Part 3

Appendices

Introduction

The appendices provide additional technical information and guidance to assist adaptation of the Future Homes exemplar designs. They:

- identify considerations for key equipment, systems and elements incorporated in the exemplar designs
- identify building compliance assumptions and considerations
- identify opportunities to enhance and exceed the Future Homes requirements.

The appendices include:

- benchmarks, technical standards and detailed design guidance
- sustainability guidance to meet the performance targets
- alternative paths for compliance and identify targets and systems that can be varied.

Disclaimer

The pro forma Future Homes exemplar plans and accompanying guidance documents set out a plan and performance schedule for the design of a residential apartment building. The plans and schedules are designed to be used in Victoria and will require adaptation to suit your site and requirements. You must obtain independent professional advice in relation to any proposal to use and adapt the plans.

Appendix 1: Structure

The following guidance is not exhaustive, and it does not supersede the National Construction Code, Australian Standards or any other regulatory requirements. Other pathways to compliance, not included in this guidance, may represent a successful design approach.

General guidance

- Loads that span between party walls can allow for internal partitions to be non-load-bearing.
- Consider prefabricated stairs to a core for a high-quality, consistent finish and to provide safe access for workers during construction.
- Consider post-tensioned suspended slabs for maximum efficiency if concrete is used.
- Coordinate set-downs in structure, so they are carefully integrated with services and other performance requirements.
- The exemplar designs and associated guidance do not consider construction in flood-prone, bushfire-prone or cyclone-prone areas.

Footings

- Footings will be designed to avoid differential settlement between buildings on the same site.
- Footings will be designed strictly in accordance with the instructions of a geotechnical consultant and structural engineer.

Retention system

- Adjacent buildings will be checked to identify any basements that might be impacted.
- Where required, cantilevered bored piles will be designed with adequate surcharge loads.
- The building surveyor will confirm whether protection works are required.

Geotechnical investigation required for each site

- Boreholes will be deep enough to analyse the use of cantilevered bored piles.
- A wet basement requires a spoon drain around its perimeter. Water collected in a basement may need to be treated before reuse.
- A dry basement design requires the treatment of groundwater or a deep, concrete slab with appropriate reinforcement for uplift loads.

Appendix 2: Fire safety

This information reflects the exemplar designs before adaptation.

The exemplar designs and accompanying guidance were generally designed with regard to the technical and construction requirements of the National Construction Code (NCC) Volume One. Further testing is to be undertaken by the purchaser and those undertaking the adaptation to ensure compliance with all relevant codes at the time of adaptation.

Independent professional advice and verification must be sought with any proposal to use and adapt the exemplar designs to suit a particular site.

The information and guidance provided is not exhaustive and does not supersede the National Construction Code, Australian Standards or any other regulatory requirements. Other pathways to compliance, not included in this guidance, may represent a successful design approach.

General guidance

- As currently designed, the exemplar designs are assumed to be sprinkler-protected.
- Travel paths and distances and the location and number of stairs and exits shown in the exemplar designs may be subject to change and performance solutions.
- If a building is not sprinkler-protected, vertical spandrel separation between external openings will be required. This does not apply to openings contained within the same sole-occupancy unit.
- Mechanical parking will be sprinkler-protected in line with Fire Rescue Victoria's Guideline 32 Buildings Incorporating Automated Vehicle Parking Systems (AVPS).
- Provide sprinkler protection to laundry cupboards where required by the National Construction Code (NCC).
- Buildings will be served by a fire hydrant system.
- The part of a building containing car parking spaces will be served by a fire hose reel system.
- The basement level will have a smoke detection system in accordance with National Construction Code Specification E2.2a Smoke Detection and Alarm Systems.
- A basement level requires a mechanical ventilation system in line with AS 1668.2-2012 Mechanical ventilation in buildings.
- A sole-occupancy unit will have a smoke alarm system in accordance with National Construction Code Specification E2.2a Smoke Detection and Alarm Systems.
- A floor contained within the same sole-occupancy unit need not be fire-rated unless it provides lateral or vertical support to another fire-resistance element.
- A separating wall will extend to the underside of the roof covering or above the floor, and it will not be crossed by structure.
- The roof covering will be non-combustible.
- External walls and internal fire-rated walls will be non-combustible; timber framing is permitted.
- Windows and other openings within 3 metres of a side or rear boundary will be protected by either external wall-wetting sprinklers or fire-rated glazing.

- Consider the increased level of protection required for openings facing paths of travel to exits.
- Consider the protection requirements for a booster assembly when located within 10 metres of the building line.
- A basement level should have at least two exits.
- Climbers and cascading plants should have an ongoing maintenance regime as part of the assessment for a deemed-to-satisfy fire safety solution under the National Construction Code. The maintenance regime could include:
  - an automatic irrigation system
  - a means to collect rainwater and a dedicated on-site tank, to serve the irrigation system
  - a monitoring device fitted to a shut-off valve serving the irrigation system, with fault signalling to the building's main fire-indicator panel
  - use of a sprinkler system.

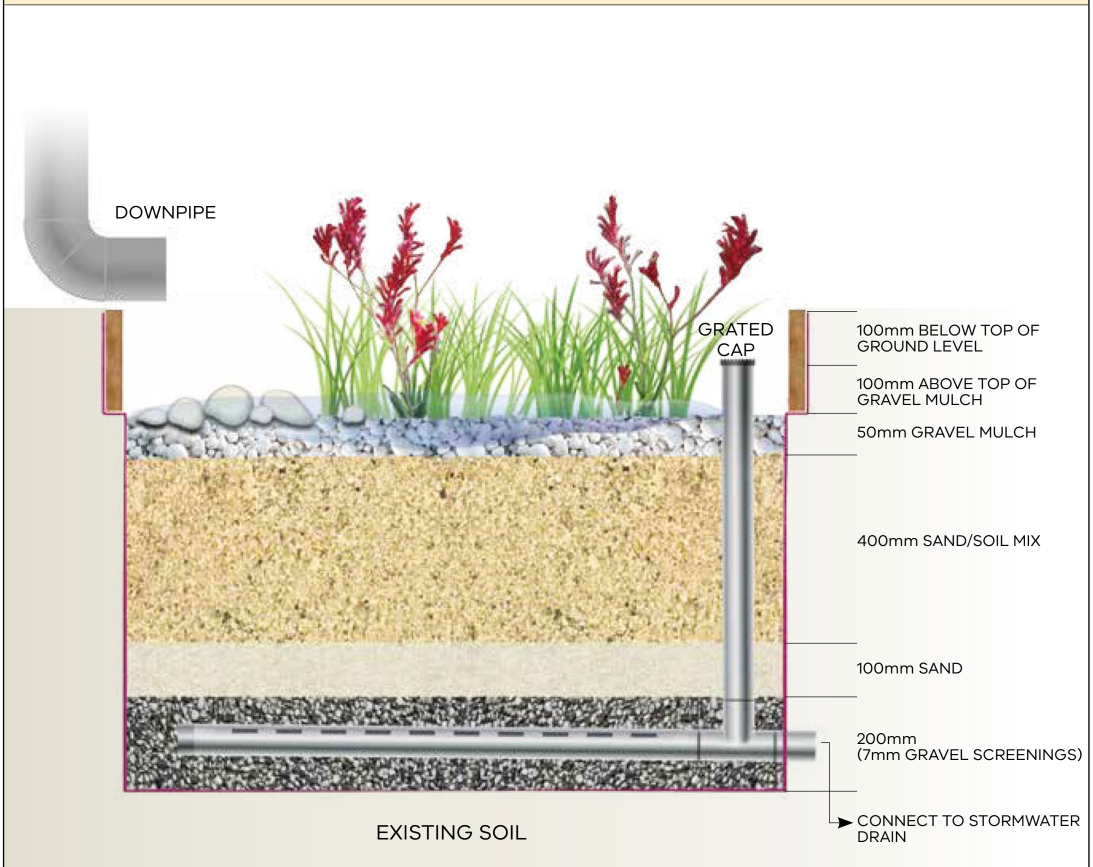
Appendix 3: Landscape

General guidance

- Any tree that is part of the calculation of canopy cover should be a minimum of 100 litres and 2.5 metres tall at the time of planting.
- If in-ground services are located in areas of deep soil, they should be subtracted from the deep soil calculation.
- Raingardens or swales are to be sized in accordance with the Future Homes ESD requirements. As a guide, these typically comprise a minimum of 1 percent to 2 percent of the impermeable site area. They are best located at the lowest point of the site and can be at multiple locations.
- Avoid locating large trees adjacent to external building walls where they are prone to impact building footings. Seek advice about the use of root barriers to reduce the risk of damage to the footings caused by changes of moisture in the soil.

Refer to Appendix 2: Fire Safety for advice on climbers and cascading plants

Figure 3.1: Section showing typical raingarden guidance



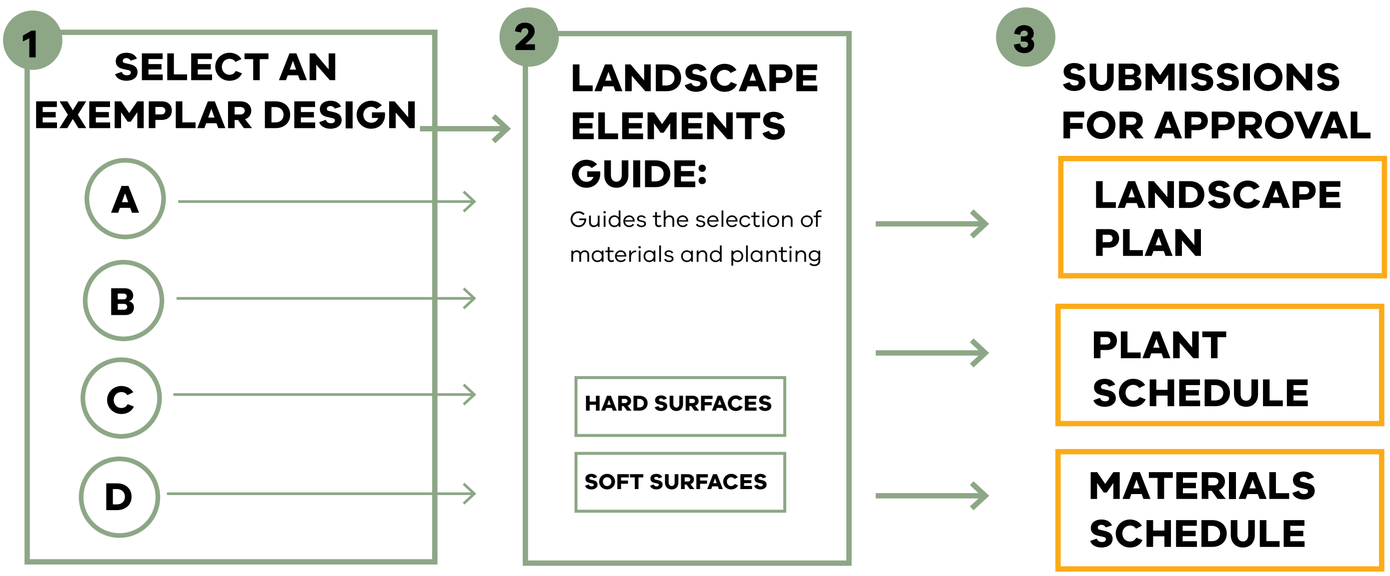
Source: Building an inground raingarden, Melbourne Water Corporation, December 2013

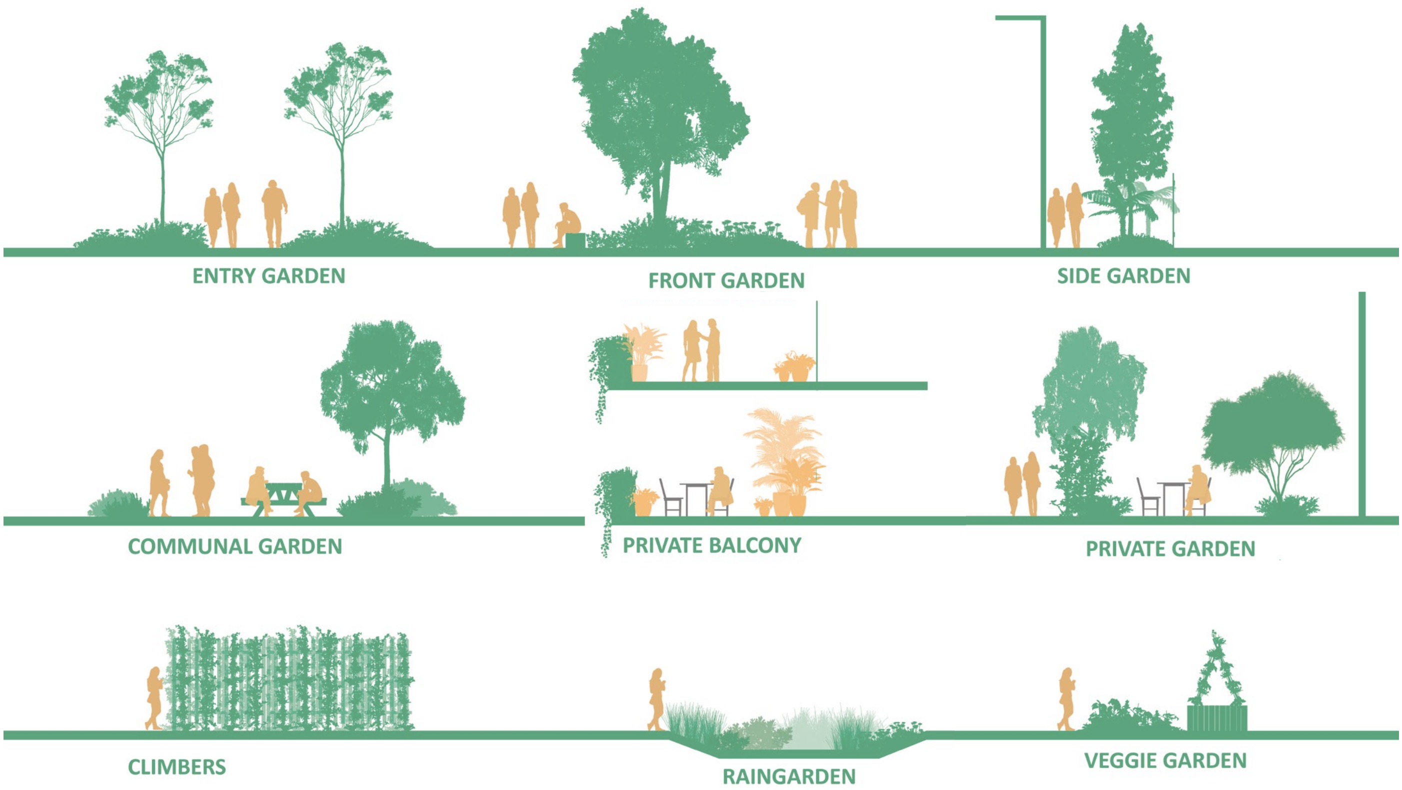
The following has been prepared by GLAS Urban.

Introduction - Using the templates to create a template plan

The landscape template plans define the extent and location of landscape typologies for each exemplar plan. The landscape elements guide provides guidance on the character of each of the landscape typologies. Designers adapting the exemplars can use the elements guide to develop a design plan for the planting and hard landscape materiality that is responsive to site. The landscape design plan plus plant and material schedules are submitted as part of the package for planning approval.

How to use this guide:





7

LANDSCAPE TARGETS

The landscape performance targets aim to establish minimum or ideal criteria to enable a more environmental friendly outcome for Victoria's future developments. In this section, Clause 55 of the Victoria Planning Provision is used as a reference for the establishment of the metrics used in the evaluation of the template schemes.

20% — **SURFACE PERMEABILITY**
REFER TO 5.2 GREENING IN PART 1

35% — **GARDEN AREA (MANDATORY)**
REFER TO 2.2 GARDEN AREA IN PART 1

5-15% — **CANOPY COVER (MANDATORY)**
REFER TO 5.2 GREENING IN PART 1

30-100 SQM — **DEEP SOIL AREA (MANDATORY)**
REFER TO 5.2 GREENING IN PART 1

8-25 SQM — **PRIVATE OPEN SPACE**
REFER TO 3.2 PRIVATE OPEN SPACE IN PART 1

30-220 SQM — **CIRCULATION AND COMMUNAL OPEN SPACE (MANDATORY)**
REFER TO 3.3 CIRCULATION AND COMMUNAL OPEN SPACE IN PART 1

INTEGRATED LANSCAPE
REFER TO 5.3 INTEGRATED LANDSCAPE IN PART 1

HEAT ISLAND EFFECT
REFER TO 6.5 HEAT ISLAND EFFECT IN PART 1

WASTE MANAGEMENT
REFER TO 5.5 SITE SERVICES IN PART 1

The landscape elements guide provides guidance on the character of each of the landscape typologies identified within the landscape templates.

H1. PRIMARY ENTRY PAVER

Application

The primary paving will be used to define the main communal pedestrian entry to the residential block.

Character

This pathway should be the primary entry, designed to enhance the entry experience and to define the entry as a welcoming, pedestrian orientated access way.

Materials

The surface should be composed of high-quality materials with a texture, scale or pattern that signifies a pedestrian access. Where relevant, surface materials should be selected to reflect the local streetscape character and to complement the architectural finishes.

Appropriate materials

- Bluestone paving
- Clay brick paving
- Granite setts
- Castlemaine slate paving

Materials to be avoided:

- Asphalt
- Copper Chrome Arsenate (CCA) treated pine

Bluestone paving

Granite setts

Clay brick paving

Castlemaine slate paving

H2. SECONDARY PATH PAVER

Application

The secondary path will be used to define secondary pedestrian circulation within the residential block.

Character

This paving should be a simple, durable material that signifies a pedestrian surface and compliments the primary paving in colour and texture.

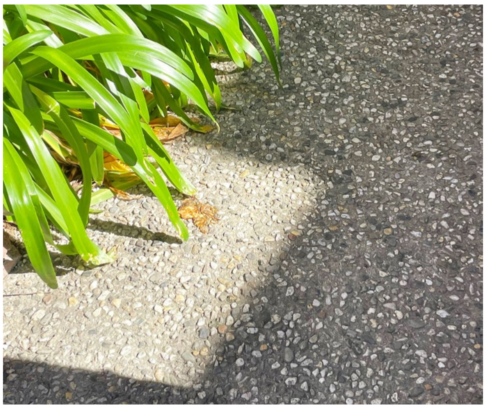
Materials

The surface should be composed of good quality materials with a texture, scale or pattern that signifies a pedestrian access. Where relevant, surface materials should be selected to reflect the local streetscape character and to complement the architectural finishes.

Appropriate materials

- Insitu exposed aggregate paving with close-set saw-cut joints
- Insitu place concrete
- Clay brick paving
- Concrete pavers

Materials to be avoided:
- Asphalt
- CCA treated pine



Insitu exposed aggregate concrete

Concrete pavers

Concrete pavers

Clay brick paving

H3. SHARED PATH PAVER (VEHICLE/PEDESTRIAN)

Application

The shared path paver will be used to define shared circulation zones between pedestrians and vehicles. They can be used on paths that guide pedestrians to car parking areas at ground or basement level.

Character

As a hard surface is required for the vehicle grade, other qualities of colour, texture, scale or pattern can be used to signify the shared access. Where relevant, surface materials should be selected to reflect the local streetscape character and to complement the architectural finishes.

Materials

This paving should be a simple, durable material that is vehicle graded. Ideally, it should minimise the hard paving area to the wheel projection path while allowing for more pervious surface around. Asphalt roads should be avoided and a more friendly surface that compliments the primary and secondary paving in colour and texture should be preferred. Grasscrete pavers have shown little performance in driveways and are not suggested as a continuous surface.

Appropriate materials

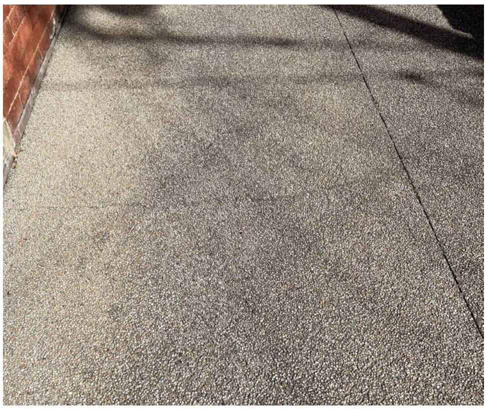
- Insitu concrete
- Clay brick paving (vehicle grade)
- Resin-bound gravel
- Exposed aggregate concrete

Materials to be avoided:

- Large areas of concrete

Insitu concrete path with integrated garden bed

Resin-bound gravel



Exposed aggregate concrete

Clay brick paving (vehicle grade)

H4. COMMUNAL TERRACE PAVER

Application

The communal terrace paver will be used to define communal areas within the residential block.

Character

This paving should be a simple, durable material that signifies a communal gathering area and compliments the surrounding architecture in colour and texture.

Materials

The surface should be composed of good quality materials with a texture, scale or pattern that signifies an outdoor communal space. Where relevant, surface materials should be selected to reflect the local streetscape character and to complement the architectural finishes.

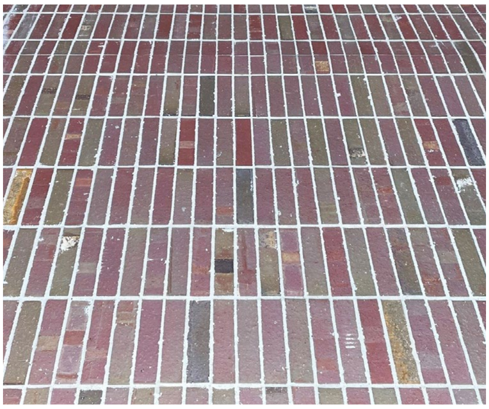
Appropriate materials

- Exposed aggregate concrete pavers
- Bluestone pavers
- Timber Deck
- Clay brick paving

Materials to be avoided:
- Asphalt
- CCA treated pine

Timber decks

Exposed aggregate concrete pavers



Clay brick paving

Bluestone paver

H5. RAISED WALKWAYS

Application

The communal terrace paver will be used to define communal areas within the residential block.

Character

This paving should be a simple, durable material that signifies a communal gathering area and compliments the surrounding architecture in colour and texture.

Materials

The surface should be composed of good quality materials with a texture, scale or pattern that signifies an outdoor communal space. Where relevant, surface materials should be selected to reflect the local streetscape character and to complement the architectural finishes.

Appropriate materials

- Steel grates
- Precast concrete sleepers
- Deck
- Concrete

Materials to be avoided:

- Asphalt
- CCA treated pine

Steel grate

Concrete

Deck structure

Precast concrete sleepers

S1. ENTRY GARDEN

Application

The entry garden will be located at the main pedestrian entry and lining the main entry pathway.

Planting character

This garden will create a welcoming entry with a variety of colourful and textured plants with seasonal change.

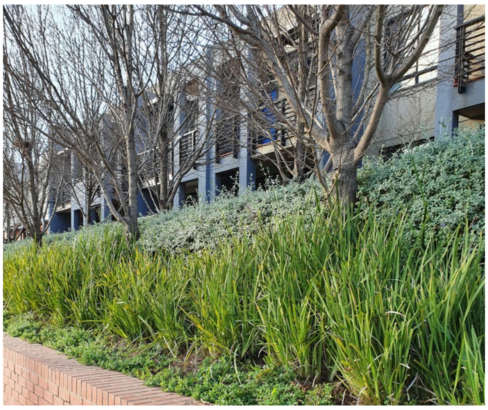
Planting type

Planting should be arranged in a combination of single-species groups and individual plants to provide a variety of heights and forms. Pathways should be lined with a combination of groundcover and low-level shrubs. Small to medium trees should be integrated. Maintain clear view lines to ensure visibility and safety.

Plant species should be selected that:

- Are appropriate to the site location, microclimate and soil type;
- Will be suited to the level of shade or sun of the specific garden bed;
- Will achieve the heights appropriate to the planting typology.

THIS NOTE APPLIES TO ALL TYPOLOGIES



Clear view framed by trees

Robust planting scheme with diverse colour and texture

S2. FRONT YARD GARDEN

Application

The front garden will be located at the interface of the lot with the street, being the main visible garden from the street.

Planting character

This garden will create an inviting entry with a variety of colourful and textured plants with seasonal change, while providing visual screening for residents' privacy.

Planting type

Planting should be arranged in a combination of single-species groups and individual plants to provide a variety of heights and forms. Depth and height of planting should be considered according to garden size, with a combination of groundcover and low-level shrubs. Small to medium trees should be integrated. Screening plants should be considered when privacy is desired.

Street interfaces can become a welcoming edge for neighbourhood interactions

Edges that allow for seating can encourage informal spaces for gathering

S3. SIDE GARDEN

Application

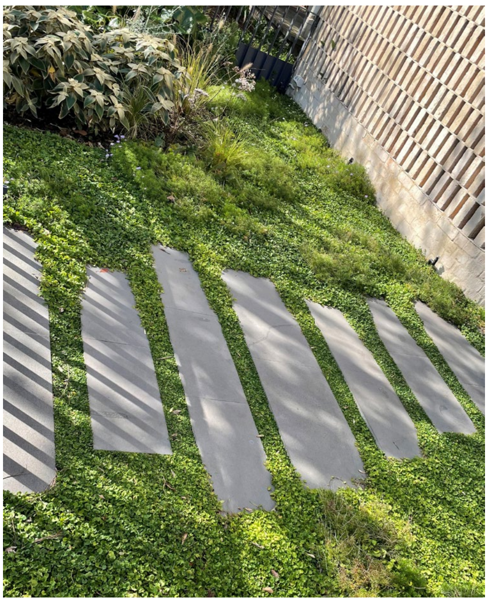
The side garden will be located at secondary entries, usually next to the lot boundary wall.

Planting character

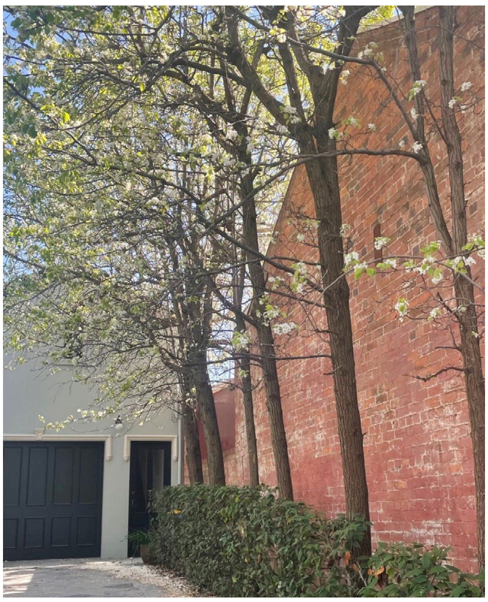
This garden will create a robust entry with screening plants or climbers against the wall.

Planting type

Planting should be arranged in a linear combination to ease maintenance. Species selection should respond to character and council requirements. Narrow trees should be integrated whenever possible. Proximity to residences should determine tree canopy size.



Low maintenance, shade tolerant plants should be used.



Small trees at boundaries provide screening and soften the edges.

S4. PRIVATE GARDEN

Application

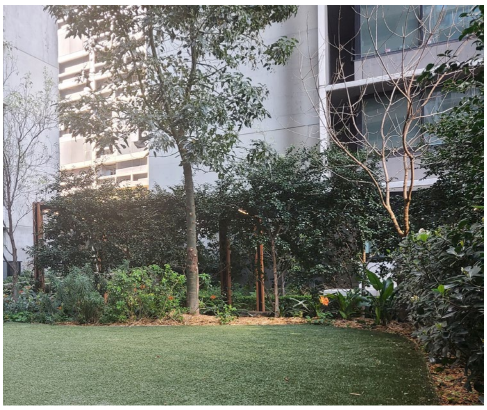
Private gardens are located on the ground level and accessed by a single residence.

Planting type

This garden should enable a flexible layout for residents to incorporate their own planting. Screening should be provided whenever privacy is required. A paved or lawn area should be included to allow space to sit outside.

Planting character

Planting should be arranged in a combination of single-species groups and individual plants to provide a variety of heights and forms. Garden beds should be located around a central paved/deck area to support high use. Small to medium trees should be integrated.



Provided adequate deep soil area for integration of trees

Robust screening plants

S5. COMMUNAL COURTYARD/GARDEN

Application

The communal garden, or communal open space, will be located in the main outdoor shared space of the residential block.

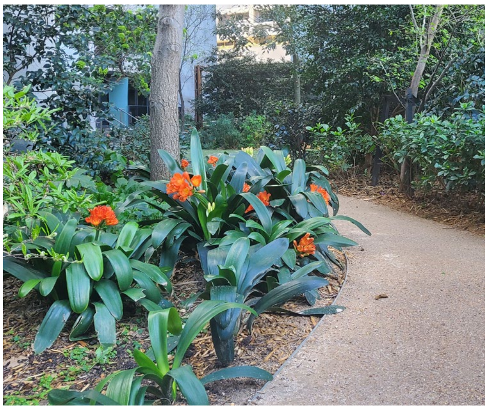
Planting type

This garden will create an inviting entry by including a variety of colourful and textured plants thatthat showcase seasonal variety and provide visual screening.

Planting character

Planting should be arranged in a combination of single-species groups and individual plants to provide a variety of heights and forms. Pathways should be lined with a combination of groundcover and low-level shrubs. Small to medium trees should be integrated. Maintain clear view lines to ensure visibility and safety.

Furniture should be provide in communal areas where possible



A combination of paving and soft surfaces can creating engaging microclimates

S6. PRIVATE BALCONY/TERRACE

Application

Built-in planters and/or individual planter pots are recommended to enhance the amenity of private balconies and terraces.

Planting type

In all balconies, planting must be robust and tolerant to wind exposure. With in-built planters, soil availability can be maximized and different species can be composed, although single-species groups allow for a stronger effect. Planting in pots will thrive better if planted alone, and the composition can be made through different pots.

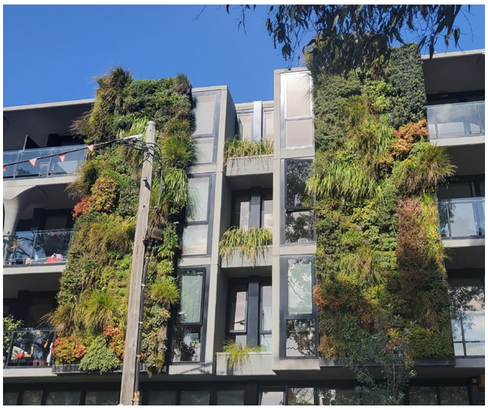
Planting character

Planting for in-built planters should be either coordinated with all residents for a consistent facade effect or can have the flexibility of a diverse effect. Where relevant, planting should be selected to reflect the local streetscape character and to complement the architectural finishes.

In-built planters should be incorporated into balconies whenever possible. Pots should be added by residents according to necessity. **Caution: Do not provide footholds or climbing hazards.**

Refer to Appendix 2: Fire Safety for advice on climbers and cascading plants.

Mix of in-built planters and pot planting



Balcony planting can help with vertical greening

G1. PRODUCTIVE GARDEN

Application

The productive garden should be located in an easily accessible and shared space between the residents. Ideally, the productive garden should be located in north-facing spaces.

Planting type

This garden can either be in-ground or in raised planters, depending on the characteristics of the site and soil conditions. It should encourage residents to maintain plant growth through a simple design with allocated storage for tools.

Planting character

Plants will be planted by residents according to season and sunlight availability.

Note: Tap(s) and rain water tanks should be provided nearby to support and encourage use.

A productive garden can be in-ground or raised according to site requirements

The productive garden can also provide screening and colourful planting

G2. RAINGARDEN

Application

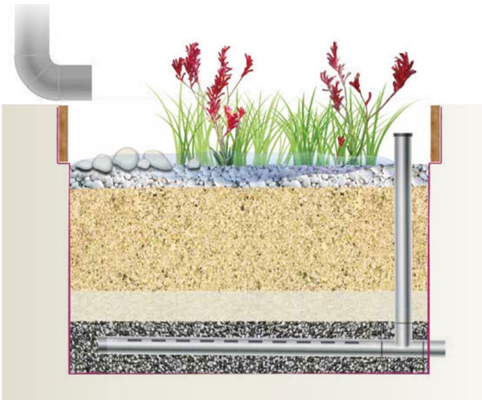
Raingardens should be located in the lower points of the garden, at the end of spoon drains or kerb lines. They will capture rainwater and treat it before directing it to stormwater drains.

Planting type

The raingarden will be lower than surrounding surfaces with an overflow connected to the stormwater network. The soil type will have a high permeability rate.

Planting character

Planting should include native species that are tolerant of drought and inundation but provide an all round visual amenity with seasonal highlights.



Coordinating downpipe location to guide roof top water into rain gardens

Rain gardens should be adjacent to large impervious areas like driveways and car parking areas.

G3. CLIMBERS

Application

Climbers can be planted in fence lines, screening trellis or can be added to facades through wire cables.

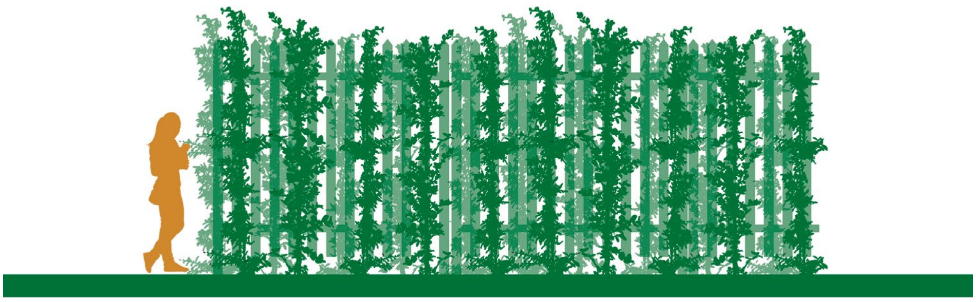
Planting type

Climbers will enable a greener look of the residential development. Climbers will also provide cooling and shading benefits.

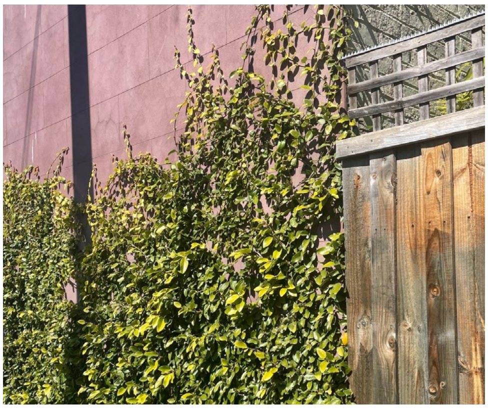
Planting character

Planting should be arranged in a combination of single-species groups to provide a continuous effect. Maintain clear view lines to ensure visibility and safety.

Refer to Appendix 2: Fire Safety for advice on climbers and cascading plants.

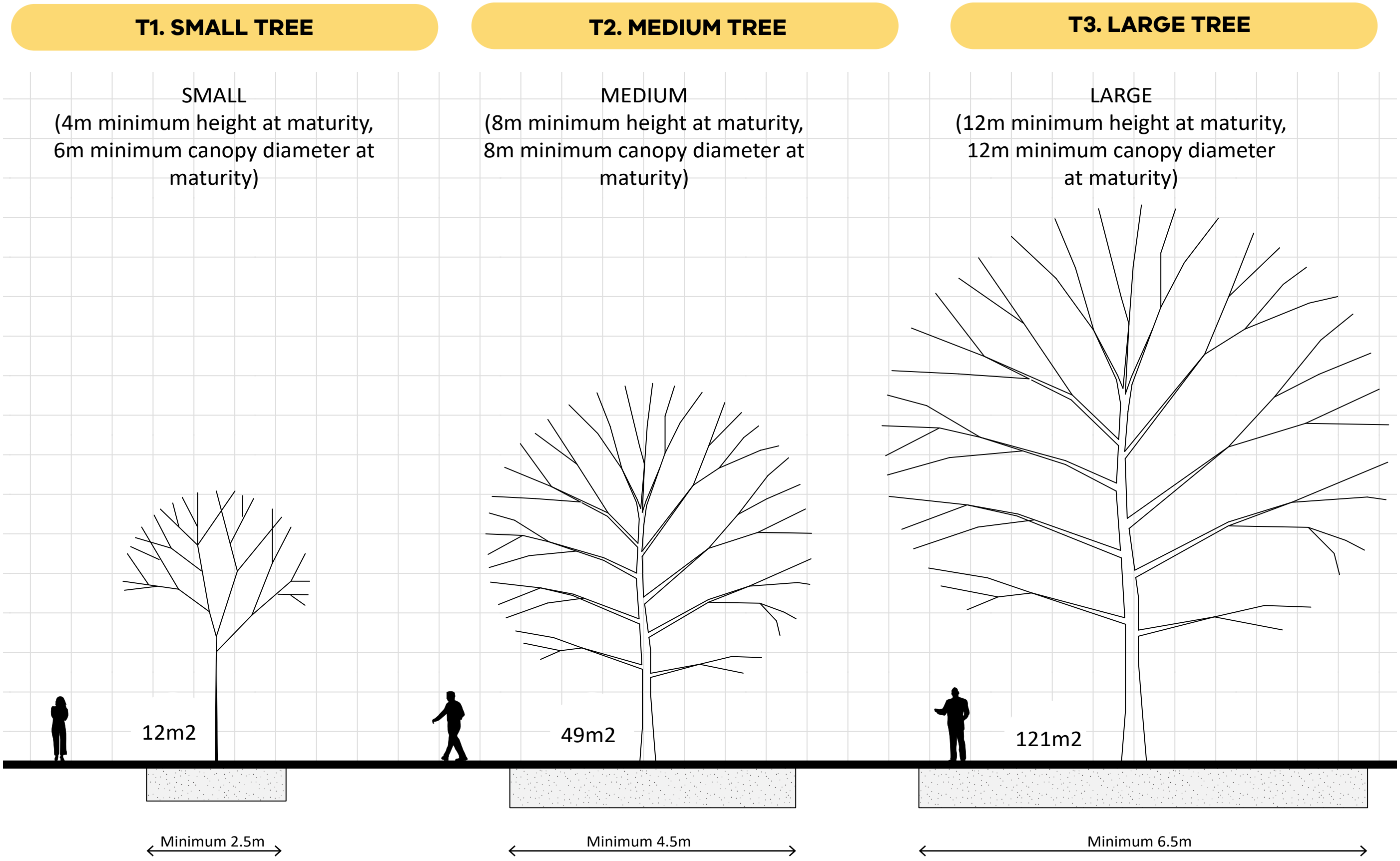


Robust native climbers should be used in less shaded areas.



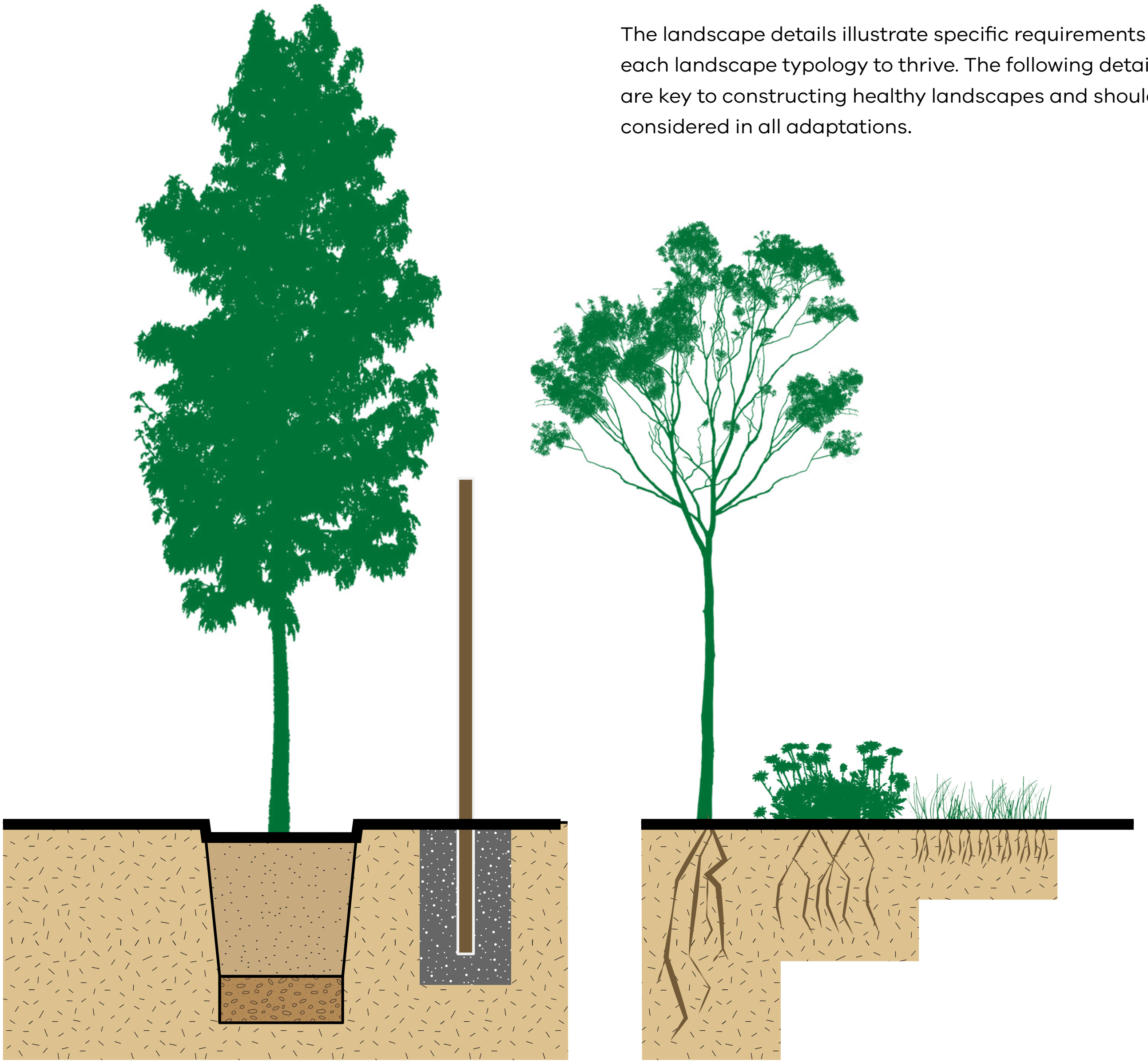
Self-clinging plants softens the buildings with minimum additional structural support.

Deep soil requirements



LANDSCAPE DETAILS

The landscape details illustrate specific requirements for each landscape typology to thrive. The following details are key to constructing healthy landscapes and should be considered in all adaptations.



Tree planting requirements

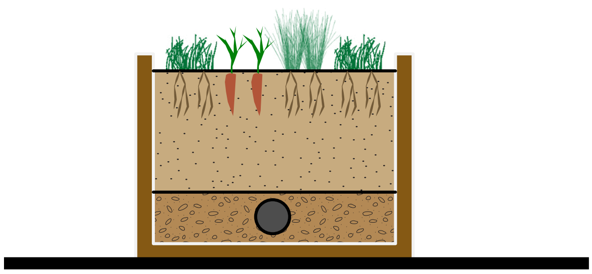
Trees planted as part of the canopy cover calculation, must be a minimum pot size of 100L, a minimum height of 2.5m at the time of planting and will be planted in deep soil. Key requirements for tree planting:

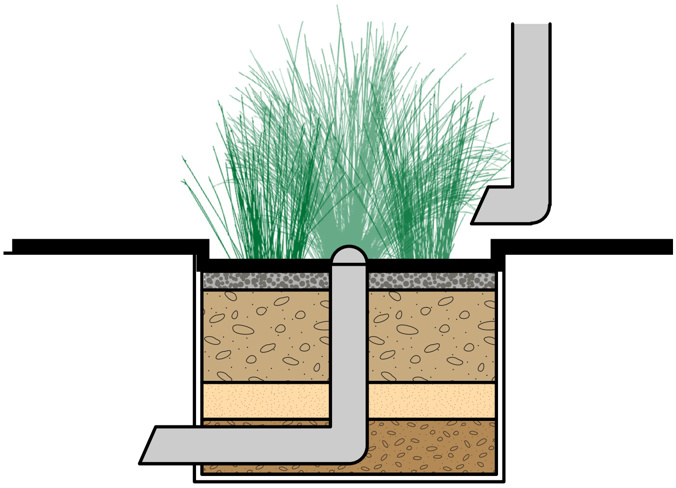
1. Minimum topsoil depth = 900mm
2. Minimum tree pits width = 1000x1000mm
3. Automatic irrigation must be provided for all trees during establishment
4. Trees pits must be a minimum of 500mm from fences or buildings
5. Trees will be staked or guyed.

Garden bed requirements

Garden beds should be designed to promote optimum conditions for growth. A mimimum of 4 plants per m2 should be provided. A minimium depth of topsoil is required for different types of planting:

1. Tree planting = 900mm min
2. Shrub and climber planting = 600mm min
3. Turf planting 250mm min
4. Gardens should have automatic irrigation.





Productive garden requirements

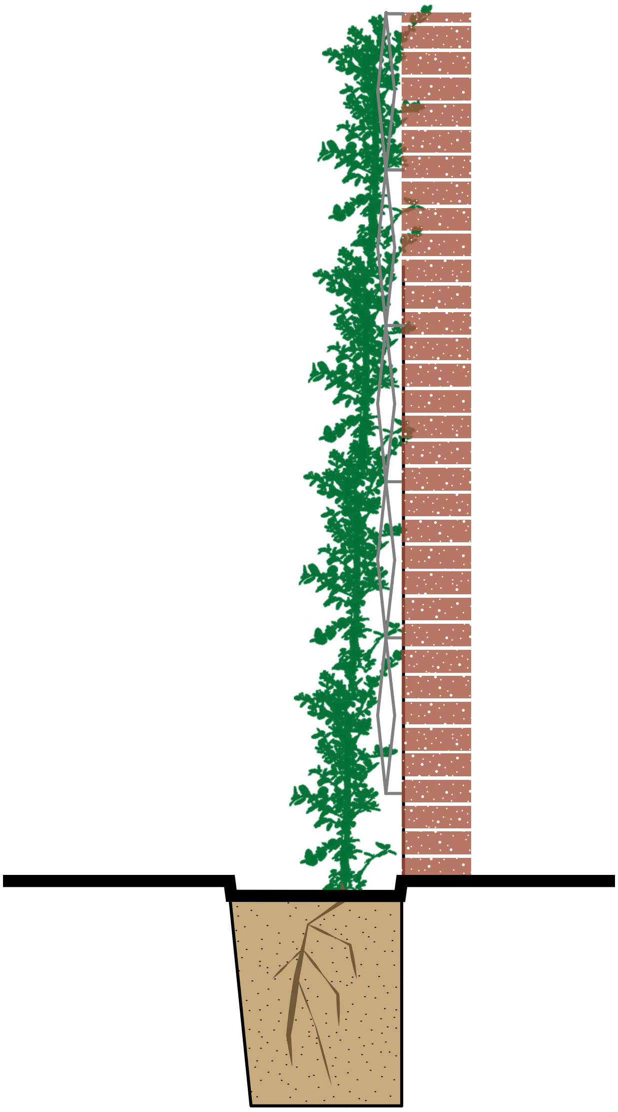
Productive gardens should be placed in raised planters to be easily accessible for maintenance. Ideal dimensions are between 600-900mm wide and 400-700mm high. The planter should include:

1. Good quality, clean topsoil
2. A drainage layer at the bottom to prevent waterlogging.
3. A tap for watering within 5 metres.

Rain garden requirements

Rain gardens capture rain water and treat it before discharging it to the stormwater drainage system. Rain gardens can be in-ground or in planters. Rain gardens should be designed in accordance with Melbourne Water guidance (www.melbournewater.com.au). Key components include:

1. Plants at 8 plants/m2
2. Gravel mulch
3. Rain garden soil (free draining sand/soil mixture)
4. Sand layer
5. Drainage layer
6. Waterproof membrane
7. Perforated pipe connected to the stormwater network
8. Stormwater overflow
9. Stormwater directed to the rain garden from downpipes or adjacent surfaces.

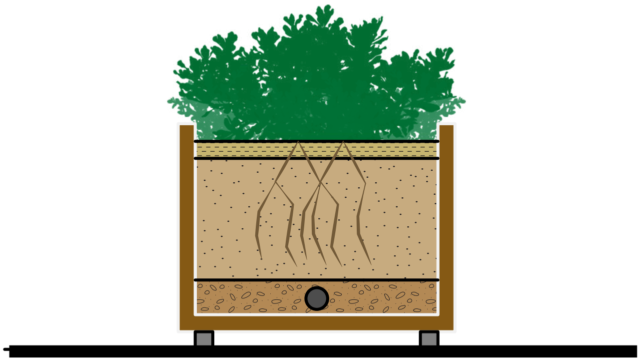


Climber requirements

Key components include:

1. Provide sufficient soil for the climbing plants to thrive. Either plant in deep soil or plant in pots with a minimum soil depth of 700mm and a minimum soil width of 500mm excluding drainage materials.
2. Wires or mesh should be provided on the fence or facade for the climbing plant to cling to.
3. Design details for proposed facade plantings should include an ongoing maintenance regime as part of the assessment for a deemed-to-satisfy fire safety solution under the National Construction Code. The maintenance regime could include:
   - evergreen climbing plant species
   - an automatic irrigation system
   - a means to collect rainwater and a dedicated on-site tank, to serve the irrigation system
   -a monitoring device fitted to a shut-off valve serving the irrigation system, with fault signalling to the building's main fire-indicator panel
   - use of a sprinkler system.

Note: sites is in a bush-fire prone area may prohibit facade plantings.

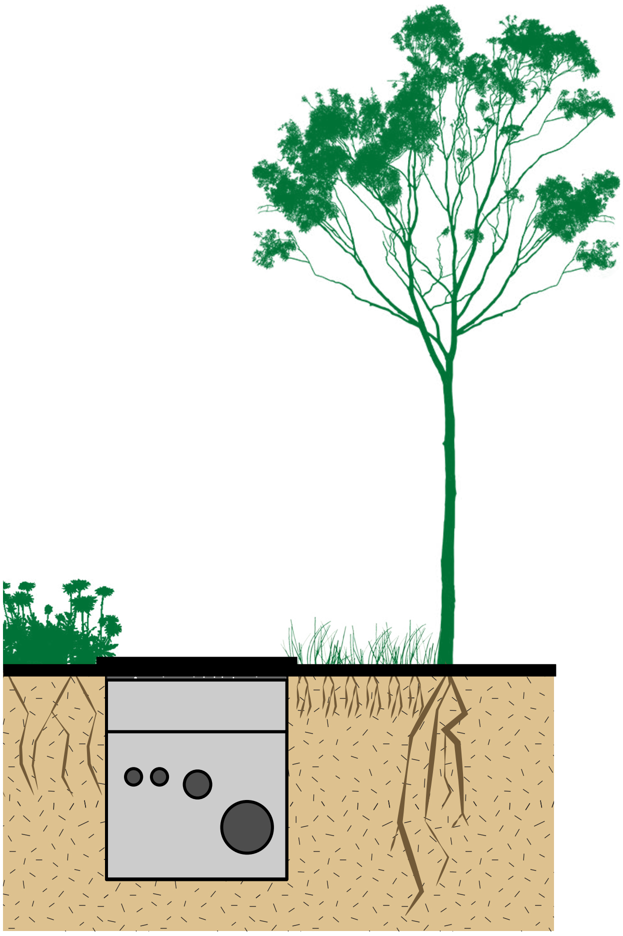


Planter box requirements

Plants should be provided to balconies and external landings. Planter boxes should provide optimum conditions for plant growth including:

1. Soil. A good quality light-weight soil should be provided, minimum sizes will vary depending on species. Minimum planter sizes should be 700mm depth (excluding drainage) and 500mm wide.
2. Weight should be co-ordinated with the structural engineer
3. Irrigation - provide automatic irrigation
4. Drainage - provide drainage
5. Exposure - positon the planters in locations that are protected from the wind where neccesary to ensure optimum plant growth
6. Shade - select appropriate plant species that will thrive with the amount of light available.

Caution: Do not provide footholds or climbing hazards.



Services co-ordination

Services should be aligned to minimise disturbance of deep soil areas.

1. Where possible align major services into common trenches
2. Locate service trenches under main pathways
3. Re-route services around 'deep-soil' areas for canopy trees
4. Consider shallow rooted planting such as groundcover and turf over services within garden beds.
5. Where no other solutions can be found, consider root-barriers.

Appendix 4: Waste

General guidance

- A waste receptacle should be large enough to store at least two days of waste and recycling. This amounts to about 35 litres for general waste and mixed recycling and about 12 litres for kitchen organics, glass recycling and soft plastics.
- Consider providing an additional receptacle for soft plastics in apartments.

Table 3.1: Waste generation rates, bin sizes and collection frequencies

Waste stream	Waste generation rate*	Shared bin size	Collection frequency
Rubbish	120 litres/apartment/week	660 litres or 1,100 litres	Weekly
Mixed recycling	120 litres /apartment/week	660 litres or 1,100 litres	Weekly
Food and garden organics	42 litres/apartment/week	240 litres	Weekly
Glass recycling	36 litres/apartment/week	240 litres	Weekly
E-waste		240 litres	At call
Hard waste		3.0 square metres	At call

*Waste generation rates are provided as a guide only and will differ between municipalities. These rates should be consulted with the relevant council to determine the exact collection and spatial requirements.

Appendix 5: Services and equipment

General guidance

Photovoltaic systems (PV)

The appropriate strategy to distribute energy to an apartment will depend on the needs of the applicant and the exemplar design chosen.

Feasible approaches for PV may include:

- an embedded network, which is more suited to large developments (e.g. 25+ apartments)
- A smart distribution system such as Allume's Solshares that distributes PV energy throughout the building while still giving residents the flexibility of choice of electricity provider
- direct cabling, which is direct wiring of a part of the PV system to each apartment, with each apartment likely to need an inverter. This may be the more viable solution for smaller developments.

Hot water system

Features of a centralised hot water system can include:

- a higher coefficient of performance, generally 2.5 to 3.5 times that of a direct instantaneous hot water system
- lower peak electrical demand
- a greater upfront cost but lower ongoing operational costs
- greater embodied energy in the production of the system
- greater spatial area
- potential for longer dead legs and wait times for hot water
- a requirement for downstream billing.

Features of a direct instantaneous hot water system can include:

- a lower coefficient of performance
- a lower initial cost
- higher instant electrical demand and greater apartment electrical capacity
- small embodied energy in the production of the system
- a small spatial area
- no downstream billing: a true ‘user pays’ system
- flexibility of installation location
- no ability to diversify.

Fire pump and tank

It is preferable to locate the fire pump and associated tank at the same level. Where spatial constraints do not allow for this, consider locating the tank underground with the fire tank located directly above it.

Adaptations could consider devices such as weather event driven rainwater tanks that uses TankTalk2 (or similar technology) to provide retention and also detention, emptying in advance of rainstorm event to reduce peak stormwater flows into the community.

Roof level services

Upper roof services should be screened with an enclosure when visible from the street level. The enclosure should be set back from the edge of the roof at any point, so it is not expressed as a high parapet.

Plant equipment, screens, and lift overruns are not included in the maximum building height calculation.

Appendix 6: Environmentally sustainable design

Table 3.2 lists two documents that together demonstrate how the exemplar designs comply with the Future Homes environmentally sustainable design (ESD) requirements.

Table 3.2: ESD planning documentation guidance

Document	Its purpose is to set out ...	Applies to ...
ESD technical report *(provided with the Future Homes exemplar design package)*	document the technical assessment and approach to compliance for each exemplar, as currently designed, against the mandatory and contributory ESD elements	all schemes: there is a report for each exemplar design
Sustainability Management Plan Template *(provided with the Future Homes exemplar design package)*	assist applicants on the reporting requirements for the SMP that will be submitted with each planning application	all schemes equally

General guidance

- External components of fixed appliances such as heat pumps, tanks and condenser units should be well integrated into the design, appropriately sized and outlined on drawings.
- Safe access to PV systems should be addressed, to minimise the risk of falling at the building's edge. Barriers around PV panels should be discreet and not overshadow the panels.
- Provide a nominated space in an accessible communal area for future installation of battery storage. Batteries maximise on-site usage of energy generated by the PV system.

Sustainability Management Plan submission requirements

ESD submission instructions

As part of any Future Homes planning application referral to DTP, an applicant must submit a Sustainability Management Plan which includes a response against the mandatory and contributory elements contained in the ESD checklist. Further guidance is provided below::

- **Sustainability Management Plan (SMP)** outlining how the adapted design addresses each of the ESD requirements for the project. A template SMP has been developed which can be used as a basis. The SMP must include project responses and technical analysis outcomes demonstrating that the adapted design will meet the ESD requirements as documented in the ESD checklist (Table 3.4). To assist applicants in preparing the required technical analysis, the State has commissioned ESD Technical Reports demonstrating how the exemplar designs meet key metrics, including:
  - NatHERS modelling
  - Daylight access

- Winter sunlight
- Effective natural ventilation
- Stormwater
- Heat island effect

Where the adapted design meets the requirements to reuse technical analysis from the ESD Technical Report (refer ESD analysis reuse guidance section below) applicants can extract relevant analysis from the ESD Technical Report and include in the submitted project SMP to demonstrate compliance.

ESD checklist

An ESD checklist has been developed which summarises the key ESD commitments and inclusions underpinning the Future Homes exemplar designs (Table 3.4). Within the checklist, each ESD initiative is classified as follows:

- **Mandatory:** A mandatory minimum requirement that must be met within the adapted design. The applicant is required to demonstrate compliance against each of these requirements.
- **Contributory:** A recommended inclusion. The applicant must respond to each 'contributory' item in the checklist regardless of whether it is included in the adapted design or not. If the item is not pursued, justification must be given, or an alternative aligned initiative proposed.

A sample Built Environment Sustainability Scorecard (BESS) assessment has been provided based on full compliance with all 'mandatory' and 'contributory' items. If an adapted design does not meet any of the 'contributory' items, the applicant may need to incorporate alternative additional ESD initiatives to maintain the target BESS score.

ESD analysis reuse guidance

The applicant may reuse items of analysis within the exemplar ESD Technical Report (minimising the need to redo analysis for the adapted design) where the adapted design meets the conditions outlined in the table below and the parameters described in the technical report.

It is noted that NatHERS and STORM will still require project-specific analysis to meet regulatory requirements, however the ESD Technical Report can be used as a resource to streamline this analysis.

An overview of what needs to be maintained in the adapted design to enable reuse of the analysis, as documented in the ESD Technical Report, is outlined below. Please note that the below table is provided for guidance only, and DTP and/or the responsible authority can, at their discretion, require that applicants provide updated analysis based on their assessment.

Table 3.3: Guidance for reuse of Technical Report analysis

NatHERS	Project-specific NatHERS modelling will be required for planning and building code compliance and therefore it is expected that project-specific NatHERS modelling will be provided by the applicant. The NatHERS modelling parameters as documented in the ESD Technical Report may contribute to a streamlined NatHERS compliance approach, however we note that NatHERS ratings can be sensitive to a range of factors including site orientation, glazing extent, apartment layouts, shading and overshadowing, project location, and NatHERS software updates. Applicants should ensure that proposed glazing solar heat gain values are conducive to maintaining visible light transmission properties as required to meet daylight targets.
Daylight access	ESD Technical Report daylight analysis can be reused by applicants where the adapted design does the following for the relevant space types (relevant space types being the spaces contributing to compliance within the ESD Technical Report daylight analysis): • Glazing extent and distribution is maintained • There is no increase in shading or overshadowing to the relevant spaces • Room depths have not increased • Minimum glazing visible light transmission (VLT) and room finishes are specified as per the Technical Report daylight modelling parameters.
Winter sunlight	ESD Technical Report winter sunlight analysis can be reused where the site orientation, living room window positions, and shading/overshadowing is not increased.
Effective natural ventilation	ESD Technical Report effective natural ventilation analysis can be reused where adapted design maintains the breeze paths between openings and the maximum distances as per the mark ups provided within the reports.
Stormwater	A compliant STORM calculator will be required to be completed for the project in accordance with planning scheme requirements, therefore a project-specific STORM calculator should be provided. It is anticipated that the calculator and mark ups provided in the ESD Technical Report will streamline achievement of a 100% STORM rating for the project. It is noted that additional stormwater measures, such as stormwater detention to mitigate flood risk, may be required within planning schemes for some jurisdictions.
Heat island effect	The heat island effect calculations can be reused where the landscaped area has been maintained or increased and the roof and hardscape minimum surface reflectance values are specified as outlined in the ESD Technical Report.

ESD checklist

Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs

Topic	Initiative	Category	Guidance
OVERALL TARGET			
Built Environment Sustainability Scorecard (BESS)	The project will achieve an "Excellence" score (>70%) under the BESS assessment tool **or** an equivalent score using an equivalent ESD assessment tool such as Green Star (minimum certified, 4 Star).	**Mandatory**	A sample BESS assessment has been provided for a project incorporating all ESD initiatives both 'mandatory' and 'contributory' within this checklist. The sample BESS assessment is a generic assessment, applicable equally to all exemplar schemes. Applicant teams are required to create a project-specific BESS assessment (or equivalent) for their project
CLIMATE AND CARBON			
Electrification	No fossil fuel use on site (in operation)	**Mandatory**	Domestic hot water is recommended to be high efficiency heat pump system (noting this typically requires a method of downstream billing). Cooktops and ovens are all electric. Induction cooktops are recommended for both efficiency and performance. Where installed. conditioning systems are generally high efficiency reverse cycle split systems.
Climate change resilience	Climate change resilience: the scheme is designed to achieve a high degree of resilience to a changing climate, particularly heatwave events	Contributory	Passive design choices should ensure that reliance on active cooling systems is minimised, such as utilisation of shading systems to reduce summer solar loads. Landscape planting is drought tolerant and plentiful natural shade has been provided.

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
ENERGY EFFICIENCY – PASSIVE SYSTEMS			
NatHERS performance (continued)	7.5 Star average across all apartments	**Mandatory**	Refer to ESD Technical Report(s) for details. Best efforts have been made in the exemplar design's NatHERS modelling to reduce required glazing performance to minimise costs, while still meeting the target. However, some designs require higher performance glazing than others: - Exemplar Design A North-South: U3.0 / SHGC 0.4 - Exemplar Design A East-West: U2.91 / SHGC 0.44 - Exemplar Design B: U2.91 / SHGC 0.44 - Exemplar Design C: U2.4 / SHGC 0.4 - Exemplar Design D: U2.1 / SHGC 0.33. In adapting the design, it may be feasible to meet the NatHERS targets with reduced performance glazing systems than currently described in the Technical Report(s). This might be achieved through further refinement of the building design, including: - Optimisation of glazed area and configuration - Further optimising shading solutions - Increasing wall/roof/floor insulation performance. Care should be taken so that any further refinement does not compromise compliance with the daylight requirements.
	6.5 Star individual apartment	**Mandatory**	
	Maximum cooling loads for relevant NatHERS climate zone as per Table 1.18 in Part 1 of the *Building Future Homes – Adaptation guide*	Contributory	
Airtightness	Meet an airtightness target of <5m3/hr/m2 at 50Pa	Contributory	Materials, fixtures and fittings, window selections and detailing will be chosen to maximise airtightness performance. Generally, this will mean ensuring that systems are well sealed (including doors) and the avoidance of leaky window types (such as louvre windows). Specification of a vapour permeable membrane may be required.
	At practical completion, undertake airtightness testing compliant with AS/NZS ISO 9972:2015. Testing must be carried out on 2,000m2 or 10% of the building envelope, whichever is greater	Contributory	

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
Airtightness (continued)	(NB: building envelope is the area of the walls, roof and exposed floors. It is distinct from floor area/number of apartments)		
Thermal bridging	Reduce the impact of thermal bridging through careful design detailing and material selection	Contributory	Reasonable steps should be taken to address thermal bridging to improve overall performance and reduce the risk of condensation within the building. This is to include: - Consideration of material selection (including structural and non-structural elements). Timber, especially timber studs, are recommended - Careful detailing of structure and insulation line - Reduction of unnecessary articulation of thermal envelope - Inclusion of thermally broken or timber window frames as standard - Consideration of prefabricated external walls that have windows and insulation pre-installed, and have a higher quality of sealing than on-site construction - Condensation should be mitigated by a combination of initiatives, not any one single item. Over-specifying in one area (e.g. wall insulation performance) will not significantly mitigate the risk if other areas (e.g. thermal bridging in the window frames) are not also addressed.
	Thermally broken, timber or uPVC window frames should be used to reduce thermal bridging, even if it is not required to meet the NatHERS target	Contributory	
ENERGY EFFICIENCY – ACTIVE SYSTEMS			
System efficiency	Provide heating and cooling systems within 1 star of the most efficient appropriately sized unit available	Contributory	Where it is not feasible (due to availability of appropriately sized units or otherwise) to meet the star rating in both heating and cooling, the target can be applied to the mode with the highest annual load (typically heating).

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
System efficiency (continued)	Provide heat pump domestic hot water with a minimum Coefficient of Performance of 3.5	Contributory	If provision of a central heat pump hot water system is not viable, or proposed, BESS Energy points may need to be re-assessed. We note that typically heat pump systems are 2 to 3.5 times as efficient as direct electric systems.
	Maximum lighting power density at least 20% lower than required by Table J6.2a of the NCC 2019 Vol 1 (Class 2-9)	Contributory	Will require high efficiency LED lighting systems.
	Car parking should be either naturally ventilated, or provided with CO controlled mechanical ventilation	Contributory	
PV system	Provide a PV system with 30kW total system capacity and a method to equitably distribute that solar energy to apartments (e.g. embedded network, direct cabling to apartments, or a distribution system such as SolShare or equivalent). The PV system should be well located, appropriately orientated and unobstructed throughout the year	Contributory	Provide a 30kW total capacity. This target anticipates that there will be some methodology to distribute PV energy equitably to the apartments in the building. It exceeds that required for base building / common area demand. The appropriate strategy to distribute energy to the apartment will depend on the particular exemplar design and the needs of the applicant. Feasible approaches may include: - Implementing an embedded network. This may be infeasible for smaller developments but could become more viable for larger developments (e.g. 25+ apartments) - A smart distribution system for example, from suppliers such as Allume's Solshare that distributes PV energy throughout the building while still giving residents the flexibility of choice of electricity provider

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
PV system (continued)			- Direct cabling which involves directly wiring a portion of the PV system to each apartment, with each apartment likely to need an inverter. This may be the more viable solution for smaller developments. Where this is adopted, it is recommended to distribute the system with reference to the size of each apartment (e.g. a 1-bed apartment has 1.5kw, a 2-bed apartment has 2kW, and a 3-bed apartment has 2.5kW). While a 'well orientated' system is generally considered one facing north, a combination of east and west facing panels may be appropriate in a residential context to address morning and afternoon usage peaks. Details of safe access to PV systems should be addressed to minimise the risk of falling around the building edge. Use of balustrades or similar approaches around PV panels are generally discouraged to avoid overshadowing.
Refrigerant	Where feasible, refrigerant loads are to be reduced through reduced length of refrigerant pipe runs, and reduced Global Warming Potential (GWP) refrigerants are to be used	Contributory	Where an appropriate unit is available, specifications of systems using new, low GWP refrigerants (such as R32) is encouraged. Most suppliers can provide low GWP options in split systems.
Metering	Provide metering as follows: - PV - Common area lighting (by level) - Common area power (by level) - Common area mechanical systems (where provided) - Carpark ventilation	Contributory	These sub-meters should be connected to a system capable of collating and presenting data. This could be a building BMS or another smart building system (such as 'Buddy').

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
DAYLIGHT, SOLAR ACCESS AND MITIGATION			
Daylight access	Living/dining rooms: 80% of living areas achieve a high level of daylight and/or Bedrooms: 80% of bedrooms achieve a high level of daylight	Contributory	Current BESS pathway assumes minimum one daylight target is met, i.e. living/dining rooms or bedrooms. Refer to ESD Technical Report for details. To achieve compliance with the requirement, the following is to be assumed: - Window: Visible light transmission (VLT) (total system) 45% - Ceiling: White/light coloured (0.8 reflectance) - Wall: White/cream coloured (0.7 reflectance) - Floor: Medium coloured (0.3 reflectance).
Winter sunlight	At least 70% of apartments achieve 3hrs of direct sunlight in living areas between 9am and 3pm in mid-winter	Contributory	Refer to ESD Technical Report for details. Direct sunlight is defined as sunlight that penetrates the living room space by at least 1m at any time of the day.
Other daylight criteria	Ensure 100% of single-aspect habitable rooms comply with the room depth requirements outlined in the section 3.4 in Part 1 of the Building Future Homes – Adaptation guide	**Mandatory**	Typically, it is preferred to locate living areas towards the corner of a building to provide an opportunity to increase northern exposure. When doing so, larger apartments can be located on the southern side of the building to maximise the number of apartments with at least one northern exposed living space.
	All bedrooms must have an external window	**Mandatory**	
	Minimise south-facing apartments	Contributory	
	Maximise north facing living spaces, and north-facing glazing generally	Contributory	

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
Shading	Provide well considered shading across the development to mitigate overheating	Contributory	A strong preference is placed on operable shading to the east and west façade. Exemplar designs, as far as feasible, have been designed to maximise the effectiveness of the shading solution. Operable shading to be considered for all balconies to enable occupant control of unwanted summer gains, such as external balcony blinds/screens on west-facing balconies. When designing fixed horizontal shading for north-facing glazing, a reasonable guide is to size the shading system to achieve a 52° vertical shading angle (measured from sill to edge of shading). Shading should account for a wide-range of sun positions at different times throughout the day and across summer months. Avoid over-designing to specific times of the year (such as the summer solstice). Use of heavily tinted glazing to provide solar control is discouraged as it will compromise the useful daylight performance of spaces.
VENTILATION			
Natural ventilation	100% of apartments will achieve effective natural ventilation (cross ventilation, single sided or mechanically assisted), as defined below	**Mandatory**	Refer to ESD Technical Report for the selected exemplar design. Note: even where natural ventilation is achieved, provision of a mechanical ventilation system with heat recovery is encouraged to provide ventilation even when external conditions are adverse. Guidance should be provided to building occupants that outlines effective operation of ventilation. When designing for natural ventilation: - Where a single window provides single-sided ventilation, that window should be of a type with both high-level and low-level openings (e.g. double-hung)

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
Natural ventilation (continued)		**Mandatory**	- Where front doors are used for cross ventilation, these should be provided with either a security door that provides airflow, or an adjacent openable window (either above or beside the door) - Consider any sources of contaminants or bad smells when nominating ventilation airpaths (e.g. windows / doors near open air waste areas may not be appropriate ventilation openings). For cross-ventilation (preferred solution): - A breeze path between 2 ventilation openings, either within the room or from one room to another - Breeze path length less than 18m measured between ventilation openings and around internal walls, obstructions & partitions - Ventilation openings located either in opposite or adjacent (perpendicular) external walls, or on an external wall and an operable skylight - Size of ventilation openings greater than 2% of total floor area or 1m2, whichever is greater. The opening is the maximum allowable clear open area for the window. i.e., if floor area of room is $55m^2$ then clear open area of window / door must be at least $1.1m^2$ - No more than 1 doorway or opening $<2m^2$ between the ventilation openings - Where the breeze path travels through an internal door, that door must be provided with door catches to hold open - If on adjacent walls, ventilation openings must be at least 5m apart at their closest point. This is to ensure the space has reasonable ventilation throughout and not just in one corner

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
Natural ventilation (continued)			- If relying on a courtyard adjacent to a ventilation opening the courtyard must have a minimum depth of 3m from the window or be a minimum size of 9m2. For single sided ventilation: - Maximum permissible depth of room is 5m - It is preferred for openings to either be split at high and low levels, or split across the width of the room, with each opening sized at 5% of the floor area served. Mechanically assisted natural ventilation with heat recovery: - Delivering fresh air rates of between 2.5 - 5 L/s/m2 (results should be supported by calculations).
HEAT ISLAND			
Heat island impact	A minimum of 75% of the site area consists of materials that minimise the impact of the heat island effect	Contributory	Building and shading roof colours are generally to be light. If they cannot meet the SRI target, compliance with the heat island target is likely not achievable. Innovative low heat absorption materials of equivalent performance can be considered. Compliance is generally achieved with the exemplar designs when roofs meet the SRI requirement (as roofs plus nominated landscape areas form more than 75% of site area). In cases where this combination does not constitute 75% of the site area, a combination of either ground level finishes (e.g. driveway and courtyards) or above ground finishes (e.g. balconies) must meet the relevant target. Elements that mitigate heat island effect include: - Vegetation, in the form of either ground level planting or green roofs

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
Heat island impact (continued)	Provide the following bicycle parking:		- Hardscape elements (or roofs) shaded by overhanging vegetation, roof structures compliant with the SRI requirement (outlined below) and solar hot water panels or photovoltaic panels - Areas directly to the south of the vertical building elements, that are shaded by these elements at the summer solstice - Water bodies or water courses - Unshaded hardscape elements achieving min. SRI (3-year SRI of min. 34 or an initial SRI of min. 39) - Roofing materials, including shading structures achieving min. SRI (Roof pitched <15°– a 3-year SRI of min. 64; Roof pitched >15°– a 3-year SRI of min. 34).
SUSTAINABLE TRANSPORT			
Bicycle Parking	Provide the following bicycle parking: — Minimum 1 bicycle parking space per apartment	**Mandatory**	
	— Minimum 1 visitor bicycle parking space per 5 apartments	**Mandatory**	
Electric vehicles	A general-purpose outlet should be conveniently located near at least 5% of bike parking for charging of electrical bicycles.	Contributory	Many car stacker models have nominated allowances for car charging locations.
	Provide adequate space for future installation of electrical car charging system	Contributory	

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
STORMWATER			
Stormwater	Site will achieve a 100% STORM score	**Mandatory**	Refer to ESD Technical Report for details. To achieve the extent of permeable surface, ground level landscape (plus raingardens treating impermeable surfaces) is preferred over permeable paving or the like. Increased extent of permeability over 20% is encouraged.
	A minimum of 20% of the site area will be permeable	Contributory	
POTABLE WATER			
Fixtures and fittings	Provide high water efficiency fittings, fixtures and appliances throughout, including: — Showers: ≤ 7.5 L/min — Taps: ≥ 5 star WELS — Dishwashers: ≥ 5 star WELS — Toilet: ≥ 4 star WELS — Washing machines (where provided): ≥ 5 star WELS	Contributory	Note, the requirement applies only as far as the nominated items are being provided. For example, where an applicant provides the dishwashers, those dishwashers should be 5 star. However, the applicant is not required to provide dishwashers to achieve this item.
Rainwater tank	Provide an adequately sized rainwater tank supplying water to toilets and irrigation. 2kL per apartment is recommended, however reduction from that amount may be permitted based on a performance-based approach	Contributory	Typically, minimum rainwater tank sizes have been set in the exemplar designs through STORM analysis (refer to ESD Technical Report). Rainwater tanks should be connected to clothes washers, toilets and irrigation. Tanks should be well integrated into the design, appropriately sized and outlined on drawings where applicable.

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
LANDSCAPE AND BIODIVERSITY			
Landscape and biodiversity	At least 35% of the site is garden area, with canopy cover and deep soil maximised	**Mandatory**	Refer to Garden Area, Landscape and Greening guidance in Part 1 of the Building Future Homes – Adaptation guide.
	Private open space (including balconies and courtyards) are provided with a tap and drainage point(s)	Contributory	
	Canopy trees should be located in outdoor communal open space or common areas	Contributory	
	Canopy cover and deep soil requirements must be provided as per section 5.2 in Part 1 of the Building Future Homes – Adaptation guide	**Mandatory**	
	Landscaping is climate responsive, drought-tolerant and reduces urban heat	Contributory	
	Landscaping supports biodiversity, wellbeing and amenity	Contributory	
MATERIALS			
Embodied carbon	The development addresses embodied energy, carbon and water costs of the materials used in the building through the following:	Contributory	Care should be taken to both minimise overall volume of material used, as well specify low impact materials as a priority.

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
Embodied carbon (continued)	— Nomination of low impact materials (such as sustainably sourced timber) and/or — Careful and efficient design (particularly structure) to minimise overall material usage compared to standard practice		Designers should consider: - Necessity of a particular material / response (e.g. sustainability by subtraction). - Nominating low impact materials, including recycled materials and responsibly sourced timber.
	The environmental impact of building materials used in the development will be addressed through: — "Common uses of PVC" (as defined in Green Star) will either not contain PVC, or comply with the Green Building Council of Australia's best Practice Guidelines for PVC	Contributory	
	— All timber used on site (including hoarding and the like) will be from either PEFC or FSC certified sources; or re-used	Contributory	
	— All steel used on site will be sourced from a Responsible Steel Maker, as defined under Green Star	Contributory	
Toxicity	All materials and finishes should be of very low toxicity, such that:	Contributory	Australian suppliers can typically readily meet these requirements.

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Table 3.4: ESD checklist – key commitments and inclusions underpinning the Future Homes exemplar designs (continued)

Topic	Initiative	Category	Guidance
Toxicity (continued)	— All internally applied adhesives, sealants and carpets will meet Green Star limits on Volatile Organic Compound (VOC) content		
WASTE			
Waste	Waste areas and access pathways sized to account for likely future authority waste streams including glass, organic and e-waste streams	Contributory	Seek guidance from a specialised waste consultant.
	Waste areas located with convenient access to the collection point	Contributory	
	Provide sufficient space in kitchen cabinetry to allow for waste separation, including kitchen organics, landfill, commingled recycling and glass	Contributory	
	Waste areas located conveniently in order to maximise their utility by people with limited / reduced mobility	Contributory	
	Non-landfill waste streams areas conveniently located as landfill waste streams	Contributory	
	Provide facilities for on-site processing of organic waste	Contributory	

Appendix 7: Construction cost guidance

General guidance

The Future Homes exemplar designs have been designed to construction rates commensurate with similar products on the market. They are intended for use in Victoria, and they must be adapted to suit your site and requirements. You must obtain independent professional advice in relation to any proposal to use and adapt the plans.

A Future Homes adapted design will strike a balance between conventional approaches to construction and new ways of building, including prefabricated elements and other more holistic forms of offsite construction.

DELWP engaged a quantity surveyor to prepare preliminary cost plans for each exemplar design. The cost plans were based on partial architectural design development resolution and adopted costs current in April 2021, at the time of design.

It is assumed that a structured cost planning and value engineering process will be followed throughout design adaptation and that the project will be appropriately documented before tender.

Key cost plans assumptions

- The structural system is a concrete slab on the ground, a concrete basement, a concrete slab above mechanical stackers and conventional lightweight materials for all levels over.
- Façades are of a nature typical for apartment buildings of this type and sit within standard benchmark rates. They include glazed, window-wall systems and framed, solid-façade systems with standard-range claddings including profiled metal, cement sheet and masonry.
- Internal finishes are assumed to be of a nature typical for aparment buildings of this type: for example, engineered timber flooring, carpet and tiles.
- Building services are typical for apartment buildings of this scale and type including LED lighting, split-system air-conditioning and smoke detection.
- No allowance has been made for fire sprinkler protection other than to mechanical car parking systems.
- No allowance has been made for fire sprinkler protection to apartments, balconies, common spaces, facades and paths of egress.
- Mechanical parking is based on available supply in Victoria as of April 2021, at the time of design.

Construction cost guidance

This information reflects the exemplar designs before adaptation. Independent professional advice must be sought with any proposal to use and adapt the exemplar designs to suit your site.

Any representation as to quantities, rates or estimated constructions costs are provided for guidance and do not constitute representations as to future matters. Quantities and costs may vary considerably depending on many factors including the site, final design, specification and other factors.

- All costs are reported exclusive of GST.
- Cost escalation: in the order of 15% from April 2021 to September 2022 and allow a further 5-6% up to July 2023, and 3.5-4% p.a. thereafter.

Furthermore, the Melbourne construction market is currently experiencing high levels of cost escalation and volatility, with tenderers pricing in varying levels of risk, resulting in large spreads in tender returns. Costs are based on projects being tendered to a minimum of four interested and appropriate builders under a competitive lump sum tender.

Potential risk factors which may impact pricing include:

- Ongoing shortages of structural steel and timber and associated lead times
- Abnormal site conditions including presence of fill, contaminated soil, non-rippable rock or groundwater
- Capacity of selected tenderers to deliver an architecturally designed multi-residentail project to the required level of quality to support the required sales rates
- Capacity of selected tenderers to take on the project based on the amount of projects currently on their order book.

These risks can be managed by:

- Confirming current tenderer order book and level of interest in tendering prior to releasing to market
- Thorough vetting of previously completed projects of each tenderer
- Ensuring the contract provides a balanced approach to risk in terms of items such as extensions of time, entitlement to variations, latent conditions, etc
- Making the project as easy to tender as possible (i.e. limit tender options, provide prompt, clear and concise responses to requests for information during the tender phase, provide procurement schedules to assist with pricing)
- Running an efficient tender process and subsequent contract negotiation and finalisation
- Working pro-actively with the successful builder and taking a collaborative approach to confirming material supply and any early commitments that may need to be made
- Finalising project detailing and construction documentation in a timely fashion with the builder's input.

Table 3.5: Exemplar A construction cost guidance (all costs are reported exclusive of GST)

	North-south, at grade	North-south, with basement	East-west, at grade
Possible construction cost	**Approx. $5.8 m**	**Approx. $6.8 m**	**Approx. $5.7 m**
Construction rates (all costs are reported exclusive of GST)			
Sellable apartment area (m2)	$3,200	$2,600	$3,200
Common circulation (m2)	$1,900	$1,750	$1,850
Covered on-grade parking (not including mechanical parking units) (m2)	$850	$1,500 (basement)	$850
Balconies and terraces (m2)	$1,400	$1,350	$1,250
External works and landscaping (m2)	$450 - $600	$450 - $600	$450 - $600

Table 3.6: Exemplar B construction cost guidance (all costs are reported exclusive of GST)

	North-south, at grade	North-south, with basement	East-west, at grade
Possible construction cost	**Approx. $5.4 m**	**Approx. $6.4 m**	**Approx. $5.7 m**
Construction rates (all costs are reported exclusive of GST)			
Sellable apartment area (m2)	$2,950	$2,550	$3,100
Common circulation (m2)	$2,650	$3,000	$3,200
Covered on-grade parking (not including mechanical parking units) (m2)	$650	$1,500 (basement)	$1,100
Balconies and terraces (m2)	$1,200	$1,000	$1,250
External works and landscaping (m2)	$450 - $600	$450 - $600	$450 - $600

Table 3.7: Exemplar C construction cost guidance (all costs are reported exclusive of GST)

	North-south, at grade	North-south, with basement	East-west, at grade
Possible construction cost	**Approx. $5.6 m**	**Approx. $6.8 m**	**Approx. $6.8 m**
Construction rates (all costs are reported exclusive of GST)			
Sellable apartment area (m2)	$2,950	$2,950	$3,150
Common circulation (m2)	$2,000	$2,550	1,850
Covered on-grade parking (not including mechanical parking units) (m2)	$950	$1,500 (basement)	$800
Balconies and terraces (m2)	$1,900	$2,050	$1,250
External works and landscaping (m2)	$450 - $600	$450 - $600	$450 - $600

Table 3.8: Exemplar D construction cost guidance (all costs are reported exclusive of GST)

	North-south, at grade	North-south, with basement	East-west, at grade
Possible construction cost	**Approx. $5.8 m**	**Approx. $6.4 m**	**Approx. $5.4 m**
Construction rates (all costs are reported exclusive of GST)			
Sellable apartment area (m2)	$3,050	$2,800	$2,800
Common circulation (m2)	$2,350	$3,500	$2,700
Covered on-grade parking (not including mechanical parking units) (m2)	$1,000	$1,500 (basement)	$1,050
Balconies and terraces (m2)	$1,400	$1,100	$1,200
External works and landscaping (m2)	$450 - $600	$450 - $600	$450 - $600

The above guidance covers direct construction costs only. In addition to these amounts, the feasibility study should include a construction contingency, and other project costs including:

- land acquisition and land holding
- marketing and sales costs
- authority contributions
- demolition of existing structures, if applicable.

Additional items which could affect costs include:

- the articulation of the building form and layout
- the external wall-to-floor ratio
- the floor-to-floor height
- the structural system adopted
- internal and external finishes adopted
- the ratio of solid to glazed façades
- future changes to the legislative requirements
- the level of internal and external finishes adopted
- site-specific conditions including:
  - in-ground conditions
  - the age and condition of existing structures
  - access constraints such as overhead power lines, and loading zone availability loading zone availability
  - the location, capacity and ability to connect to existing services infrastructure
- the form of construction contract adopted.

The overall project density (size and layout of apartments) should be carefully considered in any feasibility study that is undertaken. For example, one-off costs including kitchens, switchboards, and bathrooms can have a significant impact on square metre rates. Large, open spaces will dilute these costs downwards, while smaller apartments with many rooms will make these items represent a larger share of the overall cost.

Appendix 8: Accessibility

General Notes

The following notes should be included on the adapted plans to confirm compliance with the mandatory accessibility requirements:

All identified Future Homes Accessible apartments:

- *have extended floor finishes (slip resistant flooring) under appliances and cabinets to allow for future modifications in the laundry and kitchen*
- *have secure fixing surface provided to bathroom and toilet walls for installation of future grab rails*
- *have noggings provided to meet NCC requirements where walls are not constructed of solid masonry or concrete*
- *have the centreline of the toilet pan in a combined bathroom 450-460mm from the adjacent wall and other fixtures.*

All Future Homes accessible dwelling are to be clearly identified on submitted plans.

Accessibility Diagrams

These diagrams have been reproduced with the consent of Livable Housing Australia. They are provided to assist with understanding compliance with the mandatory Accessibility design outcomes at Table 1.13 in Part 1 and represent approaches in meeting the gold performance level of the Livable Housing Design Guidelines.

Applicants may consider obtaining certification of an adaptation design and/or the final as-built product with a registered Livable Housing Australia Design Guideline Assessor. Certification from a registered assessor will enable developments to be marketed as being LHA compliant.

Figure 3.2: Apartment entrance door clear opening plan

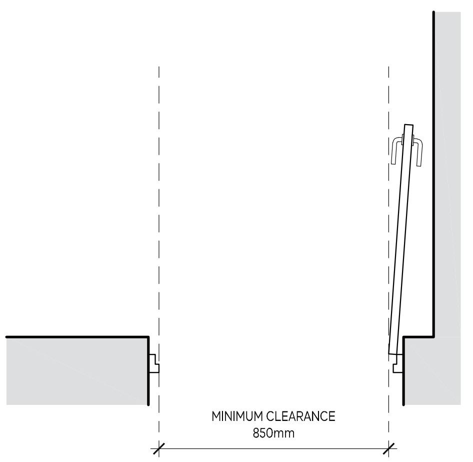
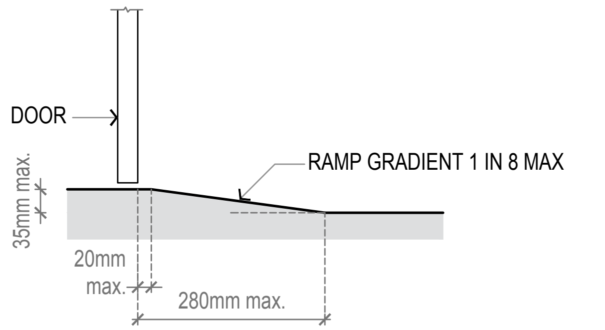


Figure 3.3: Threshold ramp section at the apartment entrance



Other design considerations at step-free apartment entries include:

- termite protection - structural depth required for termite barriers and adequate inspection zones
- weather protection - weather seals, linear drains and canopies over entries should be considered to prevent water ingress at step-free thresholds.

Figure 3.4: Toilet clearances plan when in a separate room

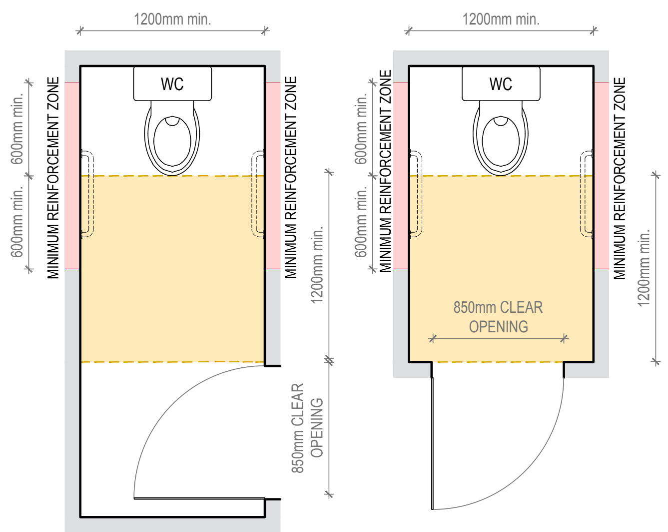


Figure 3.5: Alternative toilet clearances plan when in a bathroom

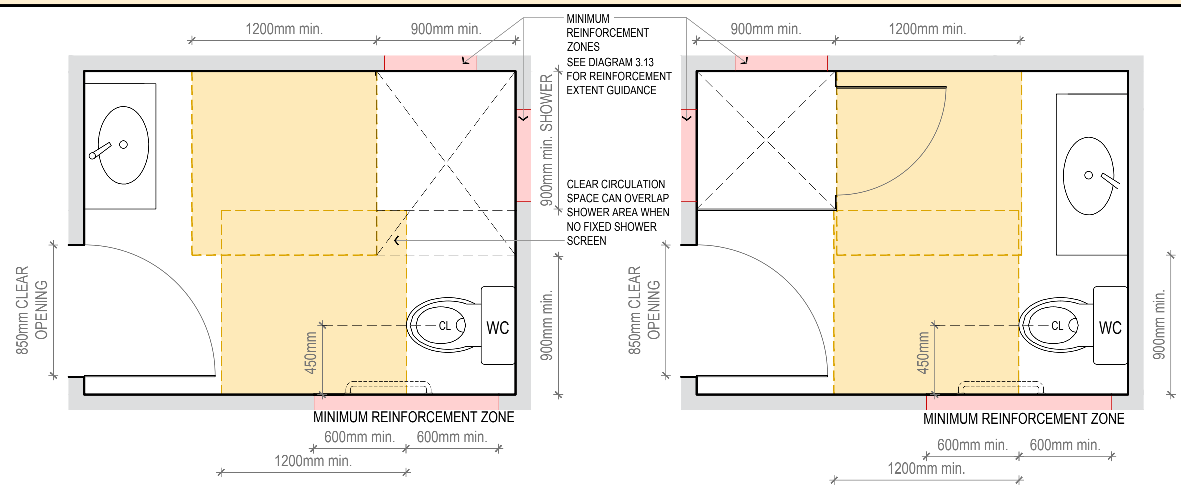


Figure 3.6: Toilet wall reinforcement elevation for future grab rails

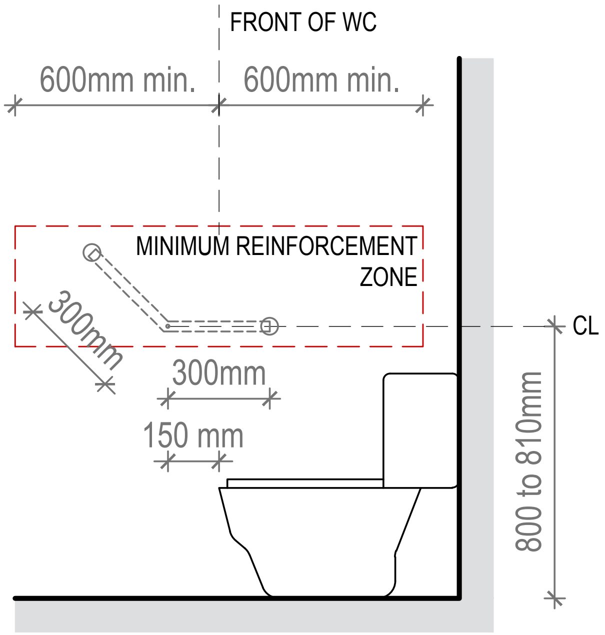


Figure 3.7: Shower clearances plan

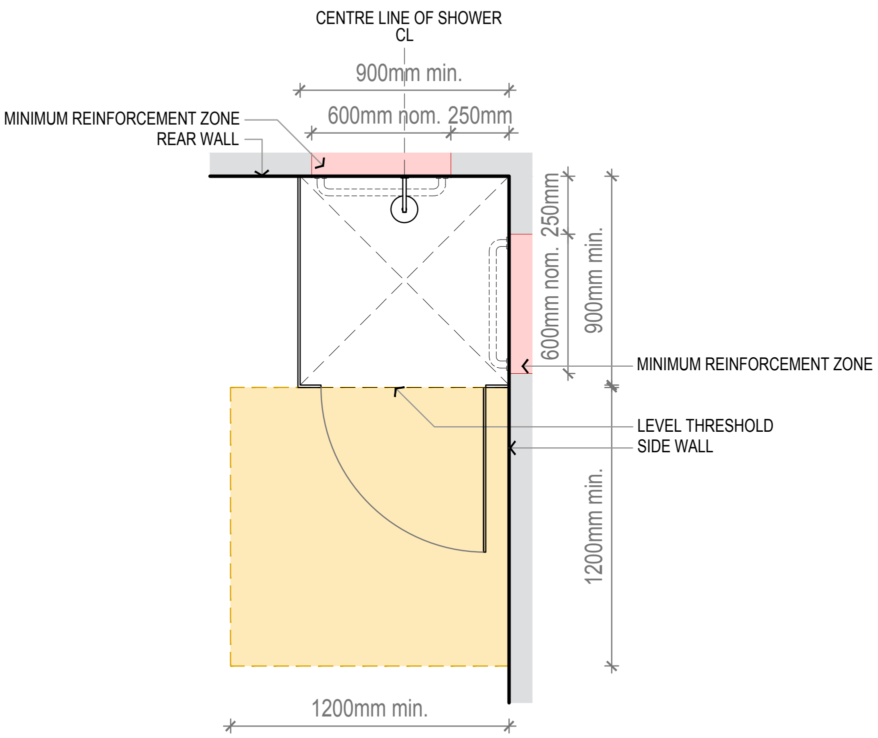


Figure 3.8: Shower wall reinforcement elevation for future grab rails

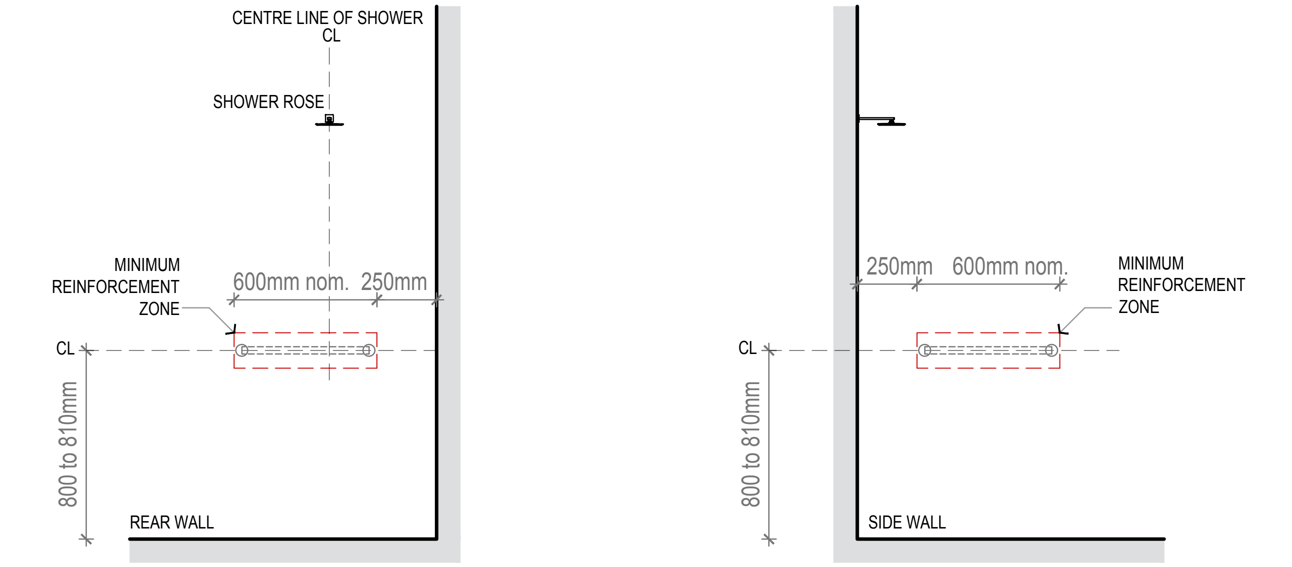
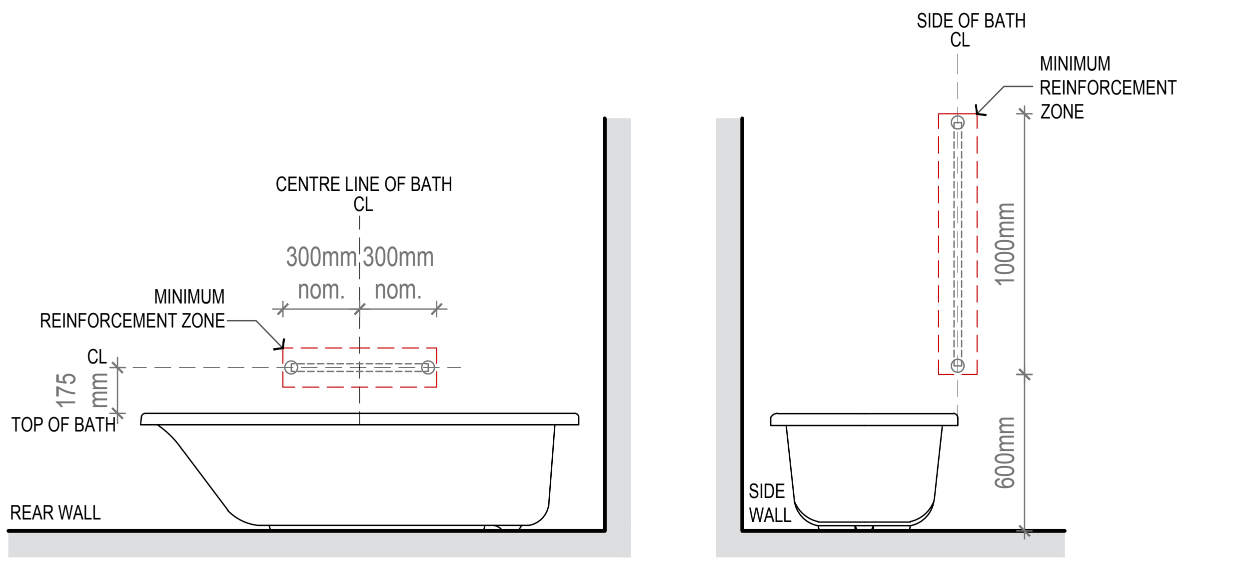


Figure 3.9: Bath wall reinforcement elevation for future grab rails



Glossary

Built Environment Sustainability Scorecard (BESS) — An assessment tool to help developers and designers show how a proposed development demonstrates sustainable design.

Exemplar design — One of the four scalable, replicable designs for three-storey apartment developments that can be adapted to various sites and which were refined from winning entries in the Future Homes architectural design competition. ‘Exemplar design’, ‘Exemplar plan’, 'Future Homes design' may be used interchangeably.

Future Homes — The Victorian Government project to increase housing diversity and density by facilitating apartment developments that are world-leading in their design quality, liveability and sustainability.

National Construction Code (NCC) —Australia’s primary set of technical design and construction provisions for buildings.

Nationwide House Energy Rating Scheme (NatHERS) — A 10-star rating system to assess the thermal performance of dwellings across Australia.

Photovoltaic (PV) system — A system that uses solar panels, an inverter and other electrical and mechanical hardware to use solar energy to generate electricity.

Determining Referral authority — This term has the same definition as the Planning and Environment Act 1987. However, for the purposes of the Future Homes streamlined planning process is limited to Department of Environment, Land, Water and Planning, Melbourne Water and Transport for Victoria who have agreed to receive referral applications upfront, prior to lodgement with the responsible local authority.

Stormwater Treatment Objective - Relative Measure (STORM) — A tool to assess stormwater treatment methods.

Transport for Victoria (TfV) — Head, Transport for Victoria, a body corporate established under the Transport Integration Act 2010.

Victoria Planning Provisions (VPP) — The Victoria Planning Provisions, which are the planning policies and controls on which all land use planning decisions are made.

Water Sensitive Urban Design (WSUD) — The design of buildings, subdivisions and works to minimise the hydrological impact of urban development on the surrounding environment.