Design Guide for complying development,* Section 30 Visual privacy.

The ADM further recommends that if terraced houses are separated by less than 15m, and more generally for apartment buildings, that the following additional design solutions are applied to achieve adequate levels of privacy:[25]

- offsetting windows on elevations that face each other
- staggering the building line or incorporating fins between dwellings
- recessed balconies and semi-solid or solid balustrades
- louvres or screen panels on windows and/or balconies
- fencing
- vegetation/planter boxes
- pergolas and other shading devices to limit overlooking into private open space.

The ADM recommends elevating the ground floor of a building by up to 0.6 metre to improve occupant privacy, particularly where the front yard is less than 3 metres. This elevation helps to raise the occupants above the eye level of passers-by, thus improving privacy.

Figure 26: Raising the ground floor of a dwelling above the street level can improve privacy



Source: *Auckland Design Manual,* Residential Design Element R5: Visual privacy.

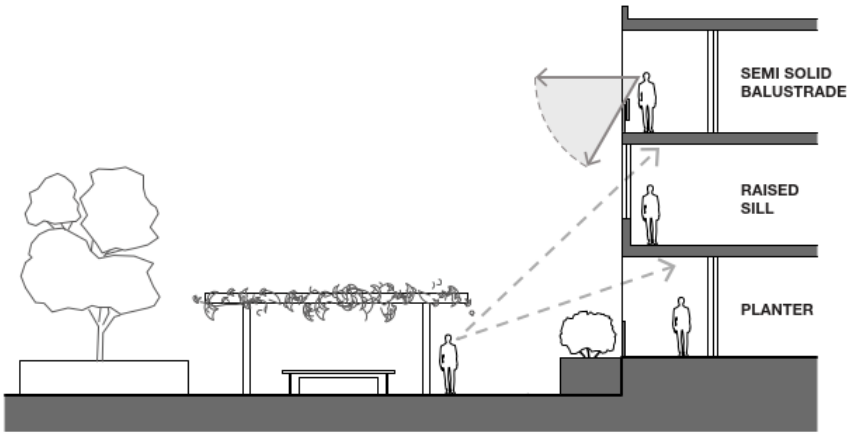
The National Medium Density Housing Guidelines and Public Housing Design Guidance recommend that the window locations are considered to ensure adequate privacy and outlook as well as design methods such as offset windows, use of screens and setbacks, and placing more sensitive room uses such as bedrooms on upper floors.[26] The Public Housing Design Guidance also discourages the use of glazed sliding doors for the main entrance to the dwelling for privacy reasons,[27] and that visual privacy is maintained between homes and any common circulation spaces.[28]

[25] *Auckland Design Manual*, Terraced Housing Design, Section 3.5 Respect the neighbours, and Apartment Building Design, Section 3.4 Designing for privacy.
[26] Ministry for the Environment. (2023). *National Medium Density Design Housing Guide*, Section 2(D).
[27] Ministry of Housing and Urban Development. (2023). *Public Housing Design Guidance for Community Housing Providers and Developers* (Version 2_1 web), Section 3.4.
[28] Ibid, Section 3.1.

The Victoria Apartment Design Guide requires building setbacks to improve privacy and avoids outlook towards the side of narrow sites.[29] Design techniques such as oblique windows, sill and balustrade heights to limit direct views downwards (Figure 29); pergola and shading devices to screen views to dwellings and private open spaces; operable external blinds or screens to habitable room windows to enable flexibility in outlook and privacy; and landscaping are all recommended to provide privacy.

It is noted that all the design guidance focuses on privacy between windows and balconies of facing buildings or a building and the street, but do not appear to address the privacy impacts of accessways (vehicle and/or pedestrian) adjacent to windows of dwellings, which is an increasingly common site layout in Tāmaki Makaurau / Auckland.

Figure 27: Design techniques to balance outlook and privacy



Source: State of Victoria Department of Environment, Land, Water and Planning. (2021). *Apartment Design Guidelines*, Section 3 Guide to windows.

Section 35 (s35) monitoring

The council's s35 monitoring found that:[30]

- Primary living areas with outlook spaces over driveways or carparking areas resulted in poorer quality outlook and privacy for residents.
- Half of the developments had 50-100 per cent of their dwellings facing adjoining sites, with potential privacy issues (visual and acoustic) arising from the configuration and location of outdoor living spaces, including balconies.
- Where dwellings are set back a short distance from the street, with their main living room outlook over the street, this could create privacy conflicts with residents drawing their blinds/curtains or erecting higher fences, which compromised the attractiveness and passive surveillance of the street.

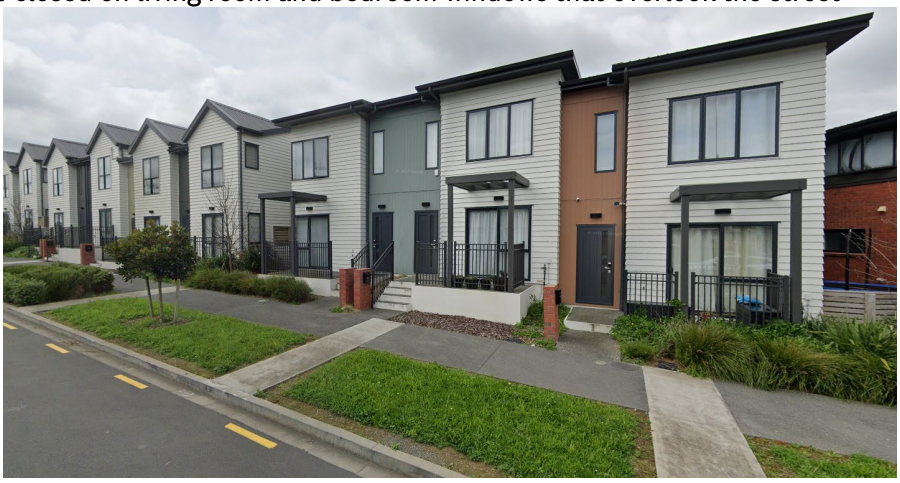
[29] State of Victoria Department of Environment, Land, Water and Planning. (2021). *Apartment Design Guidelines for Victoria,* Section 1 Siting and building arrangement.
[30] Auckland Council. (2022). *Auckland Unitary Plan Section 35 Monitoring*, B2.3 A quality built environment, pages (viii), (ix), 41 and 69-71.

Design observations

The following design matters have been observed by the council's Tāmaki Makaurau Design Ope (Urban Design Unit) in their technical review and monitoring of resource consent applications for MDH:

- A tension between passive surveillance and privacy where windows of internal living areas (lounge, dining and bedrooms, in particular) directly face and overlook a public (e.g. street or park) or semi-public space (e.g. shared driveway, pedestrian accessway or communal carpark). This tension can lead to windows being covered with blinds or similar, due to the proximity of people looking into the dwelling. This is exacerbated by the lack of a buffer such as the front yard setback required between a dwelling and the street, or between dwellings and shared vehicle or pedestrian accessways and parking.
- Large floor-to-ceiling glazing, particularly on upper-floor bedrooms, reduces privacy for occupants as well as reducing room flexibility for furniture placement.

Figure 28: Blinds closed on living room and bedroom windows that overlook the street



Source: Google Maps.

Figure 29: Floor-to-ceiling bedroom glazing with frosted glass on lower pane for privacy

Source: TMDO, Auckland Council.

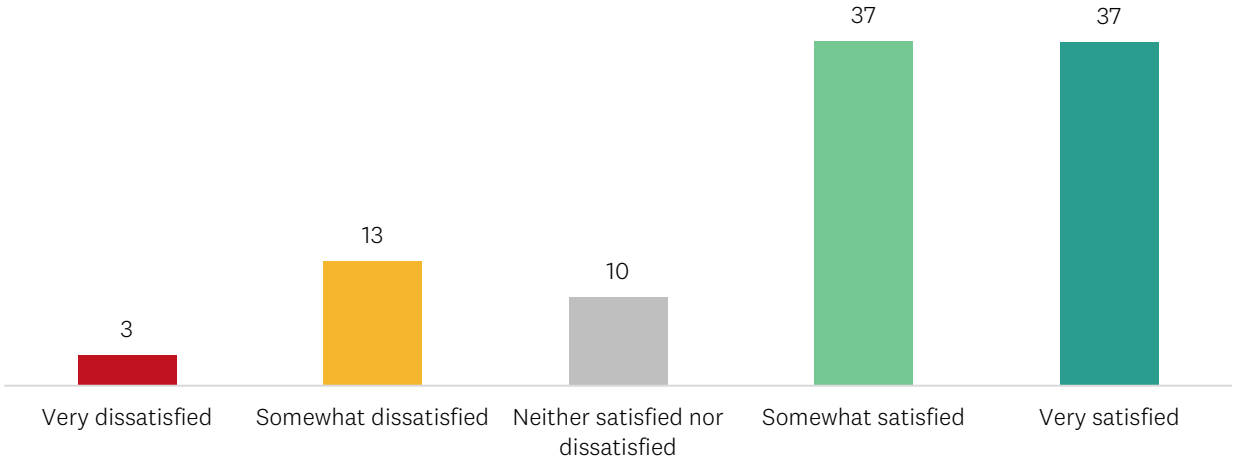
Figure 30: Outlook from internal living space over shared driveway and public street with blinds closed

Source: TMDO, Auckland Council.

3.2 Survey results

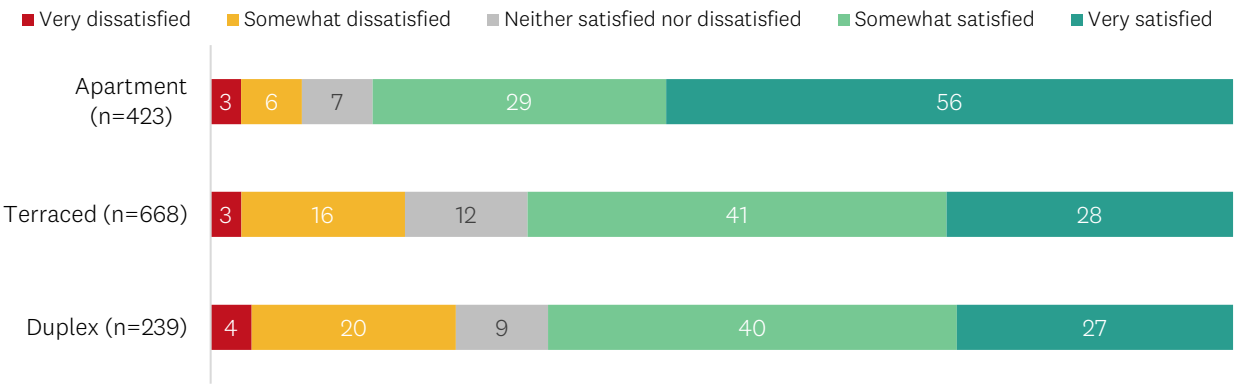
Participants were asked to rate their level of satisfaction with the privacy inside their home.[31] Overall, participants reported high satisfaction with privacy inside their homes with only 16 per cent reporting being 'somewhat' or 'very' dissatisfied.

Figure 31: Participants' rating of satisfaction with privacy inside the home (n=1330) (%)



Some differences in satisfaction with privacy are seen across the three housing typologies. The participants living in apartments were more likely to have reported being 'very satisfied' (56%) than those living in terraced houses (28%) and duplexes (27%). Conversely, those living in terraced houses (16%) or duplexes (20%) were more likely to have reported being 'somewhat dissatisfied' than those living in apartments (6%).

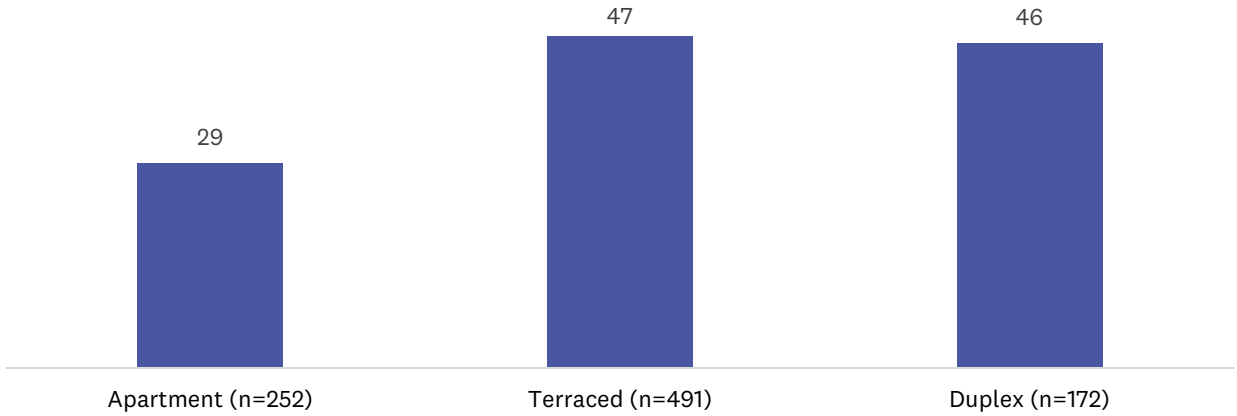
Figure 32: Participants' rating of satisfaction with privacy inside the home, by typology (%)



[31] Question 24 also asked participants to rate their levels of satisfaction with privacy in outdoor living areas (e.g. deck, patio or balcony). Results to that question are discussed in Chapter 6, Section 2.3.1.

Almost half (42%) of the households who reported having made at least one change to their home since they had moved in had made a change to improve privacy. As Figure 35 shows, households living in terraced houses (47%) or duplexes (46%) were more likely to have made changes to improve privacy than those living in apartments (29%).

Figure 33: Proportion of participants who had made changes to improve privacy (%)



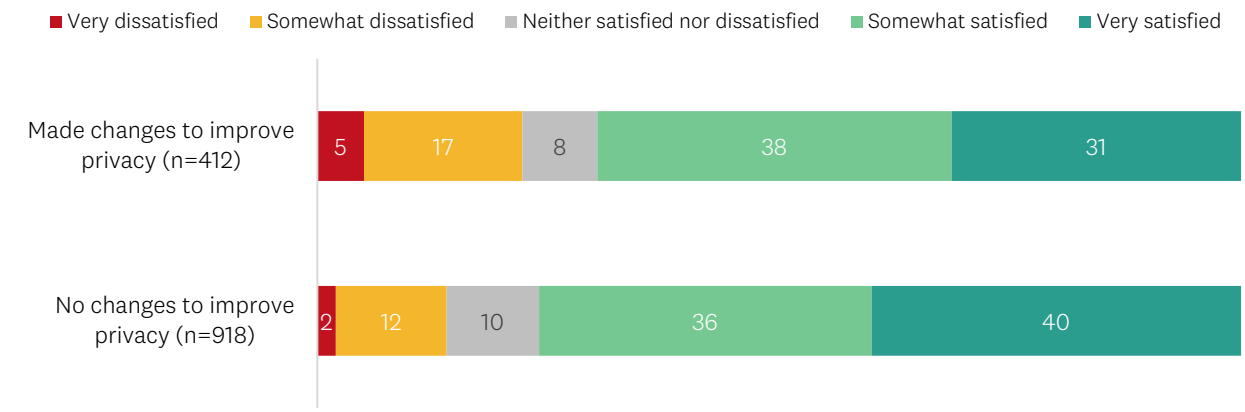
Note: Base is all the properties where participants had made at least one change to their home.

Changes made to improve privacy included:

> *Extended height of fence to have privacy from [name of organisation] tenants.*
>
> *Sheer curtains for privacy.*

Significantly more participants who had made changes to improve privacy reported being 'somewhat' (17%) or 'very' dissatisfied (5%) with the privacy inside their home compared with those who have not made changes. Those who had not made changes were more likely to have reported being 'very satisfied' (40%) with the privacy inside their home compared with those who had made changes (31%).

Figure 34: Participant satisfaction with privacy inside the home, by changes to improve privacy or not (%)



Nine per cent of participants noted a lack of privacy as being something dislike about their home.

> *Not much privacy due to floor-to-ceiling windows everywhere.*

> *Lack of privacy at the front of the house which is the living space. Anyone can look in if I don't have the blinds down.*

Five per cent of participants mentioned privacy as something they like about their homes.

> *Can't see inside of house from neighbours. Street is not busy, pretty quiet around complex.*
>
> *Privacy and how quiet the neighbourhood is.*

3.3 In-home immersions

Participants employ different techniques to improve visual privacy inside their homes. This includes adding window coverings such as blinds, curtains and sun filter film, and keeping blinds and curtains closed during the day.

Coverings on windows overlooking driveways, footpaths or streets are commonly kept closed to prevent others from looking in. By extension, this prevents the household from looking out and 'keeping an eye' on the public or communal space (i.e. prevented passive surveillance).

One household's home was at the end of a block of terraced houses, only accessible by a shared pedestrian path. They had the blind pulled down on their kitchen window which overlooks the shared pedestrian path. Their description demonstrates how members of a household can have different perspectives on privacy:

> *It's more my husband who doesn't like to be seen. So, I would normally lift it up especially when I am cooking … but my husband doesn't like the thought of it, you know, people can just see in … there are a lot of people walking down there especially during weekdays, because this is the handiest place for those delivery trucks.*

Figure 35: Kitchen with closed blind overlooking path

A participant whose glass front door was separated from the street by their car pad and outdoor living space had added frosting and a net curtain to the door and window (Figure 38). They also had a bookshelf positioned near the entranceway to further increase the sense of privacy. The front door and adjacent window were classified as their primary outlook to comply with the AUP outlook requirements (the distance between the rear window and fence was too short to comply; see floor plan below).

Figure 36: Glass front door with net curtain and frosting on window.

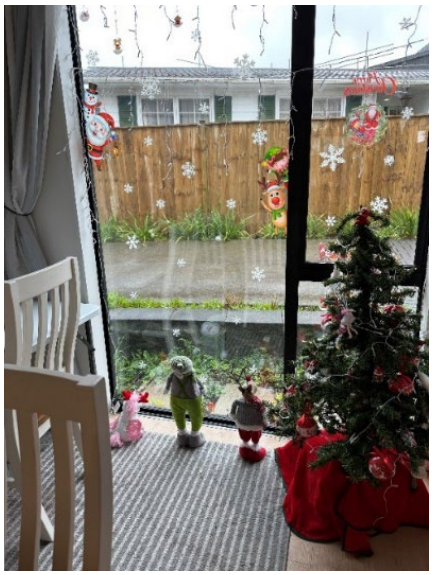
One household living in a terraced house had their kitchen in the middle of the ground floor, dining at the front and lounge at the rear. The floor-to-ceiling window in their dining room overlooked a shared driveway (Figure 39). The homes in their block had alternating floor plans, whereby the lounge and dining space swapped locations. They explained that they preferred their situation of the dining space overlooking the shared driveways:

> *We preferred this layout [dining at front] to that one [lounge at front] because our lounge room was here [at the back of the house] and not there by the front door. We didn't want to be sitting where everybody's walking past.*

This household ate their meals in the lounge and used their dining space for hobbies, as discussed in Chapter 4: Indoor spaces for living.

'Landscape buffers' are strips of planted areas between windows and spaces used by the public or neighbours. These are intended to increase the sense of privacy experienced by households so that blinds can stay open and households can look out to 'keep an eye' on the street/shared space (i.e. passive surveillance). The terraced houses in this block have some planting along the shared driveway including in front of the large windows. However, the low height and narrow width of this planting is insufficient to have an impact on participants' experience of privacy.

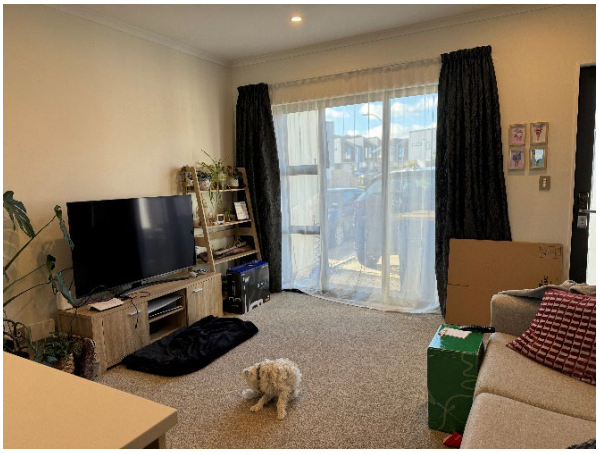
Figure 37: Dining space with overlook over the shared driveway with narrow landscape buffer

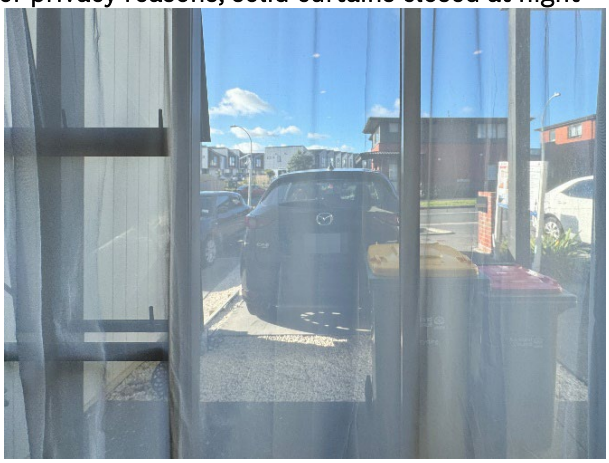


Another household in a terraced house had their lounge at the front of the home, which looked out over their car pad and the public street. They used sheer curtains during the day to create privacy and solid curtains at night (Figure 40). They commented that:

> *Yeah, the sheers are always there, we can see outside but the sheers make it quite hard to see inside. [The house] didn't come with anything [installed] ... when we were home ... people would walk past and see in, and we're like 'Okay, that's a bit weird', and then we just put some sheers in.*

Figure 38: Sheer curtains kept closed during the day for privacy reasons; solid curtains closed at night





Some households have issues with privacy in their bedrooms when these rooms are above ground level. This was an issue both for participants living in terraced homes and in apartments. While it may be practically difficult for strangers to look into these bedrooms, the possibility of being seen is uncomfortable for some participants. To mitigate this issue, participants keep their blinds closed (Figure 41 and Figure 42).

Figure 39: Closed bedroom blind on floor-to- ceiling window (first-floor terraced house)

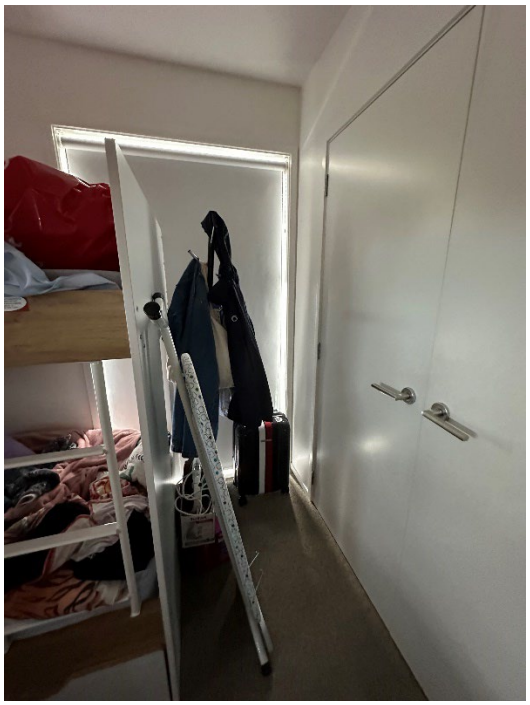


Figure 40: Blind closed in bedroom for privacy (third-floor apartment)

One participant who lives in a ground floor apartment has a floor-to-ceiling window in the guest bedroom, which overlooks the shared carpark. The parking space in front of the window belongs to a neighbour and their own carpark was adjacent, in front of their kitchen window (Figure 43). This participant keeps the blinds closed in the guest bedroom.

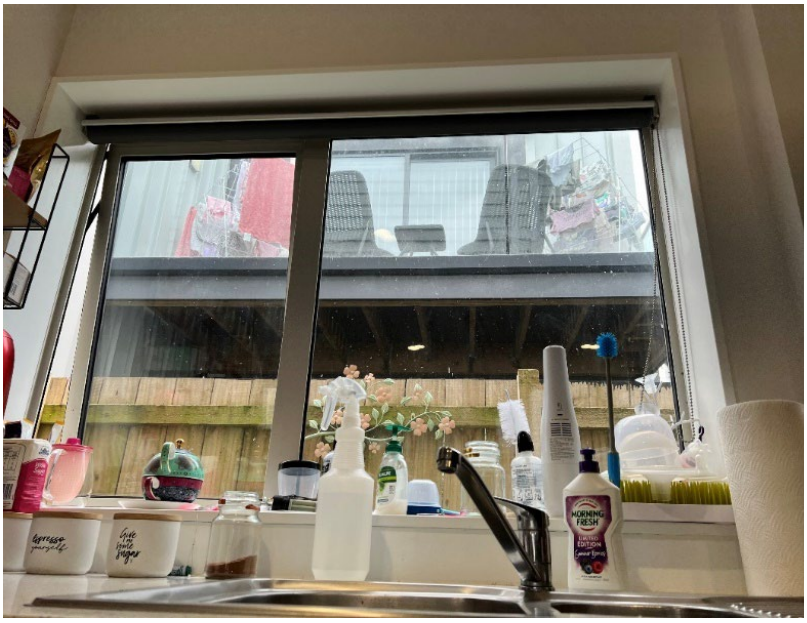
Figure 41: Blind closed in guest bedroom overlooking carpark allocated to another unit in complex

One household described issues with the proximity of their kitchen to their neighbours' balcony, which was their neighbours' outdoor living space. The balcony is set back 1.3m from the common boundary. They explained that they always have the blind down to provide privacy:

> *When they're [neighbours] in their outdoor space [balcony], because it's also raised up a bit, they can see directly into our kitchen … so we are never in here without the blind down. I don't remember the last time I've opened it actually. It definitely makes things lighter in here which is lovely and while I wish I could have it open more; it is just purely from a 'not feeling like you're living in a fish bowl' perspective.*

Figure 42: Blind closed to create privacy from neighbouring outdoor living space

Figure 43: Blind open showing neighbour's balcony and outdoor living space looking directly into kitchen



4 Sound and sound proofing

This section discusses sound and sound proofing in the home with regard to aural (sound) privacy. Regulations and best practice guidelines are described first. Results from the survey and in-home immersions follow.

4.1 Regulations and best practice guidelines

Sound transmission between neighbouring dwellings and outdoor living spaces can occur due to the arrangement of internal and external uses. Acoustic privacy requires the reduction of noise transmission between external and internal spaces and requires consideration of site context, surrounding uses, building separation and the internal arrangement of buildings. Reducing internal and external noise impacts is important for occupant wellbeing and amenity.

Auckland Unitary Plan

There are no standards or assessment criteria in the AUP for the design of residential dwellings in relation to sound or sound proofing for MDH. Noise impacts are typically only considered where a non-residential activity seeks to establish in a residential zone, or residential dwellings are located within an Aircraft Noise Overlay.

However, the AUP does more broadly require residential dwellings to be designed to meet the day-to-day needs of residents, by providing privacy;[32] this could be interpreted to include both visual and aural privacy. The fence and wall standard also seeks to provide privacy for dwellings,[33] and could be interpreted to include aural privacy.

Auckland Design Manual (ADM) and best practice guidance

There is no specific guidance in the ADM regarding the design of MDH to mitigate noise.

The National Medium Density Design Guide recommends that for more peaceful living, the internal layout of a dwelling should have good acoustic separation from external and internal noise sources.[34] This can be achieved by placing similar household activities either side of a common wall between houses, matching noisy areas and quiet areas side-by-side. Bathrooms, storage areas and wardrobes can be used as noise buffers within houses.

The New South Wales Low Density Housing Diversity Design Guide,[35] Apartment Design Guide,[36] and Victoria Apartment Design Guide all have similar recommendations and also that adequate building separation is provided for. They further recommend that where dwellings are joined by party walls, that acoustic insulation is achieved with double or acoustic glazing, acoustic seals, using materials

[32] E.g. Mixed Housing Urban Policy H5.3(5)(a).
[33] E.g. Standard H5.6.15 Front, side and rear fences and walls – Purpose Statement.
[34] Ministry for the Environment, (2023). *National Medium Density Design Guid*e, Section 6(H).
[35] New South Wales Department of Planning and Environment. (2020). *Low Rise Housing Diversity Design Guide for complying development*, Section 3P Acoustic privacy.
[36] State of Victoria Department of Environment, Land, Water and Planning. (2021). *Apartment Design Guidelines for Victoria*. Part 4H Acoustic privacy.

with low noise penetration properties, and providing continuous walls to ground level outdoor living spaces.

Some guidelines also include recommendations for acoustic treatment where a building is near major roads or railway lines and beneath flight paths.[37] This includes louvres on balconies to allow natural ventilation but also some noise attenuation. More fully enclosed 'wintergardens' are another design option to reduce road and rail noise.

Section 35 monitoring

There was no specific monitoring of sound within dwellings as part of this analysis. However, there was an observation that acoustic privacy of multiple adjoining outdoor living spaces was harder to mitigate than visual privacy, particularly with balconies at upper levels.[38]

Design observations

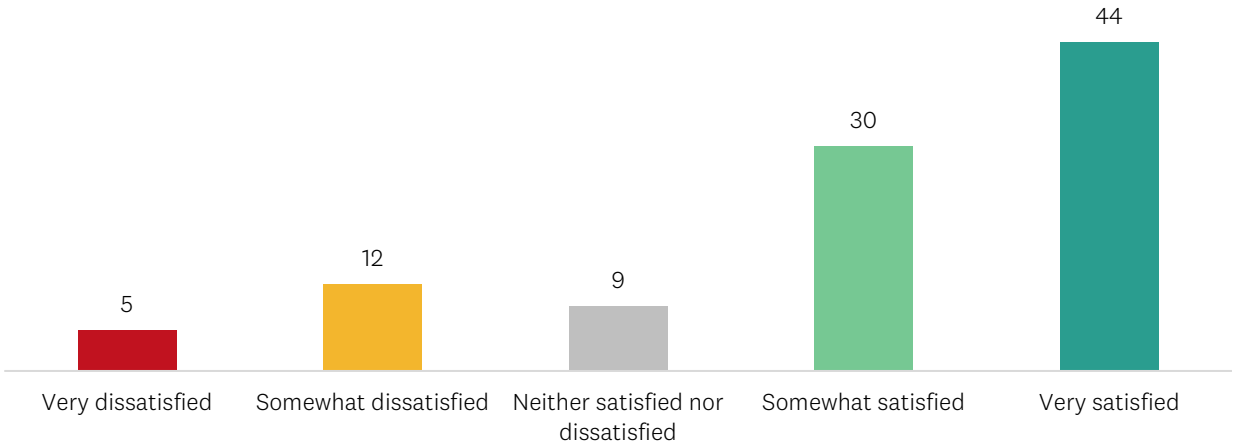
The following design matters have been observed by the Tāmaki Makaurau Design Ope (Urban Design Unit) in their technical review and monitoring of MDH applications:

- Potential acoustic privacy issues exist between adjacent outdoor living spaces, particularly where outdoor spaces are side by side and back to back.
- Noise on arterial roads may also have an impact on acoustic privacy within outdoor living spaces.

4.2 Survey results

The survey participants reported relatively high satisfaction with sound proofing on walls shared with neighbours.[39] Three-quarters (74%) of participants are 'somewhat' or 'very' satisfied with sound proofing and only 15 per cent were 'somewhat' or 'very' dissatisfied.

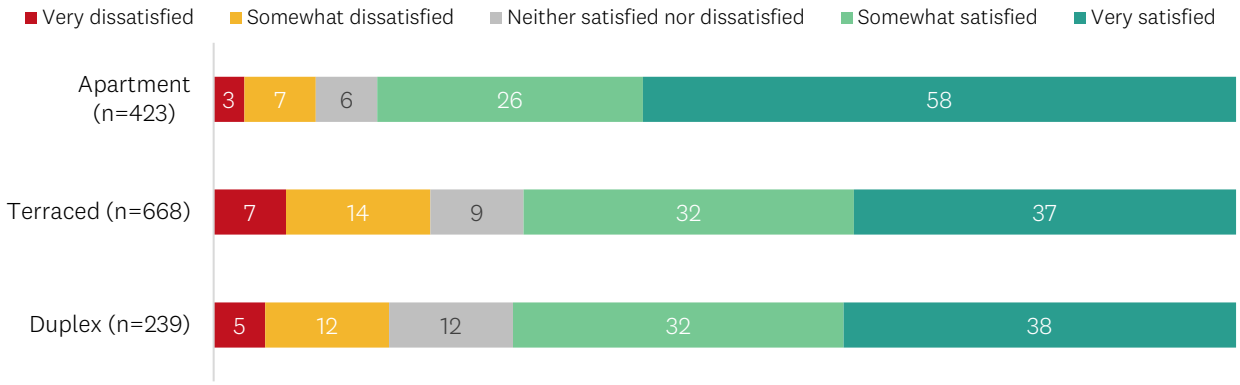
Figure 44: Participants' satisfaction with sound proofing on walls shared with neighbours (n=1330) (%)



[37] State of Victoria Department of Environment, Land, Water and Planning. (2021). *Apartment Design Guidelines for Victoria*, Section 4J Noise and pollution.
[38] Auckland Council. (2022). *Auckland Unitary Plan Section 35 Monitoring*, B2.3 A quality built environment, page 79.
[39] Question 24 also asked participants to rate their satisfaction with sound in outdoor living areas. Results are presented in Chapter 6, Section 2.3.1.

Satisfaction with sound proofing on walls shared with neighbours was higher among those living in apartments (58% 'very satisfied'), compared with those in terraced houses (37% 'very satisfied') or duplexes (38% 'very satisfied').

Figure 45: Participant satisfaction with sound proofing on walls shared with neighbours, by typology (%)



When describing what they like about their home, 8 per cent of participants mentioned that their home was quiet or had sound proofing:

> *Concrete slab internal wall to neighbours so no noise. Secure private patios and fenced garden.*
>
> *Everyone is caring and friendly. Even when we are inside, we cannot hear our neighbours, etc.*

When describing what they dislike about their home, 10 per cent of participants mentioned noise generated by neighbours or lack of sound proofing:

> *House is close to neighbour and can sometimes hear them talking.*
>
> *The noisy neighbour; we can hear our neighbour's child banging the walls.*
>
> *When you are outside, everyone can hear you.*
>
> *Noise/not enough soundproof wall between the next to house: not perfect enough for soundproof wall. Sometimes [in] the rooms next to neighbours' rooms, you can hear through the door their banging door sound or sliding door sound between the one of our bedrooms and their bedroom. No soundproof wall between our laundry area and their lounge area as you can hear and feel the home theatre speaker's vibration. You can hear [the] connected house's noise – that means they can hear our sound as well. So have to be careful in a sense of having the idea that this is not a standalone house, and it is terraced houses, so I have to be more quiet and have to be more careful. But if you close all windows fully, they maybe cannot hear us though as I feel very quiet.*

4.3 In-home immersions

Most of the households in the in-home immersions were happy with the level of sound proofing of intertenancy walls within their homes. Some commented that traffic noise and loud music did travel between homes.

One household in a terraced house commented in relation to intertenancy wall noise that:

> *We haven't heard a single noise from the neighbours, and they said the same thing. Like after a year of living here, they're like, 'No we haven't heard you once.'*

However, the same household found sound travelling between open windows was an issue, which also affected temperature control:

> *We actually got ducted air conditioning installed upstairs and a big factor for that was the fact that our neighbours had their windows open at all times during the night and we'd hear everything. The next summer we got fans, which was helpful-ish, and then the next summer we got air conditioning and now our windows just stay closed.*

Many households commented on noise travelling between outdoor spaces more easily, and that conversations and activities within outdoor spaces where somewhat restricted by this, if the household wanted to be considerate of their neighbours.

5 Perceptions of safety and sense of community

This section discusses perceptions of safety and sense of community in and around the home. Regulations and best practice guidelines are described first. Results from the survey and consented plan analysis follow. The in-home immersions did not explore perceptions of safety and community with participants; therefore, this section does not include any reference to the immersions.

5.1 Regulations and best practice guidelines

MDH often includes communal elements such as shared driveways or pedestrian accessways, apartment entrances, communal open space, refuse and recycling storage, and parking areas. These areas create opportunities for informal interaction between residents, creating a sense of community. Buildings that adjoin these areas can provide passive surveillance or 'eyes' which overlook to increase safety for residents and visitors. Passive surveillance is where windows of active rooms such as the kitchen, dining and living rooms overlook communal spaces, and provide informal opportunities for surveillance. This is most successful when provided from ground floor rooms, and bedrooms are generally to be avoided due to their increased privacy needs.

Auckland Unitary Plan

The AUP encourages medium density dwellings to overlook public spaces and provide opportunities for passive surveillance.[40] This includes "the extent to which development achieves attractive and safe streets and public open space by providing doors, windows and/or balconies facing the street and public open spaces".[41]

Auckland Design Manual (ADM) and Best Practice Design Guidance

The ADM recognises the contribution that MDH can have to the feeling of safety and security when visual connections and passive surveillance is provided over the street and adjacent public spaces.[42] It recommends locating living areas to overlook public or communal spaces, as well as casual views of common areas such as communal open space, lobbies and hallways in apartments, pathways and parking areas.

The National Medium Density Design Guide recognises the importance of views out of a dwelling which provide outlook and eyes over communal areas and the street. It recommends that generous windows are provided facing the street and communal spaces from regularly used rooms such as kitchens or living rooms at ground level, with rooms requiring more privacy, such as bedrooms, to be located on upper levels.[43]

[40] E.g. Mixed Housing Urban Policy H5.3(3)(a).
[41] E.g. Mixed Housing Urban Assessment Criterion H5.8.2(2)(c)(i).
[42] *Auckland Design Manual*, Terraced Housing Design, Section 4.4. Apartment building design.
[43] Ministry for the Environment, (2023). *National Medium Density Design Guide*, Section 2D.

The Kāinga Ora *Ngā Paerewa Hoahoa Whare Design Requirements* require that site design facilitates passive surveillance, clear and intuitive layout and connections, and a sense of ownership by demonstrating adherence to Crime Prevention Through Environmental Design (CPTED) principles.[44]

All of the Australian design guides require habitable rooms facing the street and or internal circulation routes (shared driveways and pedestrian accessways), and where outdoor living space faces the street, that fence and balustrade design still allows for views and passive surveillance.

Section 35 (s35) monitoring

The s35 monitoring observed that "dwellings with smaller distances from the street often resulted in drawn blinds or higher fences which can compromise the attractiveness of the street frontage and passive surveillance benefits".[45]

Design observations

The following design matters have been observed by the council's Tāmaki Makaurau Design Ope (Urban Design Unit) in their technical review and monitoring of resource consent applications for MDH:

- The spatial arrangement of dwellings on a site are informed by a number of AUP standards including the front yard, outdoor living space and outlook from internal living areas. The co-location of outdoor living space, outlook and front yards can create site layout efficiencies (essentially 'borrowing' land from the public street for outlook) with outdoor space and outlook oriented towards a public street. Outlook over a driveway is also common due to the reverse manoeuvring requirements of carparking aligning with the 6m outlook standard. This reduced proximity to the street or driveway can create poor privacy outcomes, with additional screening (fencing or blinds being drawn), thereby reducing any passive surveillance benefits.
- Kitchens are encouraged to overlook the street or shared accessway as it typically presents less privacy conflicts than dining or lounges.
- No buffer space between dwellings and shared accessways and carparking areas can lead to privacy conflicts, with blinds/curtains being closed.

[44] Kāinga Ora Homes and Communities. (2024). *Ngā Paerewa Hoahoa Whare Design Requirement* (Version 1.1), Section A1.3.1.
[45] Auckland Council. (2022). *Auckland Unitary Plan Section 35 Monitoring*, B2.3 A quality built environment, page 69.

Figure 46: Kitchen windows and glazed front doors overlooking a shared pedestrian accessway,and landscape buffer

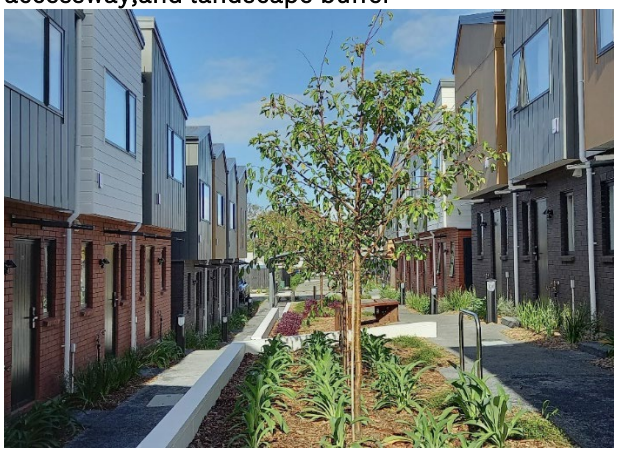


Figure 47: Communal open space overlooked by front doors and windows of dwellings

Source: Both images TMDO, Auckland Council.

Figure 48: Front doors and kitchen windows overlooking a shared pedestrian accessway

Figure 49: Lack of buffer space between a shared pedestrian accessway and dwelling resulting in additional trellis screening being placed over windows

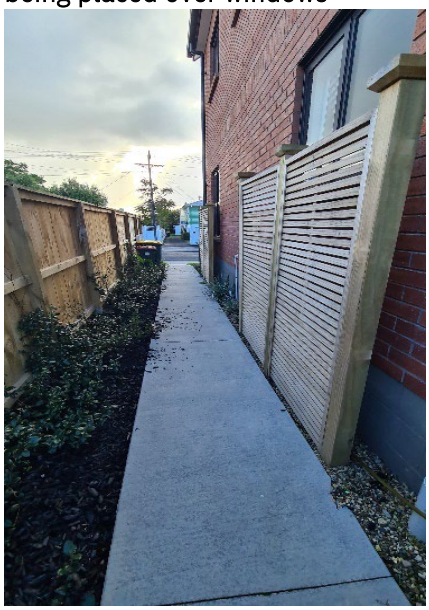


Figure 50: Landscaped buffer providing privacy to windows overlooking a shared pedestrian accessway

Source: All images TMDO, Auckland Council.

5.2 Survey results

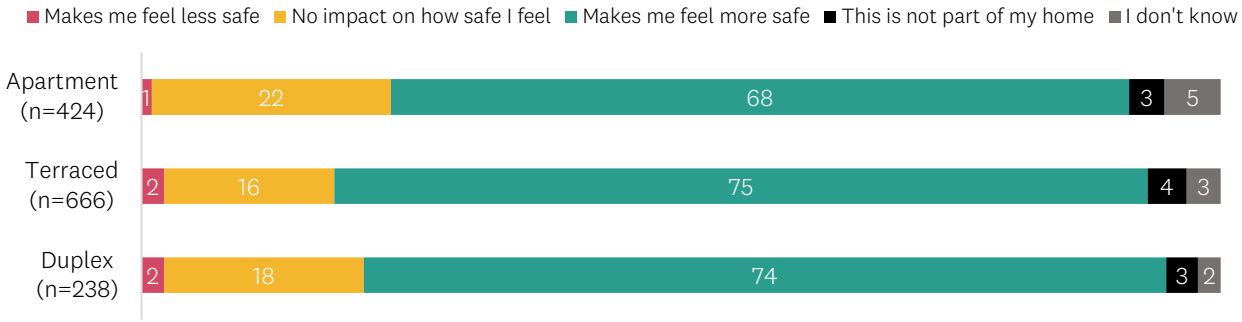
The survey participants were asked to indicate the extent to which a range of features of their home, building or complex made them feel more – or less – safe, including having a sense of community with their neighbours within their building, complex or row of houses, being able to see people at their front door (e.g. through a peephole or window at the front of their home), and windows overlooking footpaths, driveways or common areas.

Sense of community

Overall, close to three-quarters (73%) of participants reported that a sense of community with their neighbours made them 'feel more safe', while 18 per cent reported this has 'no impact' on how safe they feel.[46]

The participants living in apartments (22%) were slightly more likely to have reported that this has 'no impact' on how safe they feel than those living in terraced houses (16%) (Figure 53).

Figure 51: Participant rating of the impact of having a sense of community within the building/complex/row of houses on perceptions of safety, by typology (%)



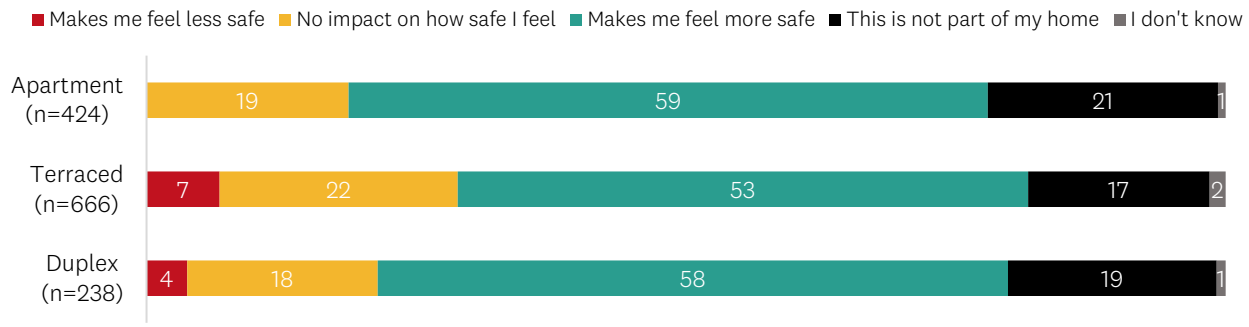
Front doors

Participants were also asked about the impact of being able to see people at their front door through a peephole or window at front of their home. Half the participants (56%) reported that this makes them feel 'more safe', 20 per cent reported this had 'no impact on how safe I feel', and a similar proportion (19%) said it was not a feature of their home.

As Figure 54 below shows, small proportions of those living in a terraced house and in a duplex reported that being able to see people at their front door makes them 'feel less safe' (7% and 4%, respectively).

[46] Question 41 asked: 'Which of the following features of your home, building or complex make you feel more or less safe?' The feature reported here is: 'having a sense of community within your complex/building/row of terraced houses/with your neighbours'.

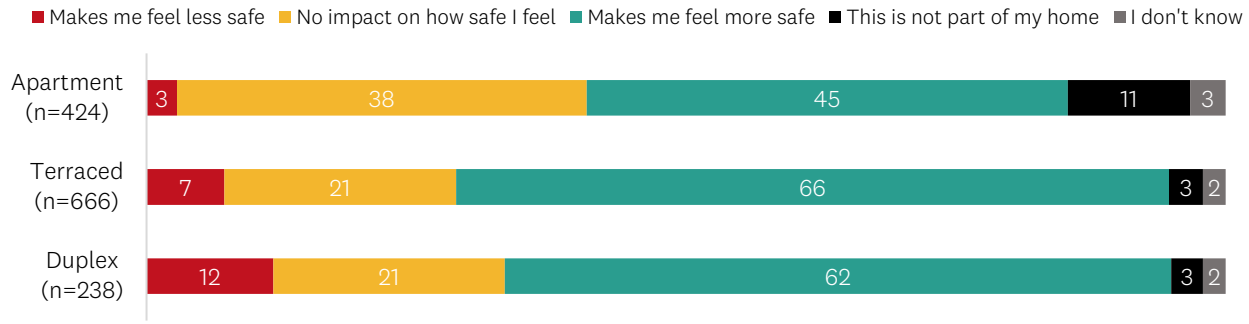
Figure 52: Participant rating of the impact of being able to see people at your front door on perceptions of safety (%)



Windows overlooking footpaths and driveways

Over half (58%) of participants reported that the presence of windows overlooking footpaths, driveways or common areas makes them 'feel more safe', while 27 per cent reported this has 'no impact' on how safe they feel. As with being able to see people at the front door, the participants living in terraced houses (7%) and duplexes (12%) were more likely to have reported that the presence of windows overlooking footpaths makes them feel 'less safe' than those living in apartments (3%).

Figure 53: Participant rating of the impact of windows overlooking footpaths, driveways or common areas on perception of safety (%)



5.3 Consented plans

As described in Chapter 3, this study included analysis of the consented floor plans for 110 properties whose households had participated in the survey.

The existence of windows in living spaces overlooking footpaths, driveways or common areas is used as an indicator of passive surveillance or 'eyes' overlooking the spaces, which in turn is anticipated to contribute to users of those spaces feeling safer. Eight in ten (82%) properties were found to have windows in living spaces overlooking footpaths, driveways, or common areas, and 18 per cent did not.

6 Summary

Environmental factors discussed in this chapter are found to be interrelated. The connections between temperature, ventilation and privacy formed a strong theme in the in-home immersions, and reinforces the results from the survey. The issues with these factors are most prevalent in terraced houses and duplexes because of having second and third storeys that are warm in summer and found to be difficult to cool. The temperature of terraced houses in the middle of a row of terraced houses is more challenging to regulate passively as these dwellings typically have only two sides with openable windows, compared with four or more sides of a standalone house.

Temperature

Twenty-eight per cent of the participants living in terraced homes and 24 per cent of those in duplexes report being 'somewhat' or 'very' dissatisfied with the temperature inside their home in summer, compared with 16 per cent of those living in apartments. Dissatisfaction with temperature in winter is lower, with 6 per cent of those living in apartments, 10 per cent in terraced houses and 12 per cent in duplexes being 'somewhat' or 'very' dissatisfied with temperature in winter.

Seven per cent of participants described the amount of sunlight their home gets as something they like about their home. The orientation and size of windows is likely to contribute to these participants enjoying sunlight in their home. The solar orientation and size of windows can also contribute to homes becoming too warm. This was commented on by one participant in the survey and several households who participated in the in-home immersions. Some immersion households were found to have blinds or curtains partially or entirely closed during the day in efforts to block sunlight as a means of temperature control.

Ventilation, or the processes of getting cool air moving through the home, is an important component of temperature regulation as well as an aspect of the home environment. In addition to supporting temperature regulation, ventilation affects humidity/dryness, can bring odour from outside into the home, and enables the sensation of a breeze/'fresh air' or reduces the feeling of being 'stuffy'. Participants report greater satisfaction with airflow through their home compared with temperature (75% 'somewhat' or 'very' satisfied with airflow compared with 65% 'somewhat' or 'very' satisfied with temperature in summer) and few differences were seen in satisfaction across the three housing typologies (14% of those living in apartments and duplexes and 18 per cent of those in terraced houses are 'somewhat' or 'very' dissatisfied with airflow). Airflow is a contributing factor to temperature and impacts other aspects of a home (e.g. humidity, feeling 'stuffy'); this is interpreted to explain the higher degree of satisfaction with airflow.

The in-home immersion participants described how they generated airflow through their homes by opening windows and doors (including garage doors, internal doors and ranch sliders). Some participants dislike the way their windows open because the opening provides insufficient airflow. The most common type of window in the homes of the immersion participants is awning windows with security latches that control how wide the windows can be opened (a requirement of the

Building Code). At least one participant described removing the security latches to increase the opening width and increase airflow.

Modifications to improve temperature were the most commonly reported change that participants had made to their home. Close to half the participants living in terraced houses (42%) and duplexes (46%) had made changes to improve temperature, suggesting issues with temperature are more prevalent in these housing typologies, probably due to their having two to three levels. In comparison, just 17 per cent of those living in apartment, which tend to be a single level, had made changes to improve temperature. Even so, dissatisfaction with temperature in summer remains for those who had made changes in an effort to improve temperature, with 29 per cent of those who had made modifications to improve the temperature of their home reporting that they were 'somewhat' or 'very' dissatisfied with temperature inside their home in summer.

Modifications reported in the survey included installation of heat pumps or air conditioning units (often in second or third floor levels) and changes to window coverings (including blinds/curtains or window tinting). The in-home immersions also found that some participants had made these kinds of modifications, and uncovered challenges such as a high financial cost, receiving permission from body corporates for the external piping/condenser unit, ducting infringing on storage capacity of wardrobes, and placement of external units in outdoor living spaces. (See also Chapter 6, Section 2.4 on site facilities in outdoor living spaces.)

Reliance on heat pumps and air conditioning units as 'active' mechanisms to cool homes in summer is of concern from the perspective of climate resilience. This suggests that homes are not being designed in ways that enables passive temperature management in summer. It is observed that Australian design guidance is more sophisticated in its management of temperature (particularly cooling) within the home. As our climate changes, Auckland may experience hotter temperatures, which could make the uncomfortable temperatures currently experienced in summer worse and may contribute to detrimental heat-related health outcomes.

Active mechanisms to cool homes have a high power cost (both financial cost to the household and in terms of demand on the power grid) and push warm air into the neighbourhood. Further investigation into how this situation may contribute to urban heat island effects and design solutions, including consideration of green space, are intended. Design solutions could include building and window orientation, window sizes and openings, sun shading and solar control devices, as well as inclusion of planting and green space.

Visual privacy

Satisfaction with privacy inside the home is high with 74 per cent of the survey participants being 'somewhat' or 'very' satisfied. Those living in apartments are more likely to be 'very satisfied' (56%) compared with those in terraced houses (28%) or duplexes (27%). Despite this, notable proportions of the survey participants reported making modifications to their homes to improve privacy (37% of those living in terraced houses, 34% in duplexes and 19% in apartments). Modifications include adding window coverings and increasing the height of fences in outdoor living areas.

Some of the in-home immersion participants described feeling at risk of being seen in their private home space because of windows overlooking shared spaces (e.g. shared driveways, public streets) or

neighbours' outdoor living spaces. This finding was supported by a small, but notable, proportion of the survey participants who reported that having windows overlooking footpaths, driveways or common areas made them feel 'less safe' (12% of the participants living in duplexes and 7% in terraced houses). Closed blinds/curtains are implemented by some of the in-home immersion participants as a way of improving privacy, as are frosted window coverings. Participants are closing blinds/curtains in upstairs bedrooms and kitchens, dining and lounges overlooking a shared space or neighbour's home.

Modifications to improve privacy, such as keeping blinds closed, conflict with the AUP expectation of passive surveillance (i.e. windows overlooking public/shared spaces that allow the household to see out). The concept of keeping an eye on people passing as a principle of Crime Prevention Through Environmental Design (CPTED) may be new to households moving into MDH. Careful consideration of how such principles are applied in MDH is needed to ensure that the intended outcome of safety is achieved without compromising household comfort and sense of privacy. A landscape buffer between windows and semi-public spaces such as vehicle or pedestrian accessways (a similar concept to the AUP front yard), as shown in some of the in-home immersions, has potential to mitigate privacy concerns and enable blinds to be open to facilitate looking out.

Section 35 (s35) monitoring reports that residents are closing the blinds of their main living space when this overlooks a street. This is interpreted in the s35 monitoring to be in an effort to improve privacy, but it also notes how this behaviour compromises the attractiveness of the street. Results from the in-home immersions supports this interpretation as it found the behaviour of closing blinds/curtains can be for the purpose of privacy and to manage temperature. In addition to having an impact on the attractiveness of the street, closed blinds/windows signal a lack of passive surveillance, which could enable anti-social behaviours and/or compromise building a sense of community.

Aural privacy

The survey participants reported high satisfaction with sound proofing on the walls they share with their neighbours (74% 'somewhat' or 'very' satisfied). As with other aspects of the home, the participants living in apartments tend to have higher satisfaction with aural privacy than those living in terraced houses or duplexes (58% of those in apartments reported being 'very satisfied' compared with 37% in terraced houses and 38% in duplexes). Sound from neighbours across outdoor living spaces was an issue for some. (See also Chapter 5, Section 2.3.1 for more information on aural privacy.)

Ten per cent of the survey participants commented that a lack of aural privacy was something they dislike about their homes. Some participants attributed this to a lack of soundproofing on intertenancy walls, while others said the problem of hearing neighbours or being heard by neighbours was manifested by sound travelling through open windows and doors. As mentioned previously, open windows and doors facilitate airflow through the home and is an important component of temperature regulation, as well as providing other benefits. A 'cost' of open windows described by the survey participants is hearing their neighbours and expecting their neighbours to be able to hear them. Households that participated in the in-home immersions also described the challenge of wanting to open windows for airflow and temperature control but hearing their neighbours through

these openings, and so some choose to keep their windows closed and have installed ceiling fans/AC units instead.