AGING IN PLACE DESIGN GUIDELINES

FOR INDEPENDENT LIVING IN MULTIFAMILY BUILDINGS

2016

OZ

ARCHITECTURE

URBAN DESIGN

INTERIOR DESIGN

Enterprise green communities®

ABOUT US

ENTERPRISE GREEN COMMUNITIES

Enterprise Green Communities is the first national green building program focused entirely on affordable housing. Launched by Enterprise in fall 2004, Green Communities is designed to help developers, investors, builders and policymakers make the transition to a greener future for affordable housing.

Visit *www.enterprisecommunity.org/green*

ABOUT ENTERPRISE

Enterprise is a leading provider of the development capital and expertise it takes to create decent, affordable homes and rebuild communities. Enterprise has introduced neighborhood solutions through public–private partnerships with financial institutions, governments, community organizations and others that share our vision. Enterprise has raised and invested more than $23.4 billion in equity, grants and loans to help build or preserve more than 358,000 affordable rental and for-sale homes to create vital communities. Enterprise is currently investing in communities at a rate of $1 billion a year.

Visit *www.enterprisecommunity.org* to learn more about Enterprise's efforts to build communities and opportunity.

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1.0 INTRODUCTION

1.0 | INTRODUCTION

Flatirons Terrace | Boulder, CO

OVERVIEW

Enterprise Community Partners is committed to ensuring that older adults have the services and support they need to live independently with dignity in their homes and communities. As complementary pieces to our Enterprise Green Communities Criteria, we are pleased to release this Aging In Place Design Guidelines document and supplemental design charrette tools aimed at helping affordable housing owners better assess and respond to the needs of their aging residents through the built environment.
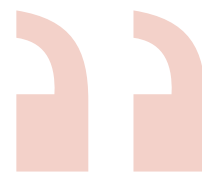
1.1 | SCOPE OF DOCUMENT

> "*Aging in Place is the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level.*"
>
> *- The Center for Disease Control*

PURPOSE

As the aging population grows and life expectancy rises, the concept of housing for aging adults has evolved to support a more independent, active lifestyle. The need for affordable housing that allows individuals to age in place is increasing as demand is outpacing supply. The Aging In Place Toolkit, which includes this Aging In Place Design Guidelines document (along with charrette tools, an existing building checklist, and prioritization tool) has been created to supplement existing Enterprise resources for sustainable, affordable housing. The Aging In Place Design Guidelines will serve as a resource for both new construction and renovations of existing buildings, by providing **best practice strategies that allow individuals the flexibility to age in their current residence and remain a vibrant part of the community**. The scope of this document does not include operational strategies and programming.

The goal of aging in place strategies is to increase the **safety and comfort** of aging residents. The support infrastructure needed to assist residents as their abilities become more limited can be planned for in new construction or addressed through building renovations to existing buildings. The current age mix of residents may not include older adults, but planning ahead for the necessary infrastructure and aging in place design features during construction and renovations will make future upgrades less costly and allow residents to stay in place as they age. The intent of this guide is not to cover age restricted or senior living developments, but rather how to construct or renovate residential buildings to accommodate independent individuals as they age. While this document focuses strictly on aging in place building design strategies, these should be considered along with the wide range of other design strategies based on project goals and building owner priorities, as well as a full complement of potential service opportunities to ultimately create not just a building, but a home that provides the foundation for a good life.

DOCUMENT ORGANIZATION

Chapters in this document have been organized by project elements, starting with the largest scale strategies (site) and progressively adding more detail until the smallest scale (rooms) is discussed. Sub-categories are called out with large colored headings within each chapter. The intent is not for design teams to feel that they must include every strategy in the Aging In Place Design Guidelines. Each project should **choose the strategies that meet the goals and specific needs of the users of the building**. Consider the principles as a library of strategies to meet an ideal end goal of addressing all possible resident conditions. The needs of the actual residents of the building will vary. Additional resources can be found in the appendix.

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1.0 INTRODUCTION

1.1 | SCOPE OF DOCUMENT

AUDIENCE

The intended audience for this document is **owners, developers, and design teams concerned with incorporating aging in place strategies within affordable housing properties.** Strategies have been included for developers with new construction projects and developers with existing buildings that will be undergoing renovations.

RESIDENT USER GROUP

Many in our population have a desire to live independently for as long as possible. Whether young or old, residents may find that living in a building designed for aging in place is attractive, as it allows for a single place to reside over time, through every phase of life. A home must meet the needs of all users. When residents move into a home designed to accommodate aging in place they may be younger, single and live on their own, or they may be raising a family. Their current needs will be different than their needs as they age over time.

The organic growth of a community over time can create diverse, multi-generational relationships that utilize each person's strengths in the community. **All age groups should be integrated into the community**, rather than segregated, to take advantage of these important relationships. Cultural differences and family make-up should be considered when planning appropriate housing types to meet varying expectations. Residents may also have varying social preferences; some may desire a more interactive co-housing environment while others may seek more privacy. Facilities that offer shared amenities for independent residents will be included in the scope of this document but licensed facilities such as assisted living, memory care and skilled nursing facilities will be excluded.
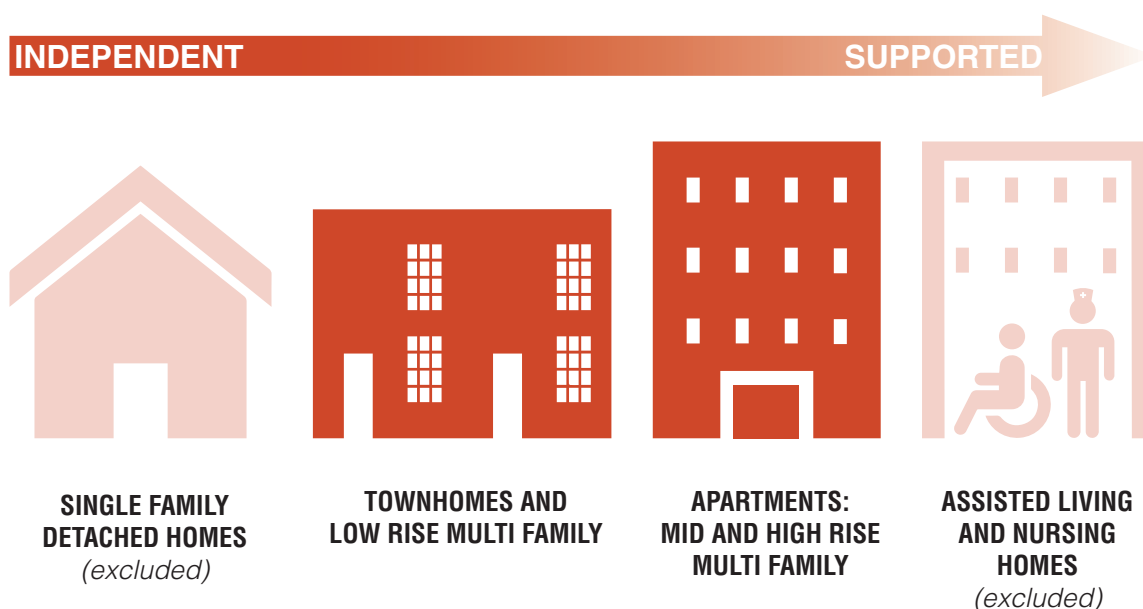
Regardless of user preferences, **the goal for all communities is to extend and enhance independence of all residents** despite their varying needs. This document includes strategies for a range of physical and cognitive capabilities- for individuals who are fairly independent to those that may require some assistance from a caregiver or spouse. Aging residents can face daily challenges from cognitive impairment, decreasing physical abilities, sight and hearing. In addition, behavioral and mental health challenges can limit an individual's ability to remain independent.

BUILDING TYPE

Individuals may choose to age in a variety of housing types. **The scope of this document covers general residential housing being constructed or renovated where there is a desire for residents to be able to remain in place as they age.** Only buildings designed for independent residents are covered in the scope of the document. Active adult, age-restricted communities and residences specifically designed for senior living are not the focus of the document. Many of the strategies to accommodate aging residents are the same however. Strategies geared towards assisted living facilities and nursing homes will not be discussed. The strategies for aging in place in detached single-family homes are different than for attached multifamily dwellings. To simplify the scope of the document, content has been limited to **multifamily communities where residents live independently and are not responsible for the exterior maintenance of the building**.

Single-family homes and for sale condo units, in which the occupant is responsible for maintenance of the home, have been excluded. Detached accessory dwellings are also excluded. However, the strategies presented may still be applicable to these housing types. **We hope that anyone designing for aging residents finds this document a helpful resource.** Multifamily attached units may include townhomes, low, mid and high-rise apartment buildings. Co-housing communities will be included, as co-housing communities can consist of detached homes or attached units. (Co-housing is a cooperative living arrangement consisting of a cluster of private residential spaces and a shared community space, often for shared meals/preparation and gathering as a community.) The focus of this document will be on affordable housing, however, new technologies and concepts which may have a higher cost will also be included to inspire creative solutions and out-of-the-box thinking.

INDEPENDENT → **SUPPORTED**

| SINGLE FAMILY DETACHED HOMES *(excluded)* | TOWNHOMES AND LOW RISE MULTI FAMILY | APARTMENTS: MID AND HIGH RISE MULTI FAMILY | ASSISTED LIVING AND NURSING HOMES *(excluded)* |

1.0 INTRODUCTION

1.2 | GENERAL INFORMATION

COST

Upgrading an existing building or incorporating aging in place strategies into new construction can be a sizeable investment. When **budgets are limited it can be difficult to prioritize** the long list of issues that need to be addressed to allow residents to age in place. The Enterprise Aging In Place Toolkit resources include a prioritization tool that can be found in the Charrette Toolkit for use in the decision making process. This exercise allows a project team to weigh the impact and cost of each design strategy; and to ultimately identify which strategies are of the highest importance. Where possible, prioritize critical elements like life safety and accessibility features over conveniences. Each design team should choose the most appropriate strategies based on the project goals.

Aging in place strategies may be **implemented all at once or over time** as the project type and budget allows. Breaking up the cost over time relieves first costs and may allow the building owner to ultimately include a larger number of age friendly strategies. Existing occupied residential units may be upgraded as the needs of residents change, spreading out the cost over a long time period. Aging in place design strategies can be less costly when they are considered in an integrated fashion with other building priorities.

PLANNING

When renovating an existing community, or planning a new one, design teams should consider many factors. **The budget, available space on the site, intended age range of the occupants, and the goals of the project are all early discussion points.** Health factors to consider in planning may include resident's mental capacity, vision, hearing, mobility and other physical challenges such as flexibility and balance, brittle bones, incontinence, and possibly an increased number of medical conditions as the body ages.

Stakeholders should be engaged early in the design process to identify aging in place goals and to prioritize strategies that will be incorporated into the design. **Planning for infrastructure to address aging in place needs early in the design process** can be less costly than renovating the building later. If strategies will need to be implemented over time, creating a phased construction plan with the needed space and infrastructure for future renovations can reduce cost. A key issue to consider during the design charrette or programming phase is the addition of extra space, exceeding minimum requirements whenever possible. Once the building footprint and layout is set it is difficult to add square footage to accommodate future needs. Consider what can be put in place now and what strategies could be easily added in the future as needs of the residents change.

If the team will also be pursuing Enterprise Green Communities Certification a list of aging in place recommendations for the 2015 Enterprise Green Communities Criteria can be found in the Aging In Place Toolkit.

Plan space for common areas in the initial construction project; as it is difficult to add square footage for these purposes in the future.
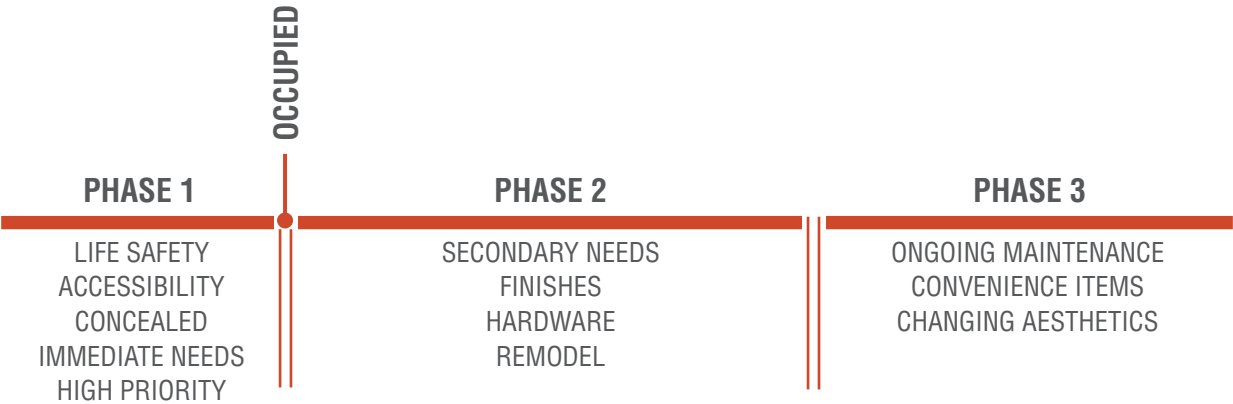

Understand the needs of the intended residents to determine what types of amenity spaces are appropriate. For example, residents who are uncomfortable with new technology may not own their own computer but may appreciate a computer station where staff or a friend can help them send an e-mail to relatives.

1.0 INTRODUCTION

1.2 | GENERAL INFORMATION

PHASING

Renovation work may need to be implemented in **incremental steps** due to budget constraints or current building occupancy. Renovation projects should prioritize upgrades that impact safety in the first phase. Consider upgrading the bathroom and kitchen first, as these rooms have more safety risks for aging individuals and residents use these rooms part of their daily lives. (Reference the kitchen and bathroom section for specific design recommendations.) As a result, space in the living room may need to be compromised to gain additional clearance in a bathroom or kitchen, which can be addressed by selecting space efficient furnishings.

The sequencing of long term improvements will be dependent on whether or not the building is occupied during initial construction activities. When possible, it is least disruptive to residents to complete any major construction (such as moving walls or adding infrastructure that will be hidden behind walls) prior to occupancy. Smaller renovations can be made as residents age and customized to their specific abilities. Capabilities change with age, so **needs may evolve** over the life of the project as residents continue to age.

OCCUPIED

PHASE 1	PHASE 2	PHASE 3
LIFE SAFETY	SECONDARY NEEDS	ONGOING MAINTENANCE
ACCESSIBILITY	FINISHES	CONVENIENCE ITEMS
CONCEALED	HARDWARE	CHANGING AESTHETICS
IMMEDIATE NEEDS	REMODEL	
HIGH PRIORITY		

REGULATORY COMPLIANCE AND ZONING

Building renovation can trigger regulatory compliance issues with code, licensure requirements or health department regulations.

Plan extra time for negotiation with officials for compliance. Areas that are undergoing major renovations are often required to be brought up to the current code and require building permits. A change in the function of the facility can change the building use which impacts both building code and zoning regulations. Facilities with components of congregate care, even when serving independent residents, may require licensure depending on the services provided.

Facilities with additional staff are zoned differently than standard residential projects. Independent living may include amenities such as a dining room with food service which would trigger health department oversight.

Relevant Codes, Standards and Guidelines:

ADA Standards for Accessible Design
Fair Housing Accessibility Guidelines
Uniform Federal Accessibility Guidelines

Enterprise Green Universal Design Specifications
Enterprise Charrette Toolkit with Aging In Place Toolkit addendum

General Building Codes:

International Code Council / International Building Codes
National Fire Protection Association (NFPA)
Local Municipality Planning and Zoning Departments
Local Building Department

Including a dining room in the project may trigger health department oversight.

1.0 INTRODUCTION

1.0 INTRODUCTION

FOUR KEY CHALLENGES

There are **four key challenges** for existing building renovations versus the flexibility of new construction projects. The design will be limited by the interior/exterior circulation, lack of infrastructure behind the walls, existing built-in components/cabinetry and the existing footprint. An Aging In Place Existing Conditions Checklist has been provided in the Aging In Place Toolkit to help teams **evaluate existing sites and buildings** to identify where project specific challenges occur. Strategies may be phased over the life of the project or implemented in a single effort.

BUILDING CIRCULATION

Efficient circulation can increase the ability of a resident to age in place. A lack of good vertical circulation in an existing building can be a detriment for a community. **A residential building with internal circulation may be easier to renovate to overcome vertical circulation challenges**. A building with internal circulation may be larger in size, increasing the opportunity to find interior space that could be converted for the installation of an elevator. A building with exterior circulation may need to sacrifice site area to add an elevator outside of the building. Smaller walk-up buildings can be cost prohibitive for elevator additions as more elevators would be required to serve all the buildings and often these smaller buildings do not have a common area that would give all residents access to the elevator. Larger buildings with interior corridors have more space to accommodate renovations to create accessible routes. Long hallways in interior circulation provide the needed length to add ramps if there are elevation changes within a floor plate. Unit doors may need to be shifted to accommodate ramps if the length of the ramp crosses the entry.

Use the Aging-in-Place Existing Building Checklist to evaluate an existing site or building (sample page shown).

BUILDING INFRASTRUCTURE BEHIND WALLS

A challenge with an existing building is that it can be **difficult to know what is behind the walls**. Demolition is an added cost of renovating an existing building. Walls will possibly need to be moved, plumbing and wiring relocated and blocking added. Renovations can trigger upgrades to meet the current code, which can be an added burden to the project. When renovating walls construction teams could **encounter unforeseen problems** such as asbestos, lead piping or paint. Careful planning and observations of the facility should be done to minimize cost creep and project delays.

CABINETRY

Cabinetry is a significant component of unit design that contributes to accessibility and livability. Because only a small percentage of units are required to be accessible, the majority of units encountered within existing buildings will not have kitchens and bathrooms with the needed clearances for walkers or wheelchairs, or **adaptable cabinetry for a standing or seated position**. Some modification might be possible, but frequently to meet accessibility requirements the cabinetry must be replaced with millwork with removable base cabinets and surface heights that can accommodate seated or standing residents. Dated cabinetry, not specifically designed with aging residents in mind, often does not have accessibility features that newer millwork does such as loop cabinet hardware, pull down shelving or roll out trays. Although millwork and cabinetry can be costly, proper design and layout can make a significant difference.

FOOTPRINT

Working within an existing building footprint can make it difficult to find space for new common area amenities. Buildings with interior circulation have more flexibility to add common spaces since spaces may be accessed from the main corridor. If common areas don't already exist in larger buildings with an interior corridor, a unit near the entry can be retrofitted into shared spaces such as a waiting area, offices for management, or amenity space. Townhomes or walk-up style buildings without a central corridor can also modify a unit to provide common space amenities. However, residents would have to access the common spaces from the exterior, rather than a corridor inside the building. A bottom level, corner unit would work best for accessibility and visibility.

Layout changes to meet room clearances may be constrained by the overall unit footprint. Moving demising walls between units can be considered, but fire separation, electrical and plumbing should be carefully considered. Space in the living room or storage rooms could be sacrificed to give the kitchen and bathroom better clearances. Changing a unit to an open floor plan by removing walls may make better use of the space and provide flexibility.

> Working within an existing building footprint can make it difficult to find space for new common area amenities.
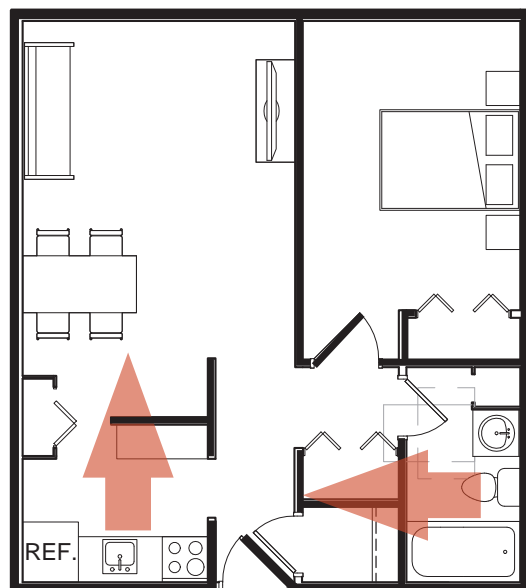
Moving interior walls within a unit can provide extra space for clearances in the kitchen and bathroom.

2.0 SITE

The Carillion | Boulder, CO

OVERVIEW

Site selection has a significant impact on the overall quality of a community and creates opportunities to increase the ability for residents to age in place. The placement of the site within the community affects the connectivity to both adjacent locations and modes of transportation. It's also critical to pick a site others can reach easily, whether for private transportation, deliveries or visitation. Safe, easy to use streets and parking, as well as appropriate site lighting and walkable sidewalks, all impact the quality and usability of the surrounding neighborhood. Creating a recognizable and easily identifiable building entry will intuitively lead residents and visitors alike to the front door. These and other site factors outlined in this chapter can have a significant impact on the livability of the community.

2.1 | SAFE WALKABLE NEIGHBORHOOD

SITE SELECTION

The project site selection process should assess possible locations for safety, desired services, walkability, access to public transportation and diversity. A sense of comfort with the surrounding community and safe means of travel are primary considerations for aging residents who interact more intimately with the neighborhood than residents traveling from place to place in their car. Perceived safety is increased by more eyes on the street and relationships with a diverse community where differing age groups can assist each other in their daily lives. An ideal neighborhood would provide the support and services needed by aging individuals with easy means of accessing those resources. Pathways of travel should be continuous and well maintained.

An ideal neighborhood would provide the support and services needed by aging individuals with easy means of accessing those resources.

A community that is perceived as safe will encourage residents to engage others in the community and travel to nearby destinations.

CONNECTIVITY

Many aging residents may have physical or mental limitations which affect their ability to operate a vehicle, therefore it is important to **select a site near public transportation or within a short walking distance of basic services**. Rural locations may be lacking accessible routes to nearby services making it difficult to get to destinations. Transportation may be provided through dial-a-ride services which respond to residents as needed. Limited mobility can also lead to feelings of isolation which can result in deterioration of mental capabilities and depression. Opportunities for social interaction are important to keep residents engaged and healthy. Try to select a location near important basic services to meet daily needs. Avoid food deserts which lack close healthy food options, or consider providing options on site. Key service areas include healthy food options, health and wellness providers, social and spiritual destinations.

EXAMPLES OF BASIC SERVICES:

Health and Wellness
- Community Recreation Centers & Parks
- Medical Facilities
- Pharmacy

Social and Spiritual
- Library
- Worship
- Community Services
- Educational Opportunities

Healthy Food Options
- Grocery Store
- Farmers Market
- Restaurants
- Community Garden

WALKABLE ROUTES TO LOCAL SERVICES

KEY
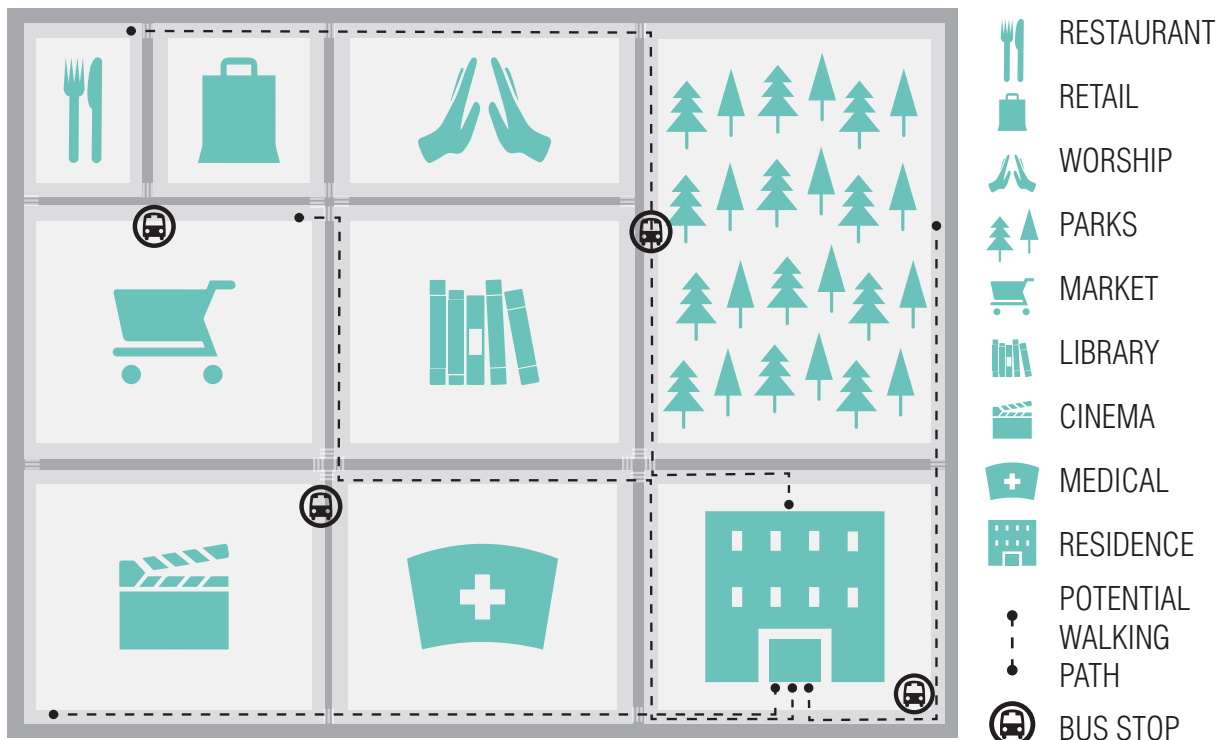
Select a location within easy walking distance of basic services and public transportation.

PUBLIC TRANSPORTATION

Public transportation provides affordable, reliable, predictable transportation for aging residents. Locate the project within a **short walking distance of transit services with safe and accessible walking routes.** Bus stops on or near the project site increase access to local services which may be too far to walk. Consider upgrading public transportation stops on the property to include a bench, shelter/shade, a clock, and a place to post schedules and maps. Wayfinding signage located at the building entry that guides residents to the nearest stops can help orient residents. Some individuals may not be as savvy with technology to use online resources to plan routes. Creating an area in the lobby for posting physical public transportation schedules will aid in planning.

1. **SHELTER**

2. **BENCH**

3. **MAP**

4. **SCHEDULE**

5. **SIGNAGE**
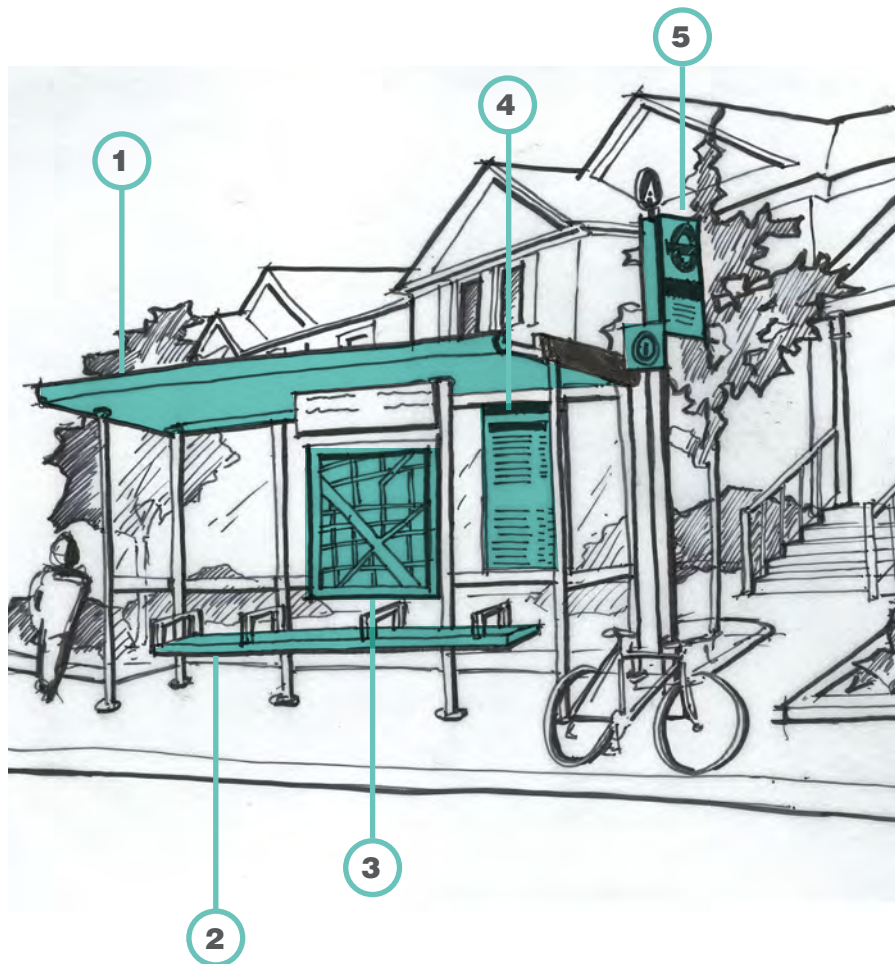
Choose a site with accessible public transportation stops within a short walking distance of the project.

2.2 | ACCESSIBLE PATHWAYS

EVALUATION OF WALKABLE ROUTES

The path of travel from a residential unit to nearby amenities includes many transitions: corridors in the building, pathways within the site and routes within the city. Evaluation of safe, walkable routes should **encompass all portions of the route** and strategies to improve walkability should be incorporated into areas within the design team's control. Check for appropriate **surfaces, slope, crossing areas and that routes are easy to navigate.** Routes that are pleasing to walk, where there is separation from traffic through landscape barriers or extra wide sidewalks, will be more frequently used. Narrow sidewalks with no barrier between pedestrians and traffic feel unsafe and if pedestrians slip during hazardous weather conditions they could fall into traffic. Ideally walking routes would include regular resting points along the entire walking route, from the unit entry to the final destination. Residents will hesitate to venture out if the walking route is an unpleasant experience.

Separation from the street with landscaping and trees creates a more pleasant walking experience.

KEY ELEMENTS OF A WALKABLE PATH

SLOPE

- Minimize vertical transitions.
- Routes within the community to local destinations should be **accessible by all residents, including those using walkers and wheelchairs.**
- The path connecting services uses guardrails at locations where a fall to a lower surface is possible.
- Pathways meet and exceed all relevant accessibility codes for stairs, ramps, handrails and sidewalks. Sloped surfaces have proper support such as handrails on both sides.
- Avoid routes with steep slopes.
- Avoid steps within the design whenever possible. Low-rise stairs are easier to navigate if steps are unavoidable. A bright colored strip at the surface edge can help designate a change in plane.
- A low wall or guardrail along low sloping walkways that are slightly raised from surrounding landscape will prevent residents from stepping off and falling.
- Pathways should slope slightly to drain so they don't collect water/ice.
- Ideally the connecting pathways leading to the building entry have a zero entry plane
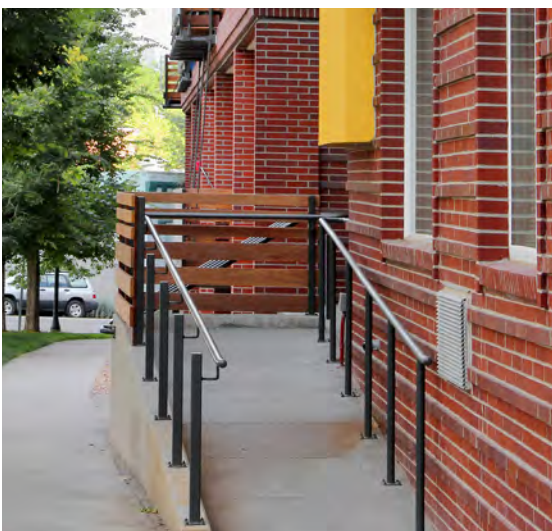
SURFACES

- **Sidewalks are continuous, well maintained and free of cracks or broken sections that are a tripping hazard.**
- There are smooth joint transitions between materials.
- The finished surface of path materials provides proper slip resistance - concrete with a broom finish is appropriate.
- Color may be used to help identify different types of pathway surfaces, or pathways to different destinations.
- If stairs are necessary, concrete stairs with a rounded edge are preferable to metal grate surfaces which can lead to additional injuries during a fall due to sharp edges.
- **Smooth hard surfaces free of tripping hazards** (such as concrete sidewalks) provide the safest surface for regularly traveled pathways between the building and nearby services. Uneven surfaces may cause a resident to lose their balance.
- Gravel pathways can be difficult to walk or roll through.

Provide handrails on both sides of ramps.

Create continuous sidewalks within the site that connect to pathways in the surrounding neighborhood.

2.0 SITE

2.2 | ACCESSIBLE PATHWAYS

CROSSINGS

- Extended crosswalk time allows slower moving individuals to cross several lanes of traffic.
- A median with flat space wide enough to safely stand will allow pedestrians to cross the road half way if it is difficult to cross all lanes at once. This allows pedestrians to look for gaps in traffic only one direction at a time.
- For long traffic cycles providing a low garden wall or bench where an individual may sit while waiting is helpful.
- **Crosswalks with visual, tactile, and audible cues** are helpful for individuals with hearing or vision impairments, such as truncated domes, flashing lights and audible timers on crossing signals.
- Crossing areas should be **distinct with pavement markings and changes to surfacing.** Reflective or glow in the dark paint markings are more visible to cars and people crossing at night. Colored artwork can also be used to highlight the pedestrian crossing areas.
- Provide **reflective and brightly colored signage** for both people crossing and cars. Signage can be located on the ground as a reminder to look up and check for traffic, or pole mounted where it is easy for both cars and pedestrians to read.
- Intersections and crossing areas should be **well lit** so cars can see individuals crossing. Flashing crosswalk signage can help identify crossing areas at night.
- Sidewalks should **ramp down** to the level of the street and use warning strips to indicate transition at intersections and crosswalk
- Z-crossing, or staggered crosswalks, are generally safer because pedestrians are directed to face oncoming traffic before turning to finish crossing the street, however, the change in direction can be a challenge for the visually impaired. Adding detectable surface warning strips or railings can help realign the individual.

1 **CROSSWALK**

2 **RAMP TO STREET LEVEL**

3 **BENCH**

4 **POLE SIGNAGE**

5 **WARNING STRIPS**

6 **Z CROSSWALK**

7 **SURFACE SIGNAGE**
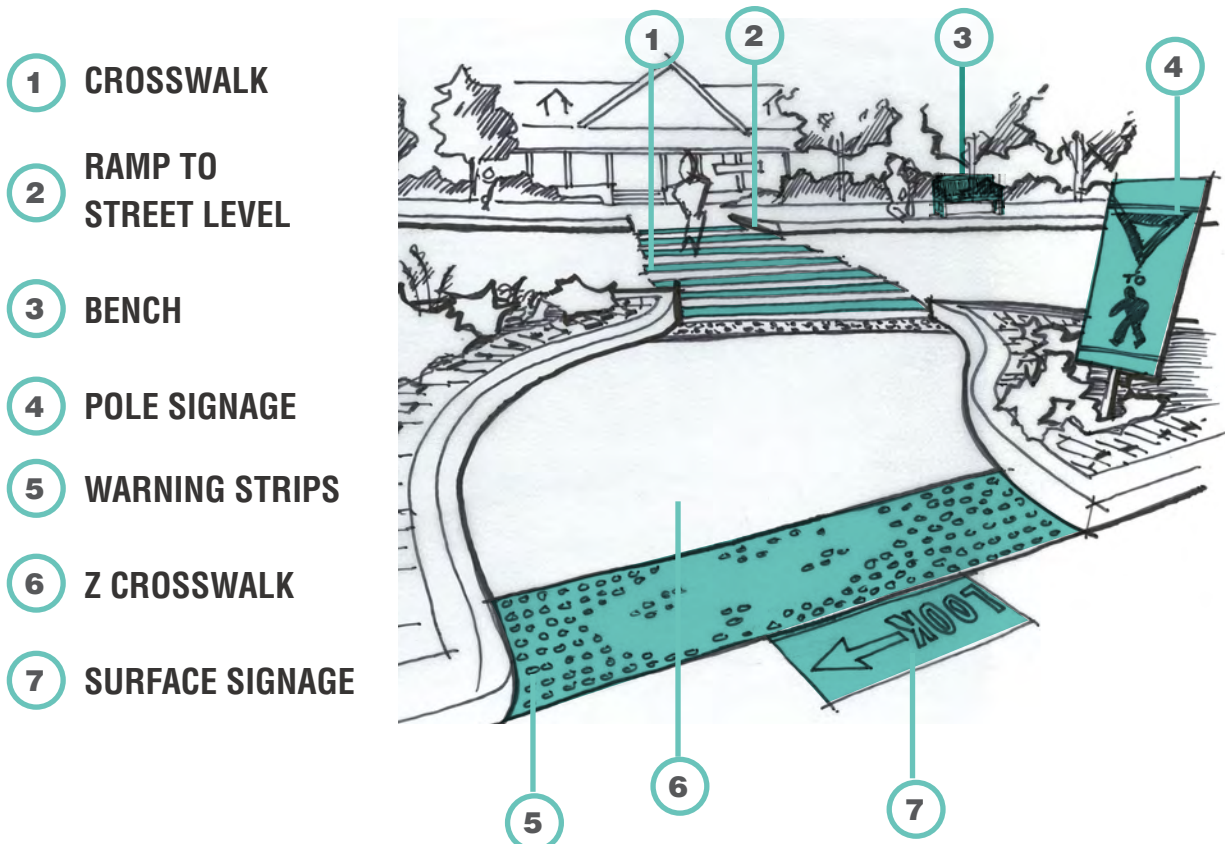
Wide sidewalks allow pedestrians to easily pass by others on the route without stepping off the path.

NAVIGATION

- A **continuous, easy to follow pathway** between home, transit and frequently used services should be available that does not require short cuts through parking lots, alleys or landscaping.
- Simple routes with unobstructed views between the building entry and nearby services will reduce incidents of residents getting lost along the route. Complex directions can be hard to remember and follow.
- Excessive driveways and alleys where vehicles may suddenly pull out across the path of travel, or the slope of the sidewalk may suddenly dip, can be a hazard. Minimize interaction between pedestrian and vehicular pathways and provide clear and unobstructed visibility where they cross. Reduce areas where a vehicle backing up crosses a pedestrian route.
- The entire route between destinations should be well lit without any dark areas that seem unsafe. At night visual cues used to navigate a route can be difficult to see. An isolated path may also feel unsafe, and response to a fall or other emergency could be delayed.
- While benches and shade are helpful along the route, sidewalks should be free of obstructions and wide enough to walk around any site furnishings or trees along the path of travel.
- Connectivity of sidewalks is critical so pedestrians do not encounter dead-ends with hazardous conditions where residents are forced to make unsafe street crossings.
- For ease of navigation **streets should be clearly marked with signage that is highly visible and easy to read**.
- A wide path of travel allows more flexibility when passing by others.
- Common sidewalk widths:
    - 3 Feet: Single user
    - 4 Feet: Two people can walk side by side
    - 5 Feet: Two wheelchairs can pass
    - 6 Feet: Two wheelchairs can travel together

2.0 SITE

STREETS AND INTERSECTIONS

Developments with multiple buildings may have **internal private streets** for circulation. These roadways will have less traffic than city streets but should still include **traffic calming measures and safety features at intersections.** Intersections should be clear of vegetation and obstructions so both cars and people have clear line of sight. Intersections throughout the community should have clearly marked and visible crosswalks which ramp down to road level. Locate additional crosswalks with enough frequency that residents with mobility issues aren't traveling extra distance to cross the street to reach community buildings. Internal streets should be paired with adequately sized sidewalks and lighting that illuminates both the road and the sidewalk. Consider reducing the traffic speed on internal roadways. Pedestrians feel more comfortable walking next to traffic moving at slower speeds. Street parking or landscaped strips along the sidewalk provide a buffer between moving traffic and pedestrians. Traffic calming strategies such as bulbouts, pavement surface changes, speed bumps, raised intersections, roadway jogs and traffic circles can improve safety.

Mid-street crossing areas are helpful for long stretches of roadway without intersections.

Intersections with changes in pavement type and color at crossing areas are more obvious to approaching cars.

Tactile warning strips alert pedestrians with visual impairments of crosswalk ends and changes in direction.

2.0 SITE

WAYFINDING

In large communities maps can help orient people to their current location in relationship to their destination.

Signage with large text, few words, symbols and color coding are easier to understand.

As residents age they may become disoriented in a community with a large number of similar looking buildings. **Clear, easy to read, directional signage** will provide a clear path to the desired location within the community and avoid confusion. Signage with large text, few words, symbols and color coding are easier to understand. Well-lit signage will allow easier navigation at night. Recognizable landscape elements can provide a reference point in communities with many buildings. Consider naming internal streets after landscape elements associated with street location (i.e. Water street goes towards the pond) as an added navigational aid. In large communities maps may be helpful with navigation.

PARKING/DROP-OFF AREA

Residents traveling farther distances will need convenient access to shuttles, taxi services and personal vehicles. Provide **sufficient parking and loading areas** for these services and health service providers close to the building entrance. Transportation providers should be able to easily navigate through the site to a drop off area at the main entrance. If possible provide a curbless entry along the entire drop off drive to provide more access than a single curb ramp. Bollards may be required for safe curbless entry. Plan for a covered seating area near the entry for residents waiting to be picked up.

Parking areas for residents should be convenient with **generous space for oversized vehicles with lifts and for individuals with mobility devices** to get in and out of vehicles and to the building entry. If the anticipated percentage of aging residents is high, consider adding more accessible parking than the code minimum. Accessible parking spaces should be clearly marked with surface paint and signage. Place accessible spaces closest to the main entrance and along an accessible pathway. **All parking spaces should have easy access to the front door.** Additional ramp access points add convenience so residents don't have to travel as far through the parking lot. Minimize the slope of the lot. Increase safety by designing landscaped pathways in parking islands so people don't have to walk through the parking lot. Landscaped areas with trees will also produce shade which reduces the temperature of the pavement and cars parked in the lot. While pervious paving may be beneficial for water infiltration, pavers can be a tripping hazard if they shift over time and surfaces are uneven or gaps are large enough for walkers or canes to get stuck.

Give passengers easy access to the loading area by creating a drive that is flush with the building entry.

ENTRY TYPES

Depending on the residential building type there are **three primary types of building entry**.

TOWNHOMES
Townhomes each have direct access to the outdoors through their own private entrance and may have a front stoop or porch. If the entry plane is higher than the surrounding site, the front entry may need to be retrofitted with a ramp.

WALK-UP BUILDINGS
Units in walk-up buildings each have direct access to the outdoors from the front door. Walk-up units often have an exterior corridor lined with entry doors to each unit. Upper units are typically accessed by stairs which can limit residents with mobility issues to ground level units.

INTERIOR CORRIDOR BUILDINGS
In an apartment building with internal circulation residents enter the building through a main lobby area and travel to their unit, which has a front door off of an interior corridor. Security is easier to maintain in a building with a lobby as facility staff can help monitor visitors, and access can be restricted at the main entry with key cards or other types of building security systems.

All entry types should have adequate lighting, features to free hands to manipulate the door, weather protection and easily located address signage with large text.

Ground level unit entries can be accessed directly if the exterior and interior surfaces are on the same plane, or ramps may be installed where entries are raised from the ground.
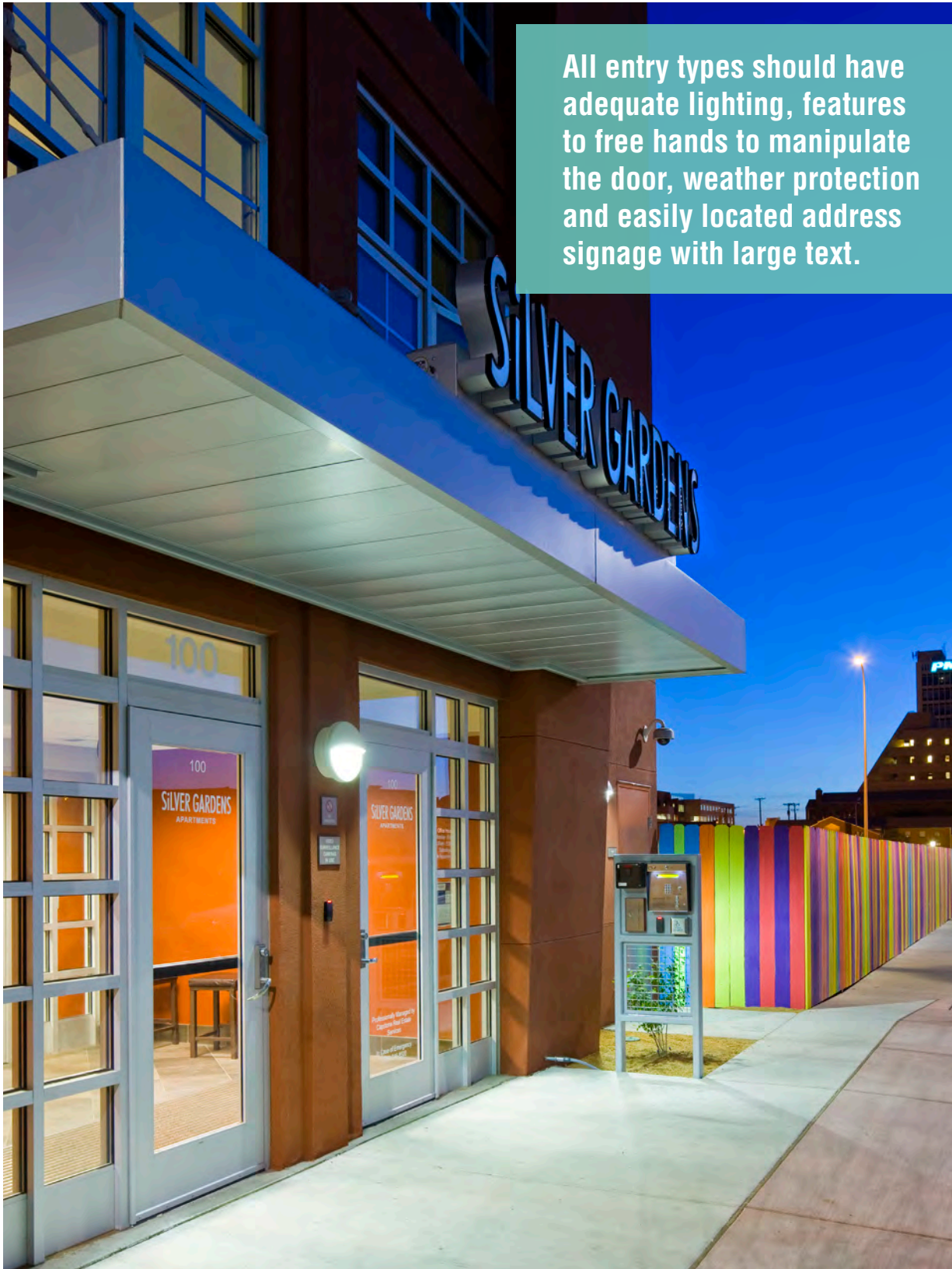
All entry types should have adequate lighting, features to free hands to manipulate the door, weather protection and easily located address signage with large text.

A single accessible height kiosk can house security access, visitor notification, signage and hands-free door operation.

2.4 | EXTERIOR ENTRY

WAITING AREA:

1 Locate waiting area by the door with a line of sight to the pick-up area; add site furnishings for residents to rest or interact with others while waiting. Both exterior and interior waiting areas are helpful for inclement weather.

ZERO ENTRY PLANE:

2 Provide at least **one entry to the building without stairs;** design the doorway with a flush threshold or minimal beveled door transition.

SIGNAGE:

3 Exterior signage should be well lit to enhance visibility; **addresses should be easy to locate and read with large numbers.**

DOOR:

4 Entry doors should have push or lever style hardware; automated doorways can free hands for mobility aids or when carrying packages; although energy efficient, revolving doors are not appropriate for walkers and wheelchairs.

SHELF:

5 Provide a surface to place packages while opening the door from the outside.

SECURITY:

6 Resident and visitor access keypads should be at an accessible height and have adequate light for readability. Numeric keypads can be difficult for aging residents with memory issues, a card reader is a better choice; combination video or text and audio visitor call systems accommodate individuals with hearing or vision impairment.

WEATHER PROTECTION:

7 Cover the main entry with a canopy and recess the door when possible to protect residents from wind, rain, and snow; Snowmelt systems in the paving may be helpful for problem areas; avoid drip lines in the doorway.

LIGHTING:

8 Lighting should clearly define the entry at night; place lighting at the door in front of the occupant so card readers/intercom systems are not in shadow.

SURFACES:

9 Paving at the entry should have **good slip resistance;** ensure the entry is not the low point on the site where water may pond and freeze.

ARCHITECTURE:

10 Front entry design should clearly define the entry from a distance.

ORIENTATION:

11 Orient the entrance to the south to prevent ice build up.

DROP ZONE:

12 Design **covered vehicle access** for drop-off/pick-up adjacent to the front door.

VISIBILITY:

13 **Entry should be visible from the access road and the parking lot;** provide a clear path to access the main entrance.

RESIDENCE

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SAFETY

Despite good intentions, overlighting a site can cause as many visibility issues as underlighting spaces. High contrast areas of very bright light can make lower light areas appear darker than they really are, as eyes have difficulty adjusting between the high and low light levels. **Layers of lighting** at varying heights can reduce the contrast between lit and unlit areas, increasing visibility. **Focus direct light only where it is needed,** creating task lighting for the outdoors. Lower height lighting spaced closer together keeps light focused on objects and illuminates better than large overhead high-intensity lighting with far spacing. Full cut-off lighting only directs light down at the ground where it is needed and has the added benefit of limiting the direct visibility of light sources which can cause individuals to see "spots". Intense light sources can be agitators for individuals with mental health issues

There are many other issues that can cause poor visibility on site. Glare issues can be caused by reflective surfaces. Color rendition can also affect visibility. For example, the orange light from high intensity sources can make it hard to differentiate surfaces and colors from one another. Additional security and energy efficiency may be provided by motion sensor activated lights near areas that aren't frequently used at night, such as the trash dumpster.
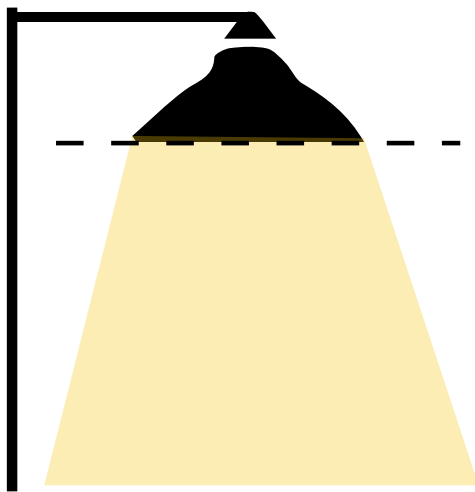
Full cut off lighting does not shine above 90 degrees.

These full cut off bollards only direct light down at the path.

Low bollards light pathways back to the building entry.

PATHWAYS OF LIGHT

Create **pathways of light** throughout the site that direct residents back to the main entrance. Use light as a navigation tool to highlight the entry from a distance. Building signage should also be lit so it is readable from a block or two away. Shorter bollards or lights embedded in the sidewalk illuminate the path but allow the eyes to adjust to the darker surroundings. Provide step lights along ramps and stairs or provide handrails with built in lighting.
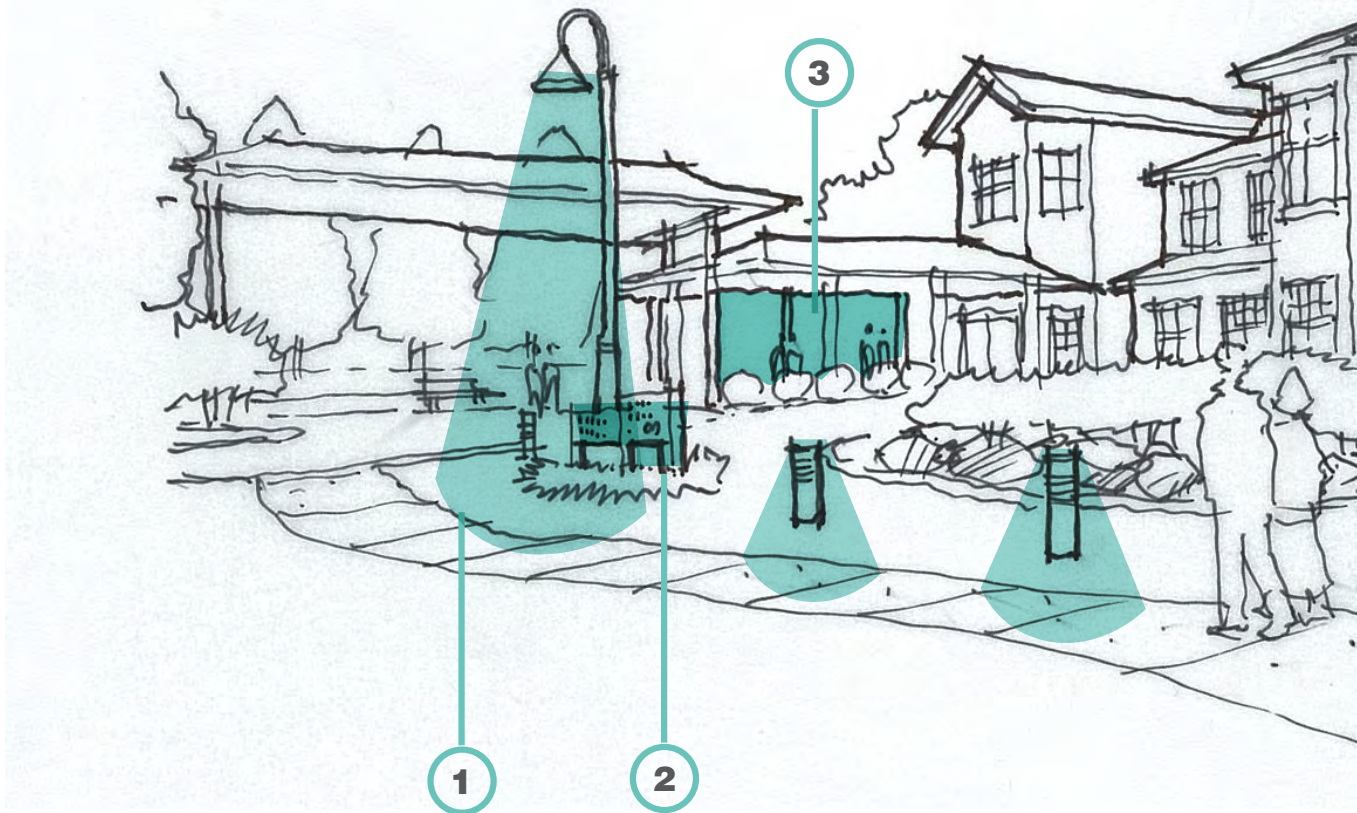
(1) **FULL CUT OFF LIGHTING**

(2) **WELL LIT WAYFINDING SIGNAGE**

(3) **ENTRY LIGHTING**

4 BUILDING LIGHTING

5 BOLLARD PATH LIGHTS

2.0 SITE

LANDSCAPING SURFACES/PATHWAYS

Landscaping materials can vary greatly and natural materials are often not uniform in size. **Mitigate tripping hazards** such as transitions between materials, exposed tree roots, landscape edging and pavers with uneven surfaces. Larger, more visible landscape edging may be safer than thin metal edging, which is difficult to see and sharp edges may cut residents. Grass is desirable for recreational opportunities and socialization but can be lumpy for walking. Provide a hard path through areas of turf for residents with mobility issues.

Allow residents the ability to maneuver throughout the landscaping on different types of surfaces. Walking paths through the landscaping can be more informal and utilize more variety in materials. Plazas and gathering spaces should also be designed for mobility. Hard, even surfaces like breeze or colored concrete are the easiest to navigate. Flagstone with grout or tight fitting pavers are less of a trip hazard than pavers with large gaps. Small rock, such as pea gravel, that squishes when traveled through, can trap wheels on wheelchairs. Ensure landscape pathways, stairs and ramps also meet accessibility codes. Marking the edges of steps or ramps with a contrasting color or reflective paint will make them easier to see in day and night.

> **Hard, even surfaces like breeze or colored concrete are the easiest to navigate.**

MOBILITY OF LANDSCAPE SURFACES

POOR   AVERAGE   GOOD

Pea Gravel   Grass   Pavers   Breeze   Rough Concrete

2.0 SITE

PLANT SELECTION

Plants create tangible experiences that engage all the senses. A connection to natural elements and the outdoors can combat depression. An inviting landscape can lift the spirits and create social opportunities with other residents. To bring variety throughout the year select plants that change color with the seasons so there will always be new experiences. Choose plants with pleasant fragrances and be conscious of possible allergens. Avoid plants that are poisonous, have thorns, or vegetation that attract unwanted insects, pest or animals. Plants can also be selected to attract beneficial wildlife such as birds, bees, and butterflies, which can be entertaining to watch. Gardens that attract bees should be located away from the entrance so people can choose whether or not to be in close proximity. Trees and vegetation that provide **relief on hot days** can be placed along pathways and resting areas. Plants that drop seed pods or attract birds can be a maintenance issue.

VISIBILITY VS SEPARATION

Use landscaping and vegetation to **create areas with privacy and areas that are open.** Avoid disorientation by maintaining regular visibility through vegetation back towards the building. Garden walls, decorative fencing, planted screens or hedges can visually divide spaces to serve different purposes. Some residents may seek open public recreational opportunities while others seek semi-private or private areas to escape. Some residents may feel more comfortable if the site perimeter has a sense of separation from people walking by so visitors must pass through security to gain access to the site. Fencing with slats, bars or chain link allow visibility but prevent access, while solid fencing provides more privacy. A noticeable boundary or barrier at the site perimeter may help residents who are easily disoriented from leaving the property unintentionally.

Fencing can provide privacy and a sense of security.

2.0 SITE

Provide frequent places to rest throughout the site. Tables with movable chairs can arranged as needed by residents or moved to accommodate a wheelchair. A low wall can also be used for seating.

SITE FURNISHINGS

Site furnishings at the building entry and throughout the site provide areas to rest and socialize. Space seating at short intervals for frequent rests by aging residents. Locate gathering spaces in areas with partial shade and a view. Movable chairs offer the most flexibility to accommodate wheelchairs at tables and can be arranged as needed for groups of residents socializing. Provide space next to a bench for a wheelchair also. Seating should have arm rests to aid an individual in getting up from a seated position. Low walls can double as seating for outdoor events when more people may be in attendance. Locate trash receptacles in convenient visible places. Fountains can help eliminate traffic noise in urban settings by providing calming white noise.

Space seating at short intervals for frequent rests by aging residents.

2.0 SITE

COMMUNITY GARDEN

① SEATING AREAS

② GREENHOUSE

③ WATER SOURCE

④ CHICKEN COOP

⑤ WHEEL CHAIR ACCESSIBLE PLANTERS

⑥ RAISED PLANTING BEDS

⑦ TOOL SHED

Community gardens offer aging residents tangible experiences with nature. **Gardens provide access to fresh fruits and vegetables, the natural environment, as well as opportunities for physical activity and social interaction.** Gardens should be designed with raised beds at varying heights for accessibility and to limit bending. **Raised beds** can be designed with recesses underneath give better access to residents with wheelchairs or other assistive devices. Locate the garden near the building for ease of access. Provide a shed for gardening tools and a nearby hose connection. A greenhouse can provide opportunities for gardening year round. Standing for long periods of time can be difficult, the incorporation of seating areas and shade provides a means for rest. Consider small agricultural animals, such as chickens, as a way to engage residents, provide a food source, and connect with the circle of life.
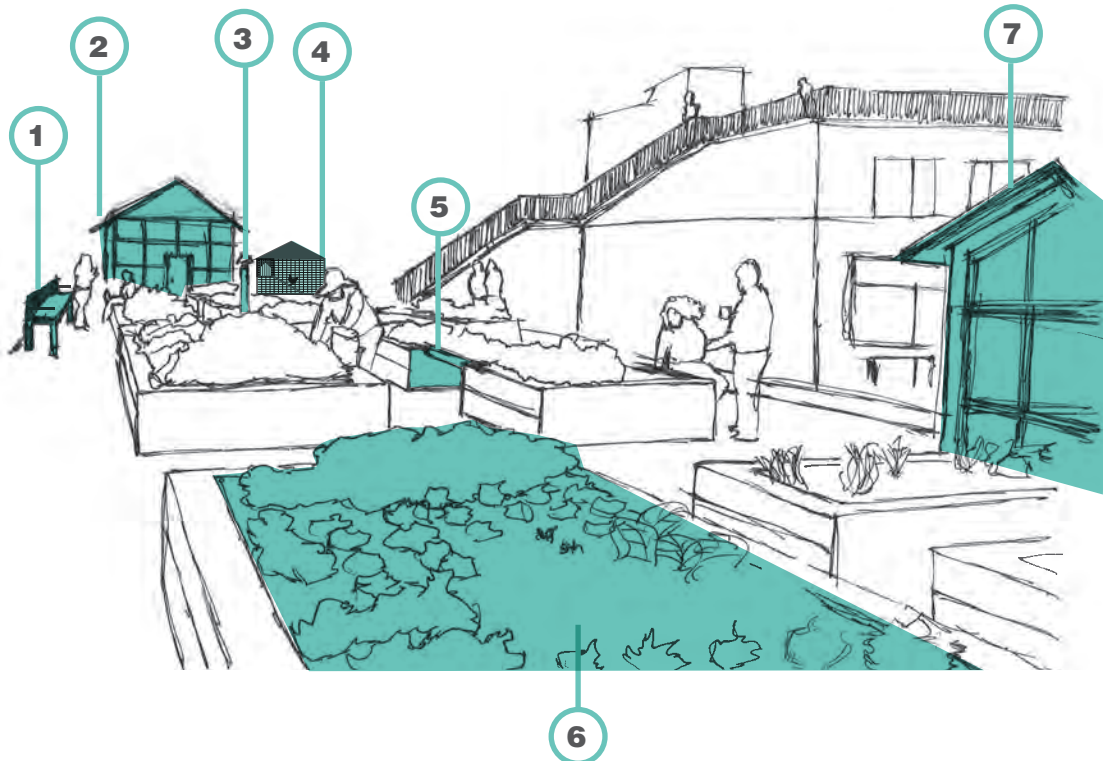
2.0 SITE

Provide a variety of recreational opportunities for residents of all abilities.

Physical therapy and reflexology pathways include a variety of surfaces and obstacles for practicing balance and stimulating the sense. Pathways should always include handrails. True Nature Healing Arts Reflexology Path by DHM Design.

RECREATION

Provide a variety of recreational opportunities for residents of all abilities. Outdoor pathways provide a safe walking environment near the building. Mileage signs help residents track their progress. Consider outdoor adult playgrounds with exercise equipment specifically designed for aging residents. Outdoor, low impact recreational games, like croquet, provide opportunities for socializing and activity. An outdoor pavilion for organized events and activities can serve many purposes.

Studies show that views and access to the outdoors can improve health and increase healing. **Healing gardens with walking paths** also provide opportunities for physical activity and social interaction with other residents. Physical therapy pathways can be designed with features to practice balance, such as ramps, varying surface types, small sets of practice stairs, different types of rock surfaces and small boulders to navigate. Handrails should be placed along physical therapy trails for added support.

Bike amenities should be designed for residents who are able to bike, but have limited abilities. The path required to get to the **bike storage area should not require any lifting of the bike, have stairs or other obstacles.** Bike racks should not be wall or ceiling mounted, which would require lifting the bike into place. Providing secure, sheltered, accessible bike storage on the ground level is preferred.

The bond with a pet can reduce feelings of isolation or loneliness by providing constant companionship.

PETS

Residents of all ages can benefit from the constant companionship of owning a pet. However, a pet can age with their owner and their demands may increase as human abilities decrease. Dogs that like to pull on the leash can be difficult for older residents to walk. This can be an opportunity to form a relationship with younger residents of the community. A dog run where pets can be off leash, walking areas, or dog wash stations are helpful additions for pet owners. Dog owners will also appreciate areas of grass where dogs can run and play. Aging residents who are unable to care for pets may benefit from visits from therapy dogs. This interaction often improves the mental state of residents who feel isolated. Cats and other small animals also offer companionship and are more self-contained within a resident's unit.

2.0 SITE

3.0 GENERAL BUILDING TOPICS

Highlands Gardens| Glendale, AZ

OVERVIEW

There are multiple building concerns that should be addressed when facilitating a better aging in place environment. While common interior spaces provide opportunities for interaction between residents and foster stronger socialization in the community, strong consideration should also be given to spaces outside of the private residential dwellings such as decks and patios. These areas provide private outdoor regions where residents can enjoy a personal activity uninterrupted by others. Careful attention towards the mechanical and electrical systems can also have an impact on the overall quality of life, but each system will have pros and cons concerning its functionality versus cost. When designing windows and doors consideration should be given to ease of operation and durability of products in order to provide ample access to the outdoors both visually and physically. These big picture elements directly impact the ability to age in place comfortably.

CORE FUNCTIONS

Shared spaces serve as the core of residential buildings, filling functional needs such as **space for facility management, security, circulation, on-site services, and social opportunities.** A residential building is much like a microcosm of the city. Circulation serves as the streets and intersections that allow navigation between living spaces and services within the building. There are residential neighborhoods on each floor served by local community amenities co-located on the floor or nearby on an adjacent floor. Adding clusters of furniture arrangements and services as a gathering place on each floor will strengthen the feeling of smaller communities within the larger building. Residents gain a sense of belonging to a neighborhood. Residents may become isolated if they do not feel comfortable leaving their unit. Placement of frequently used services on each floor, such as trash/recycling collection, laundry and coffee stations, will reduce travel distances and encourage residents to venture outside of their unit. Social interaction can happen through daily activities like checking the mail or dining. Locating different types of amenities on different levels, as well as general spaces on a common floor, such as the ground floor or penthouse, will encourage more interaction throughout the building and has the added benefit of increased walking and exercise for residents. In an existing building with limited designated areas for shared amenities, consider sacrificing a residential unit and retrofitting the space into facility management and community amenity space. Take advantage of any unused space within the building such as oversized intersections or circulation areas that can be used for these functions. Key community spaces are described on the next pages.

Placement of frequently used services on each floor, such as trash/recycling collection, laundry and coffee stations, will reduce travel distances and encourage residents to venture outside of their unit.
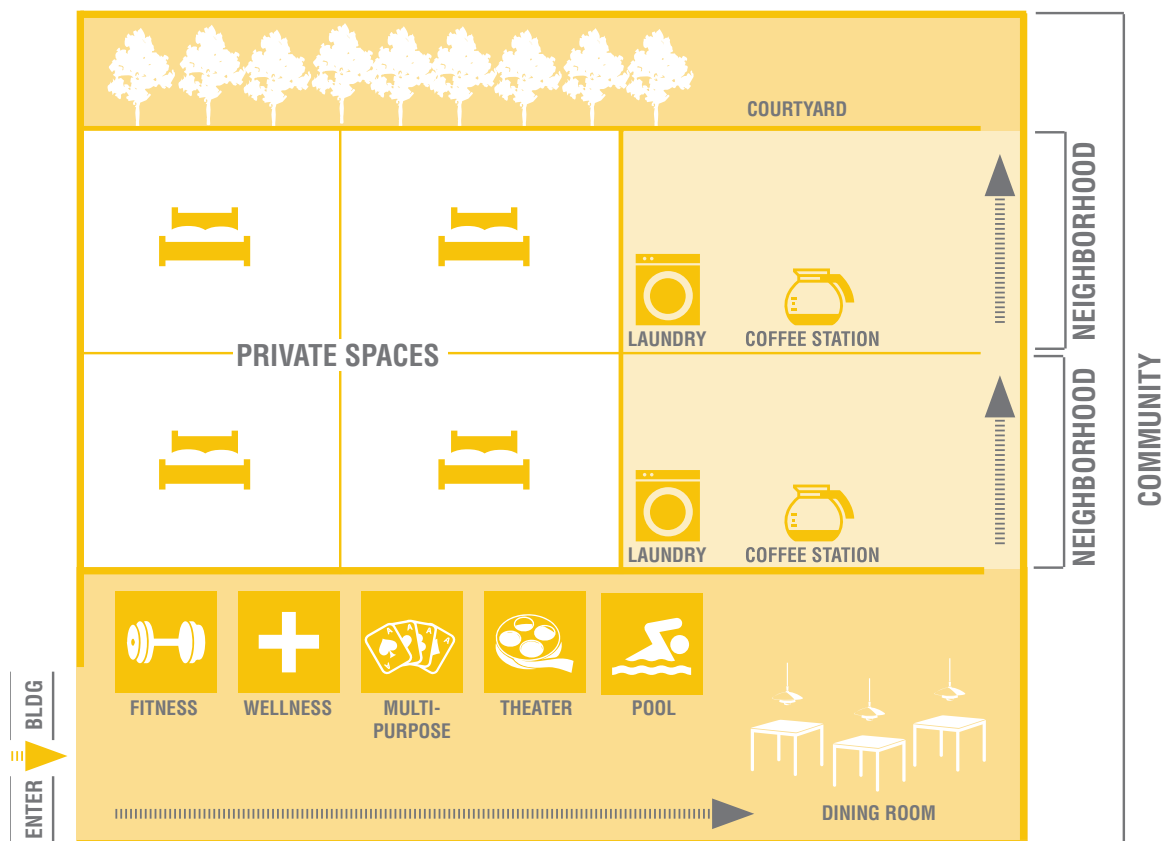
A residential building can be a microcosm of the surrounding community with its own internal neighborhoods and services.

3.0 GENERAL BUILDING TOPICS

LOBBY

The lobby is the primary access point for the building and provides the first impression to residents and visitors coming for the first time. A building lobby serves **several key functions - building security, information resources, space for a resident/visitor waiting area and opportunities for social interaction.** Access to the lobby should be secure from the outside or have a regularly staffed front desk that can monitor people entering the building. The front desk can also be a source of information where residents can ask questions, and visitors can check in. Space for bulletin boards in the lobby can be used to post resident information, public transportation schedules or upcoming community events. The waiting area should be located where residents have a **good line of sight to the pick-up area** outside the door and management can view activity from the office area. Waiting areas become the place to see and be seen for residents expecting visitors. Co-locating the waiting area with other amenities such as a library, coffee station, or lounge creates opportunities for residents to socialize while waiting, and entertain guests once they arrive. Small groupings of furniture can facilitate conversation or offer privacy for more intimate conversation. Visitors and residents coming and going from the building during inclement weather can track in moisture causing floors to possibly become slippery. An **entry vestibule with a recessed grate and drain, or walk-off mat,** will serve as a temperature buffer and keep out weather. Systems that remove dirt and moisture from shoes have the added benefit of prolonging the life of the flooring due to reduced wear and tear.

The lobby should have a good line of sight from the front desk and the waiting area towards the entry where visitors will be approaching.

3.0 GENERAL BUILDING TOPICS

Daily activities like checking the mail give residents a reason to venture out of their unit and into common areas where they may start a conversation with another resident.

MAIL ROOM

The mail room is another space that gives residents an opportunity to socialize and get out of their unit to mingle with other residents. The mail room should have an open design and be visible to the lobby and by management for security. **Mailboxes designed with accessible dimensions for aging residents may require extra wall space** to ensure the highest and lowest mailboxes are reachable. Both mailboxes and parcel storage should be accessible. Parcels could be stored in lockable millwork cabinets as a lower cost option that provides security. Evaluate the mailbox hardware to ensure the **lock and door are easy to open.** Provide a shelf or counter to set the mail or any other carried items while opening and closing the mailbox. A recycle bin nearby is handy for eliminating junk mail before carrying the rest home.

ADMINISTRATION

The need for dedicated administration space will vary by community. Needs will range from multiple offices to minimal or no need for dedicated administrative space. When provided, the administrative office should be **located near the entry door with good overall visibility to the lobby.** Visibility can be achieved by use of a window or partial height wall from the office to the lobby. Signage should clearly identify the space to those entering the community. Provide seating near the administration area for residents waiting to meet with facility staff. The office can provide security by being located within visible proximity to spaces like the mailroom, lobby and elevators. Administration staff can include building or property managers, maintenance personnel, service coordinators and case managers.

3.0 GENERAL BUILDING TOPICS

3.1 | SHARED COMMUNITY SPACES

Locate common restrooms near social amenities.

COMMON RESTROOMS

Restrooms in shared community spaces may be used by residents, visitors, or staff and should be accessible. Residents with incontinence issues may avoid socialization for fear of not being able to reach a restroom in time. If possible, **locate restrooms near all shared amenity spaces to encourage socialization and limit required travel time back to residence.** Several single-occupant accessible unisex restrooms offer more flexibility, turning space and privacy than a traditional men's and women's restroom with stalls. Design **doors to swing out** so others have easier access to the room if a user has a fall inside and is blocking the door.
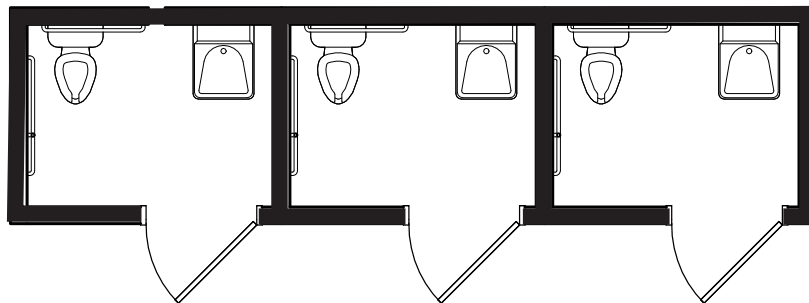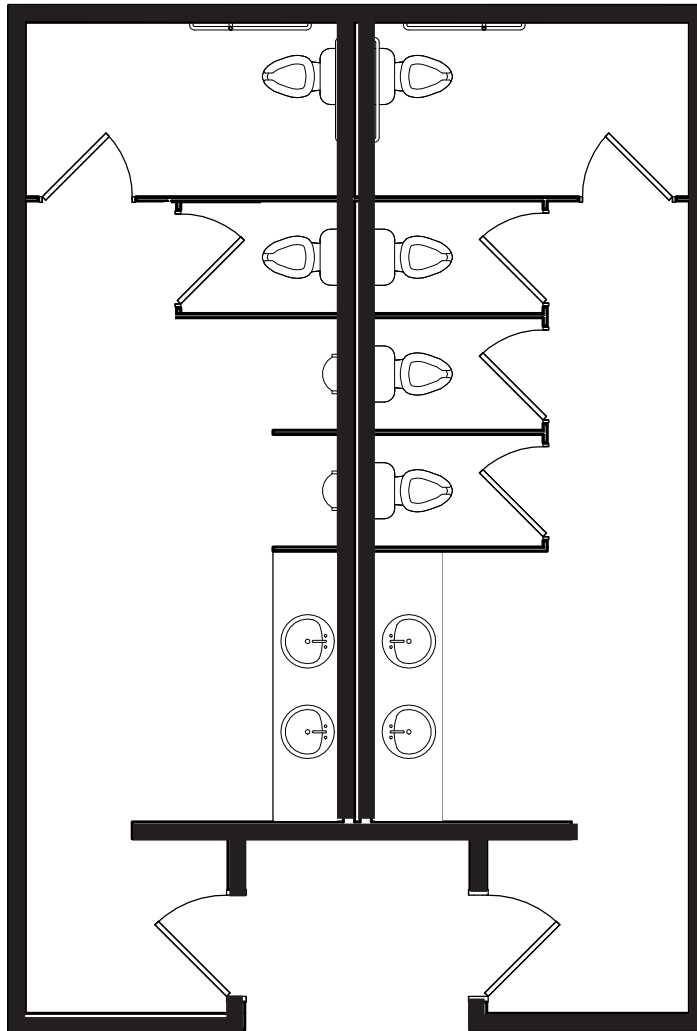
Groupings of unisex bathrooms offer more privacy and accessibility than standard restrooms.

3.0 GENERAL BUILDING TOPICS

3.1 | SHARED COMMUNITY SPACES

STORAGE

There is always a desire for more storage. As one ages the need for **ample, accessible, usable storage** remains. Storage needs range from mobility devices to holiday decorations. Storage within the unit should be maximized, but additional storage options within the building are advantageous for residents, especially those who do not have good access to transportation.

There are many opportunities to maximize storage outside of the units. An individual storage unit can be the size of a walk in closet, or as small as a base cabinet. **Locks and hardware in common storage areas should be easy to use, graspable and accessible** for aging hands. Storage areas should be in a secure area of the building not accessible by a non-resident.

Electric scooters can take up a large area in a residents unit. By placing scooter parking in common areas with appropriate power outlets, residents can store and charge scooters outside of their unit but in close proximity.

Some facilities may provide the ability to check out a personal shopping cart and will need a room to store the carts. Providing the ability to check out a personal shopping cart would **aid residents in carrying packages** back from stores or from a vehicle up to their apartment.

COMMUNITY DINING

Shared eating spaces can take many forms depending on the type of residence. From co-housing developments with community kitchens for group cooking, to on-site cafes or traditional dining services, the types of amenities incorporated into residential housing is evolving. **Dining areas can be a destination to engage in conversation with other residents** or to listen and feel like a part of the community. Dining areas can serve as multifunctional spaces that could be used for many types of activities that require table space. Smaller community kitchens where residents come together to cook should reference the kitchen section under the room by room breakout in this document for design guidance. These shared cooking spaces can also be used for classes on cooking and healthy eating tips for different age groups. Tables and seating should have plenty of **space to maneuver** around the furnishings. Chairs that are easily movable allow any table to be accessible.

The dining room can be a social gathering place to actively or passively engage with others. Flexible furnishings allow the room to be arranged for other purposes such as a night of cards or a mid-day book club meeting.
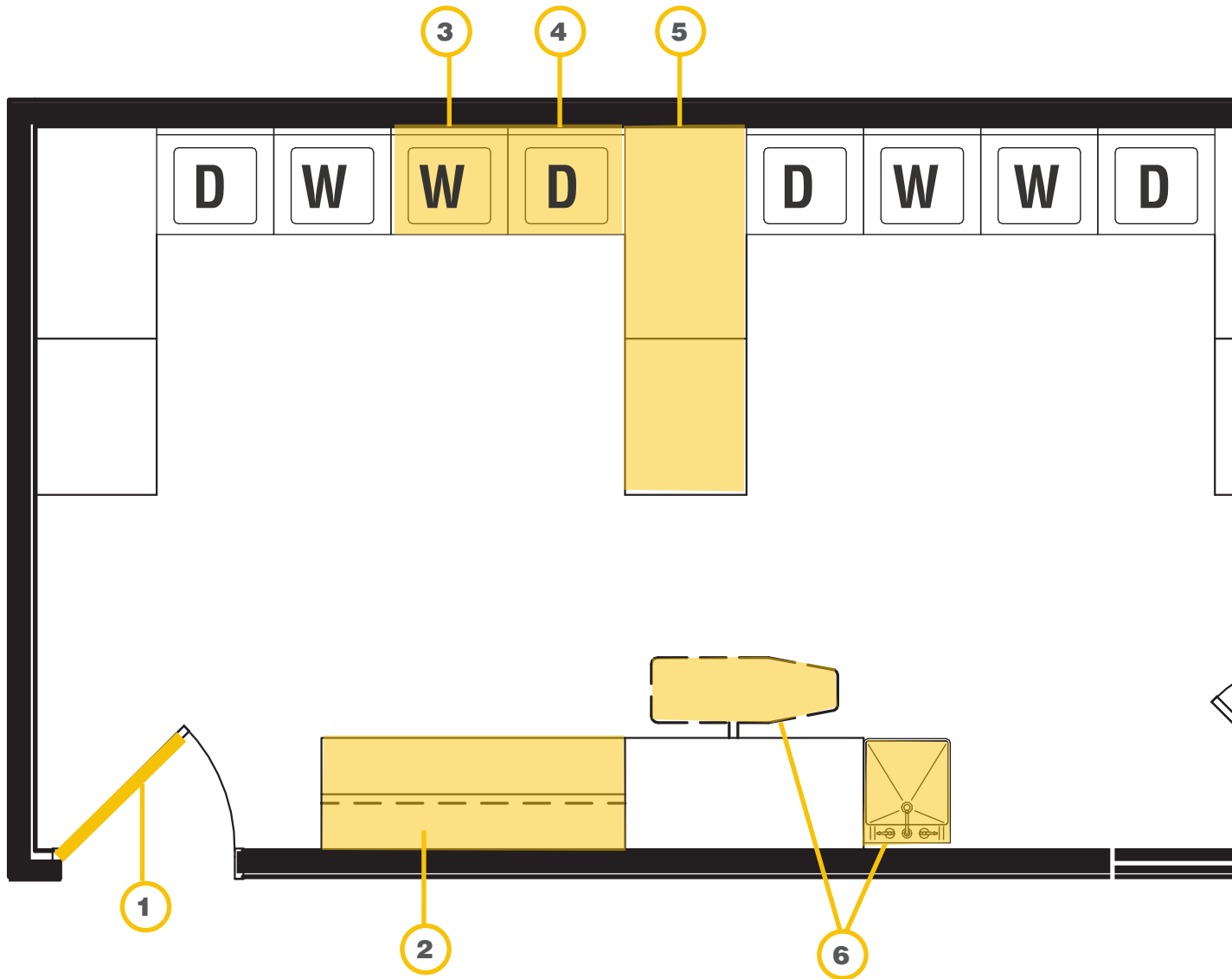
OPEN DOOR:

1. Provide **hands-free entry** to the room by eliminating the door, providing a door hold open, or automatic entrance.

HANGING SPACE:

2. Hanging space should be a height that is also accessible by residents in wheelchairs.

WORKFLOW:

3. Place washer, dryer and folding area in this order to minimize distance laundry must be carried.

APPLIANCES:

4. The washer and dryer should be **raised off the floor, be front loading and have controls on the front of the appliance.**
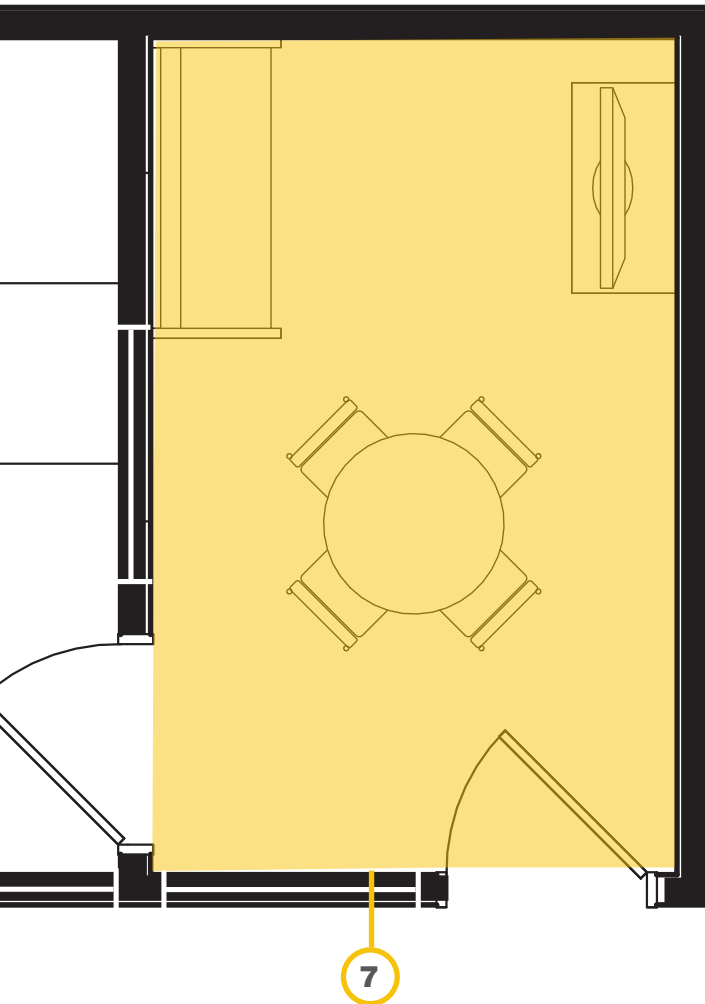
LAUNDRY

The community laundry room should be convenient and provide opportunities for social interaction with other residents. The room should be usable by residents in a seated position or standing position that requires little bending. The room layout can also be designed to limit the distance laundry must be carried at different phases of cleaning. Create individual laundry stations by laying out appliances and counters adjacent to each other to follow the typical laundry workflow - washer can easily be unloaded to dryer and dryer to folding area.

Create individual laundry stations by laying out appliances and counters adjacent to each other to follow the typical laundry workflow.

FOLDING SPACE:

5 Provide a dual height counter with **standing height space** to set a laundry basket without bending over and a **lower section** at the end for wheelchair access and as a convenience for aging residents who need to sit.

AMENITIES:

6 Extra counterspace with a pull out ironing board and wash sink allow users to perform all laundry functions in a single room.

WAITING AREA:

7 Create a **waiting space,** such as a lounge or TV room, adjacent to the laundry to encourage socialization and eliminate the need to travel back and forth.

3.0 GENERAL BUILDING TOPICS

3.1 | SHARED COMMUNITY SPACES

SOCIAL AMENITIES

Residents who don't leave their unit may feel isolated or depressed. Being a part of community activities (even a passive participant) can create a sense of belonging. Community spaces can include **passive spaces** (library, TV room, sensory gardens etc.) **or active social opportunities** (game/puzzle tables, crafts, classes, outdoor recreational areas etc.). Amenities on multiple floors encourages movement throughout the building. Community gathering spaces could be interior or exterior spaces. Create centrally located spaces that are inviting with ample daylight and artificial light, room to circulate, and temperature control. Social spaces that are open and highly visible are more likely to be used than closed spaces located in the far corners of the building. When renovating an existing building look for centrally located small areas of unused space where small social areas can be created such as a wall of books and a few chairs, or a table and chairs tucked into a corner with a cabinet of games. For larger areas a unit could be converted into community space or consider converting two existing two-bedroom units into one-bedroom units and use the adjacent bedrooms for a renovation. Existing buildings may have more room within the site than on the interior to create gathering spaces. In good weather crafts or classes could be held outdoors in a shady pergola or amphitheater.

Create centrally located spaces that are inviting with ample daylight and artificial light, room to circulate, and temperature control.

Glazed doors give the perception of increased safety as activities aren't happening out of view. Glazing also allows other residents to view inside the room to see if anyone is there to socialize with.

Provide a variety of types of seating areas in amenity spaces to accommodate different activities.

Outdoor spaces may also be used for community gatherings.

3.0 GENERAL BUILDING TOPICS

3.0 GENERAL BUILDING TOPICS

Select age appropriate fitness equipment.

Features designed for physical activity should be designed with aging resident's limited mobility in mind.

Fitness activities in water are easier on joints.

OCCUPANT HEALTH

Focus on strategies that aid in the prevention of multiple health factors for aging populations. For example, design features such as gardens increase social interaction which reduces depression, provides exercise, exposes users to fresh air and encourages healthy eating which can reduce obesity and reduce risk of other diseases. **Preventative action can reduce the likelihood that a health factor will become an issue in the future** as the population ages.

PHYSICAL ACTIVITY

A wellness program can improve resident strength, balance and flexibility. Features designed for physical activity should be designed with aging resident's limited mobility in mind. Fitness equipment which puts less strain on joints should be selected specifically for aging residents. Keeping **goals small and manageable** will encourage older adults to take small steps towards becoming more physically active. A fitness room may be a desirable amenity. Room size and amenities provided will depend on the available budget for the project. Even a small room may be able to accommodate a few pieces of equipment or space for floor activities such as yoga. Design the room with impact resistant flooring, space for circulation around equipment and acoustics that muffle sound to adjacent units. Fitness areas should include clear instructions and graphics showing proper of use of equipment. Inspirational slogans on walls and small areas with exercise stations, such as wall push ups (which are easier to do) and small weights, can challenge users as they build skills. Enlarged stair landings or unused space in corridor niches can be used for this purpose. Hallways may accommodate equipment, but older adults may desire some privacy while exercising and may not use equipment. Provide activities for residents in wheelchairs also with activities designed to be performed while seated.

A variety of fitness options and methods keep residents engaged. Plan for **active design solutions within the building** which encourage walking and movement in addition to traditional fitness equipment. An open, inviting stair located by the elevator will promote use. **Amenities located on a variety of floors will encourage walking** to destinations throughout the building. Note that stairs can be a particular challenge for aging residents with reduced balance. Encourage practice on the stair by numbering stairs, older adults can set a goal of walking a certain number each day and gradually increase their goal.

3.0 GENERAL BUILDING TOPICS

3.2 | HEALTH AND WELLNESS

Protect ductwork from dust and debris during construction.

AIR QUALITY

Many older adults have a weakened immune system and suffer from respiratory related medical conditions, such as asthma. These conditions may lead to increased sensitivity to second-hand smoke and off-gassing from construction materials. Many aging residents also have a weakened sense of smell that inhibits sensing odors that warn of dangerous chemical emissions, they may be unaware they are breathing chemicals which can cause health issues. Specify low-emitting materials and protect duct work from debris when renovating or constructing a new building. Also consider flushing out the building with fresh air prior to occupancy. Providing a temperature controlled shelter away from the building will discourage smokers from congregating near building entrances and exposing other residents to environmental tobacco smoke.

A non-smoking policy can protect residents from second-hand smoke.

Provide a smoking area away from the building entry and any openings.

3.0 GENERAL BUILDING TOPICS

FLOORING

Smooth, hard, durable surfaces (wood, concrete, vinyl) are good choices for aging residents with decreasing mobility. Consider the **slip resistance and ease of maintenance** when selecting flooring. In addition to improving indoor air quality for residents, installing smooth, hard flooring reduces tripping and allows greater mobility for older adults because they are more easily able to shuffle feet on hard surfaces.

Carpet is often desired for comfort and warmth. **Limit carpet to small areas and select easy to clean, short pile carpets** for these areas. Carpet is more difficult to roll across and textured or large loop residential carpets may catch on the wheels of wheelchairs. Carpet may wear more than hard surfaces and spills are harder to clean. Transitions between flooring types can be a tripping hazard, so carefully consider transitions between dissimilar materials. One option for carpet is to recess the carpet into the floor to maintain a level surface with hard surface flooring. Area rugs placed on hard surfaces can also present a tripping hazard or may slide causing a resident to fall.

Incontinence and reduced balance can lead to more spills, so flooring which is water resistant and easy to clean will reduce the need for frequent replacement. Use of carpet may add to maintenance costs if carpet frequently needs to be replaced. Hard surface flooring is easier to maintain for longer periods of time.

COLOR/TEXTURE

Color gives residents visual cues about materials, transitions and edges. Avoid flooring with dark patches in a more neutral field that can be mistaken for holes, or dark borders that may appear like large cracks to someone with diminished vision. More uniform patterns and colors are not perceived as obstacles. Busy or high contrast patterns can be confusing. Carpeting with recognizable objects, such as flowers, can confuse residents with early signs of dementia as they may try to bend down and pick the objects up. Select understated, random patterns for flooring. Darker colors, or subtle patterns, hide stains better.

Color gives residents visual cues about materials, transitions and edges.

GOOD CARPET PATTERNS
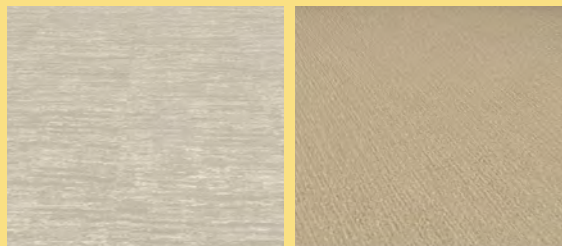
Subtle neutral patterns are not perceived as obstacles.

POOR CARPET PATTERNS
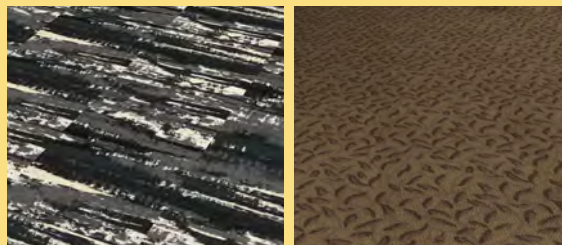
Dark spots can be mistaken as holes to someone with impaired vision.

BUILDING INTERIOR FLOORING MATRIX

The below matrix explores the relative comparison of interior flooring materials based on care, hazards and ease of mobility.

GLARE* : Dependant on color and pattern variations.

POOR — AVERAGE — GOOD
1 SYMBOL — 2 SYMBOLS — 3 SYMBOLS

MATERIAL	COST	LOCATION	CARE	HAZARDS			EASE OF MOBILITY		
			MAINTENANCE FREE	LEAST GLARE*	SLIP RESISTANT	TRIP RESISTANT	FEET	WALKER	WHEELCHAIR
VINYL COMPOSITION TILE (VCT)	$	BACK OF HOUSE	1	3	2	3	3	3	3
LUXURY VINYL TILE (LVT)	$ $	COMMON ROOMS	3	2	2	3	3	2	2
SHEET VINYL	$ $	LIGHT FITNESS AREAS BATHROOMS	3	2	2	3	3	3	3
RUBBER	$ $ $	FITNESS	2	3	3	3	2	2	2
TILE (PORCELAIN CERAMIC)	$ $	LOBBY RECEPTION BATHROOMS CORRIDORS	2	2	2	2	2	1	2
CARPET	$ $	CORRIDORS OFFICES QUIET SPACES	2	3	3	2	1	1	1
WOOD	$ $	LOBBY BISTRO	1	1	1	2	2	2	2

Chairs with wheels on the front legs, and not the back, can be rolled by lifting the back but won't roll unintentionally when the user is seated.

Select shallow padded furnishings - seating that leans back or is deep may be difficult for older residents to get out of. Furniture with arms aid aging residents when getting up from a seated position.

FURNISHINGS

Design with **age appropriate furnishings** to avoid injuries. Bar height furniture may be difficult for older residents to use. Additionally, seating that is low to the ground, has long depth to back of furniture, or seating that leans back may be difficult for older residents to get out of. Furniture with arms aid aging residents when getting up from a seated position. Padded arms offer extra comfort. Fabric should be selected for **easy cleaning**. Chairs with open design that can drain spills are easier to clean than chairs with recesses that collect dirt. Hard surfaces which don't adsorb liquids are more sanitary, especially if aging residents may have incontinence issues. **Lightweight furnishings, that can be easily rearranged,** can offer flexibility for different social groups and activities. Chairs with wheels on the front legs, and not the back, can be rolled by lifting the back but won't roll unintentionally when the user is seated. In areas where furniture will be moved frequently select flooring that won't easily scratch if furniture is dragged across it. Furniture arrangement should maintain clearances around furnishings. Rugs offer warmth to hard surface flooring but can be a tripping hazard.

ACOUSTICS

When residents can't participate in conversation due to hearing loss they often become frustrated by the situation and become socially isolated. **Better acoustical design can reduce ambient noise** which can be a factor in the ability to hear what someone is saying. Partitions can help block unwanted noise. Soft furnishings, fabric wall panels and ceiling tiles can absorb sound making it easier to hear conversation. Small areas for more intimate conversation without distracting noises, or providing social amenities that allow people to connect without conversation, allow residents to stay engaged.

INTERIOR WAYFINDING

Interior wayfinding can become confusing as the eyes age and memory issues set in, especially in larger buildings. With the **use of color, large text and graphics**, wayfinding can be made easier and can help distinguish specific areas within the building. The color scheme of each floor can be unique or simply alternate at every other floor. The use of distinctive furniture in the elevator lobby of each floor – visible from the elevator – can provide a quick visual cue. Colored graphics on the wall can also provide a unique and recognizable feature at each floor. Interior signage should be easy to spot as one travels through the building. A sign background with contrasting color to the wall will be easily identifiable. The use of oversized text will make signage easy to read, and where appropriate infographics can reinforce the written words. Simple graphic icons can signal locations for common service areas such as elevators, laundry, recycling or coffee stations. Appropriate lighting should be placed to highlight signage and make it easier to read.

Color and large text can help identify each floor level.

CIRCULATION

Aging residents need a safe path of travel from the building entrance to their unit, and various destinations within the building. Pathways may include corridors, ramps, stairs, lifts or elevators. Each can be designed to optimize safety. The **routes throughout the building should be easily navigated by someone using a walker or wheelchair -** avoid level changes, steep slopes, or steps with no alternate route. In addition to strategies for level changes, places for rest should be included in active circulation. **Aging residents may need to stop several times while traveling from one point to another in the building.** These resting spaces can be opportunities for social spaces. Corridors with handrails on both sides give extra support while walking or resting. Some aging residents count on the elevator to get to upper floors due to a physical limitation that would prevent them from taking the stairs. While active design is encouraged to increase physical activity, ensure that the design of the stairs (meant to promote their use in active design principles) doesn't hide the elevator or make it difficult to find.

Place the elevator in a central location that is easy to get to from all parts of the building.

The routes throughout the building should be easily navigated by someone using a walker or wheelchair - avoid level changes, steep slopes, or steps with no alternate route. In addition to strategies for level changes, places for rest should be included in active circulation.

STAIRS AND RAMPS

The elevation of the interior floor level may be higher or lower (as in garden level units) than the ground level and require stairs or a ramp to reach the building or unit entry. There may also be level changes within a single level which require steps or a ramp. Stairs can be dangerous for people with limited mobility. **Ramps are preferred when the level change is minimal** and space is available. Long hallways provide the needed length to add ramps if there are elevation changes within a floor plate. Unit doors may need to be shifted to accommodate ramps if the length of the ramp crosses a unit entry door. Stair lifts may be an option where space is limited.

Stairs and ramps can be designed with accommodations to make them easier to navigate. Lower rise steps that are less steep and fewer steps between landings make stairs easier to manage. Also, stairs which turn direction at each landing will lessen the distance of a fall, if one should occur. Provide **handrails on both sides** of ramps and stairs. Choose slip resistant materials for stairs and ramps and make certain surfaces are **well lit** to help prevent accidents. Handrails with integral down lighting illuminate surfaces without shadowing. Color can be used to enhance safety and provide a more inviting space. **Highlighting the edges** of stair treads, ramp edges and landings with contrasting color strips and/or glow in the dark tape will improve visibility. Side curbs on ramps also help define the edge.

Stairwells have unique safety considerations. Enclosed stairways can be isolated from the rest of the building, posing a risk of someone falling and no one knowing. Adding glazing can provide visibility into the stairwell. Glazing on an outside wall can provide natural light during the day, which is a benefit if the power suddenly goes out when a resident is in the stairwell. Aging residents with limited mobility may have difficulty using the stairs to move to safer areas of the building. Consider providing areas of refuge in stairs cores with phone access (or some other form of communication).

3.0 GENERAL BUILDING TOPICS

ELEVATORS/LIFTS

Aging residents may not be able to navigate stairs on a regular basis. **An elevator or lift can be a critical component to allow aging in place.** Residents will likely use the elevator multiple times a day. Choose a **central location** in the building and where it is easily accessible. Controls should be large in size, if available, and easy to find and operate. Label floors so they are easy to understand, abbreviations can be confusing, or it may be unclear which is the ground level. Graphics and colors can aid navigation. Match the lighting level in the elevator to the level in corridors so eyes don't need to adjust when entering/exiting. Plan for an oversized elevator waiting area and cab to accommodate wheelchairs, scooters and gurneys (in case of medical emergencies). The starting and stopping motion of the elevator may cause aging residents with balance issues to stagger - provide handrails on all sides of the cab.

Newer existing multi-story buildings are likely to already have an elevator. Older buildings and multifamily buildings with 2-3 stories such as town homes and walk-up buildings may not. It can be cost prohibitive for design teams constructing new town homes and walk-up buildings to provide elevators for every building or unit, however, units could be planned with large stacked closets or other flexible space where an **elevator could be added in the future where needed**. A similar strategy can be used for older existing buildings without an elevator. Flexible space or extra bedrooms that stack in the center of the building are potential candidates for a renovation. An elevator core could also be added outside an exterior wall as an addition. Where there are smaller elevation changes between portions of the building, and there is not room for a ramp, lifts may be an option.

CORRIDOR

ROOF

ASSEMBLY

LEVEL 4

ASSEMBLY

LEVEL 3

CARD ROOM

LEVEL 2

LOBBY

LEVEL 1
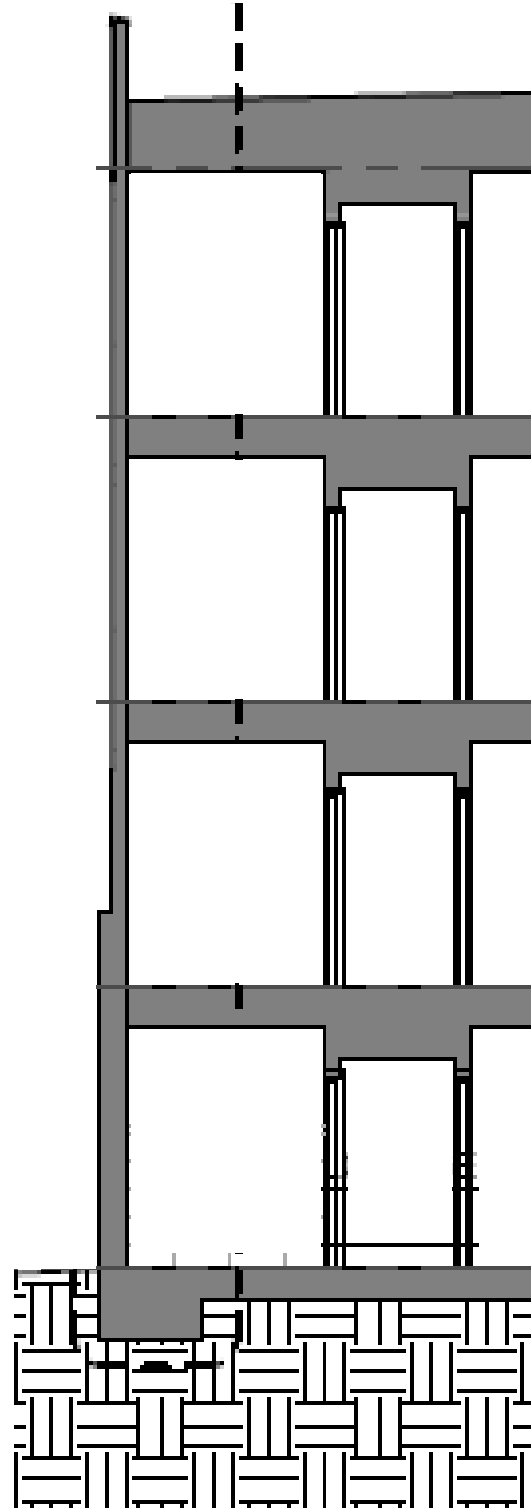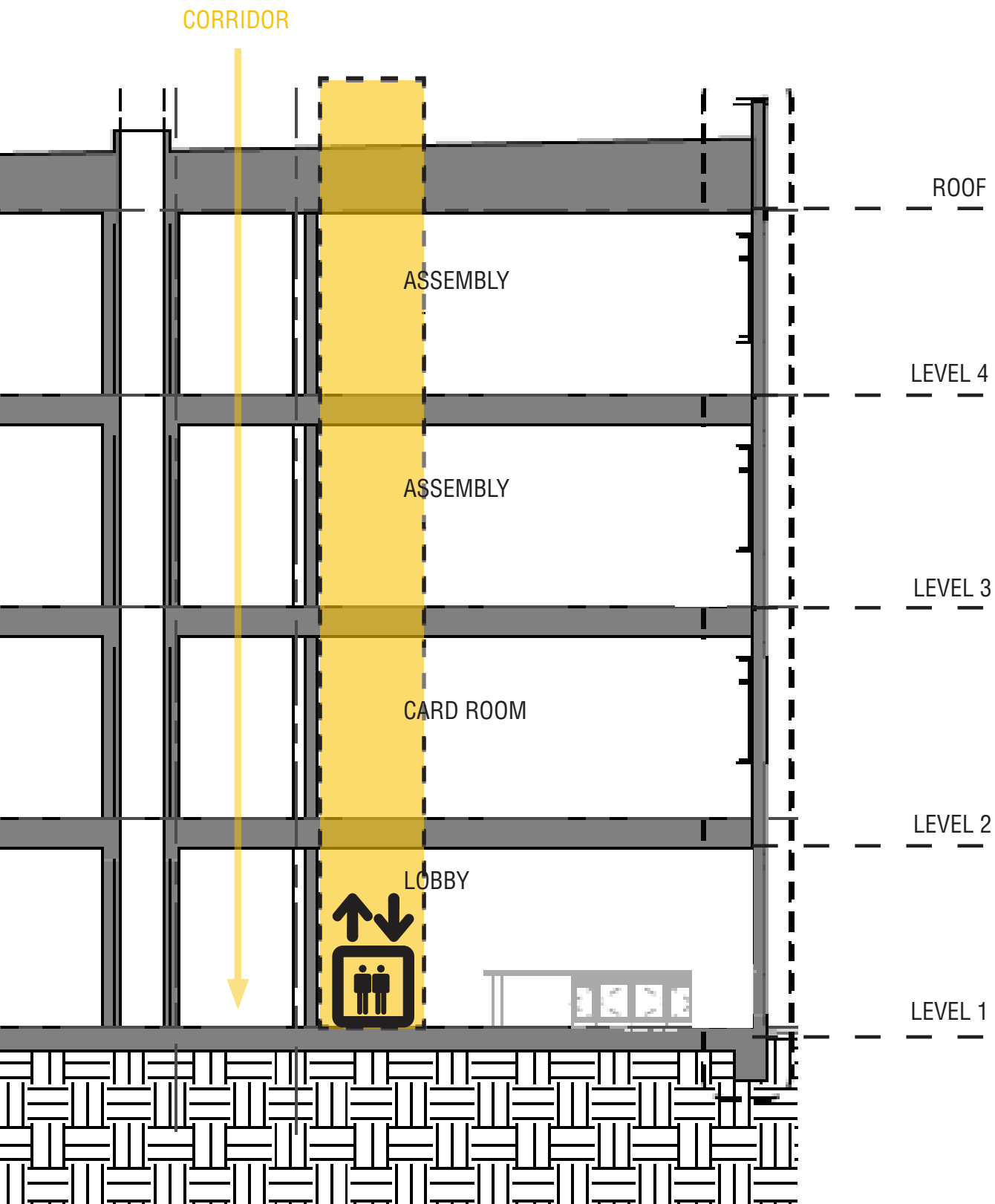
Portions of stacking amenity space could be used for an elevator. Place the elevator in a central location that is adjacent to the corridor and easy to get to from all parts of the building.

3.0 GENERAL BUILDING TOPICS

PRIVATE EXTERIOR SPACE

Decks and patios offer a private connection to the outdoors. Research indicates a connection to nature can foster positive well being. Decks and patios are often under utilized by older adults because they **don't feel safe or have difficulty accessing them** with wheelchairs and walkers. Decks that cantilever off the building can be perceived to be less secure, many residents will feel more comfortable on decks that are recessed into the building.

A Juliette balcony (railing across the outside of a balcony door without a deck) will give the perception of having an outdoor space with views while remaining inside. This type of balcony can create a more open and sizeable connection to the outdoors than a window. A Juliette balcony is a good alternative if the design team feels that full decks won't get enough use to justify the cost. It may be possible to retrofit Juliette balconies onto an existing building if the necessary infrastructure is in place.

DECK/PATIO SURFACE COMPARISON MATRIX

The below matrix explores the relative comparison of exterior deck and patio materials based on care, hazards and ease of mobility.

POOR — AVERAGE — GOOD
1 SYMBOL — 2 SYMBOLS — 3 SYMBOLS
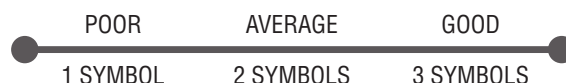
GLARE*: Dependant on color and pattern variations.

MATERIAL	COST	CARE	HAZARDS			EASE OF MOBILITY		
		MAINTENANCE FREE	LEAST GLARE*	SLIP RESISTANT	TRIP RESISTANT	FEET	WALKER	WHEEL CHAIR
SYNTHETIC DECKING	$ $	●● (2)	● (1)	● (1)	● (1)	● (1)	● (1)	● (1)
WOOD	$ $	● (1)	●● (2)	●● (2)	● (1)	●● (2)	● (1)	● (1)
PAVERS	$ $ $	●●● (3)	●●● (3)	●● (2)	● (1)	●● (2)	● (1)	●● (2)
CONCRETE (BROOM FINISH)	$	●●● (3)	● (1)	●● (2)	●●● (3)	●●● (3)	●●● (3)	●●● (3)
TRAFFIC COATING	$ $	●● (2)	●● (2)	●● (2)	●●● (3)	● (1)	●● (2)	●●● (3)

A recessed deck may feel more secure and offer more weather protection than a cantilevered deck.

NON-SLIP SURFACES

An important aspect of an outdoor space's usability is the **slip-resistance of the surface**. Decks and patios are constructed differently and require different strategies to achieve the maximum slip-resistance. Ground level patios are typically slab on grade concrete pads or pavers which have relatively good slip resistance. Pavers with an uneven surface can be a tripping hazard. Deck materials vary considerably as designers grapple with how to best drain the surface. Wood slats or synthetic decking allow the water to drain through but gaps in boards can create an uneven surface which can catch the edge of a cane or become a tripping hazard. Decking with more grain and texture has more foothold than a smooth surface. Materials that grip feet are best for slip resistance, such as traffic coatings or applied surfaces with a sand texture. Coatings and self-adhesive grip surfaces can be applied to existing surfaces on retrofit projects. Exterior stairs should also be constructed out of a slip resistant material.

3.0 GENERAL BUILDING TOPICS

HEIGHT RELATIONSHIPS

Minimizing transitions in vertical height can help facilitate better aging in place. Changes in surface height can create more opportunities for a fall. Ideally the floor inside and the surface outside will be at the same elevation. To maximize the accessibility of patios and decks a **flush door transition** from inside to outside is ideal for giving individuals with wheelchairs and walkers safer access. Standard doors and French doors have a lower door threshold. Sliding glass doors or sliding panelized doors (more costly) have the ability to recess the bottom of the frame into the floor for a smooth transition but this is a non-standard detail. Typically sliding doors are installed on top of the sub floor and protrude several inches, which residents must step over. Barrier-free ramp thresholds can be added or retrofitted to slope between floor level and taller door thresholds.

The elevation of the ground may be significantly lower than the interior floor elevation. This creates two possible scenarios. The first option is to have the patio at ground level. Either a small landing with steps, or a ramp, must be constructed to reach the patio at ground level. The second option is to raise the elevation of the patio to match the interior floor elevation. The latter creates a fall hazard as the patio will be higher than the surrounding landscaping. Although code often does not require railings for elevation changes of a foot or two for standard residential construction, it is recommended for units that will serve aging residents. Both scenarios have safety concerns. Whenever possible use site grading to keep the ground plane at a similar elevation as the interior floor to create a flush transition.

Minimizing transitions in vertical height can help facilitate better aging in place.

Minimize the elevation change between the interior floor level and the level of the patio.

VINYL SLIDING DOOR SILL 1/2"
MAX ABOVE FINISH FLOOR

"JAMSILL" PAN

CONTINUOUS SEALANT AT SILL PAN

RESILIENT FLOORING

1/2" MAX
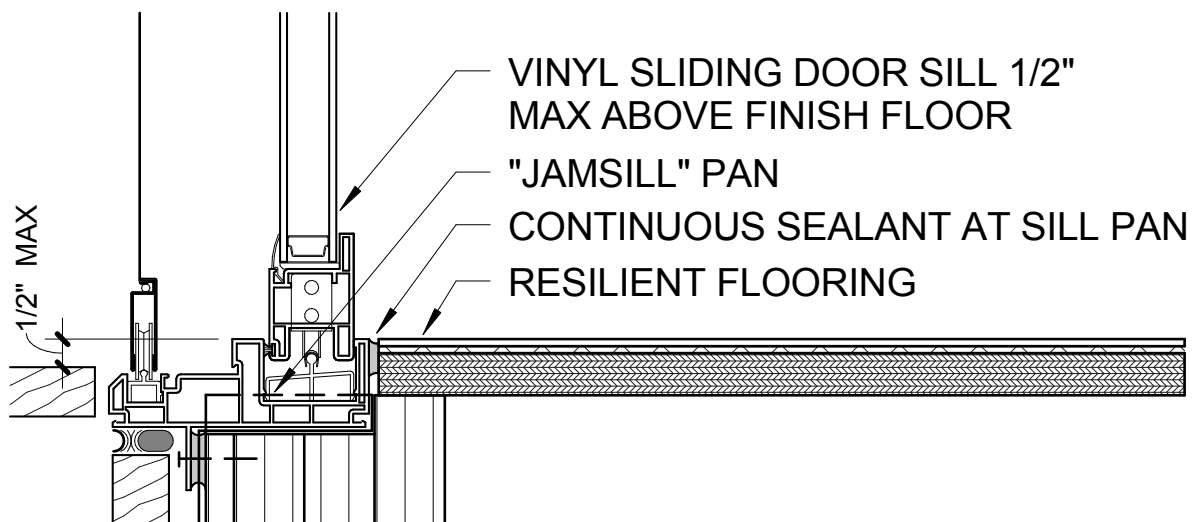
Recessed Sliding Door Sill Detail: Sliding glass door sills may be recessed into the floor for a lower

3.0 GENERAL BUILDING TOPICS

LIGHTING

SAFETY

Inadequate lighting can cause strain on eyes when trying to perform tasks. Plan for **layers of lighting** to accommodate general overhead lighting needs and lower height **task lighting** for specific activities. Outlets for portable light fixtures allow users more flexibility in placement of needed task lighting. Additional information on task lighting for specific rooms are covered under individual room sections. Lighting levels of overhead lighting can be reduced to general illumination levels for safety which **decreases glare** issues caused by more intense light levels. Color and reflective sheen of counter tops, cabinets, and flooring can also cause glare problems. Areas with large amounts of glazing and natural daylight can create areas of high contrast where non-daylit areas appear darker than they are. Add lighting to areas in shadow to balance overall lighting levels. Balance lighting in corridors by including ceiling mounted and sconces on wall. To prevent falls **illuminate steps and ramps** with step lighting or glow in the dark tape along edges; especially in enclosed areas with no daylight such as stairwells. Scale and place lighting where it doesn't become an obstacle for residents. Low hanging fixtures can cause residents to bump their head.

MAINTENANCE

When specifying light fixtures consider the location and type of fixture for **ease of changing light bulbs**. Select wall sconces in lieu of ceiling mounted fixtures for simplicity of maintenance and to avoid the need to stand on a step stool to change out the bulb. Select fixtures with a long life that will require less frequent bulb replacement. Identify critical location lighting (hallways, exits, bathrooms) and specify fixtures with

LIGHT SWITCH GRASPABILITY

POOR   AVERAGE   GOOD
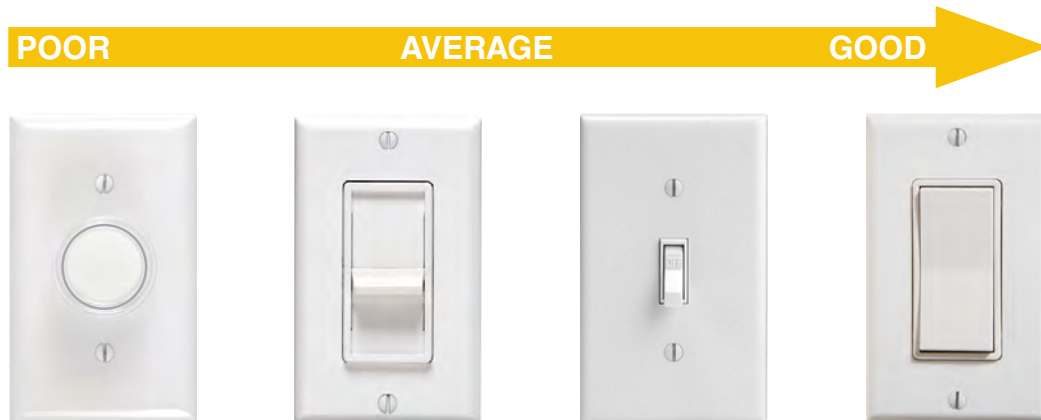
Switches which require grasping small controls or a turning motion can be difficult for older

LIGHTING CONTROLS

TYPES

Select light switches that are easy to use and do not require fine motor skills. Wall switches with a large push button, touch control or rocker switch do not require grasping smaller elements such as smaller toggle switches, dials or sliders. If budget allows, custom lighting control systems can be programmed for scenes based on time of day or activity. A simple push of a button can change lighting levels in the entire home. This can eliminate residents struggling with lighting switches and traveling from room to room to adjust lighting. To better suit aging eyes, dimmable switches also allow more **individual user control** in selecting light levels. A lack of light can be a deterrent for individuals with early signs of dementia, dimmable lighting in the entry may make the space uninviting for individuals likely to wander out the door. Use occupancy sensors for rooms where residents will be frequently carrying items when entering the room for hands free lighting control. **Luminous controls** near the unit entry and bathroom will eliminate searching in the dark to find a light switch.

LOCATION

Fumbling in the dark to reach a light switch can lead to a fall when obstacles can't be seen. Residents may need to get up in the middle of the night to use the restroom. To avoid crossing a room in the dark to turn on the light, **arrange switches so each entry point to a room has a switch.** Standard height for light switches meets most accessibility guidelines.

> **Select light switches that are easy to use and do not require fine motor skills.**

3.6 | ELECTRICAL

OUTLETS

Place outlets where they will be convenient and accessible to all residents. Confirm outlets above cabinetry will be within reach of residents in wheelchairs. Outlets can also be placed along the front of cabinetry, islands or side walls for better reach. Outlets along walls should be free of obstructions and placed higher to avoid bending down to plug in items. Add outlet covers or twist-to-activate styles as an added safety feature. Do not locate outlets directly adjacent to sinks where they may get wet.

LOCATION OF ACCESSIBLE OUTLETS AND CONTROLS:
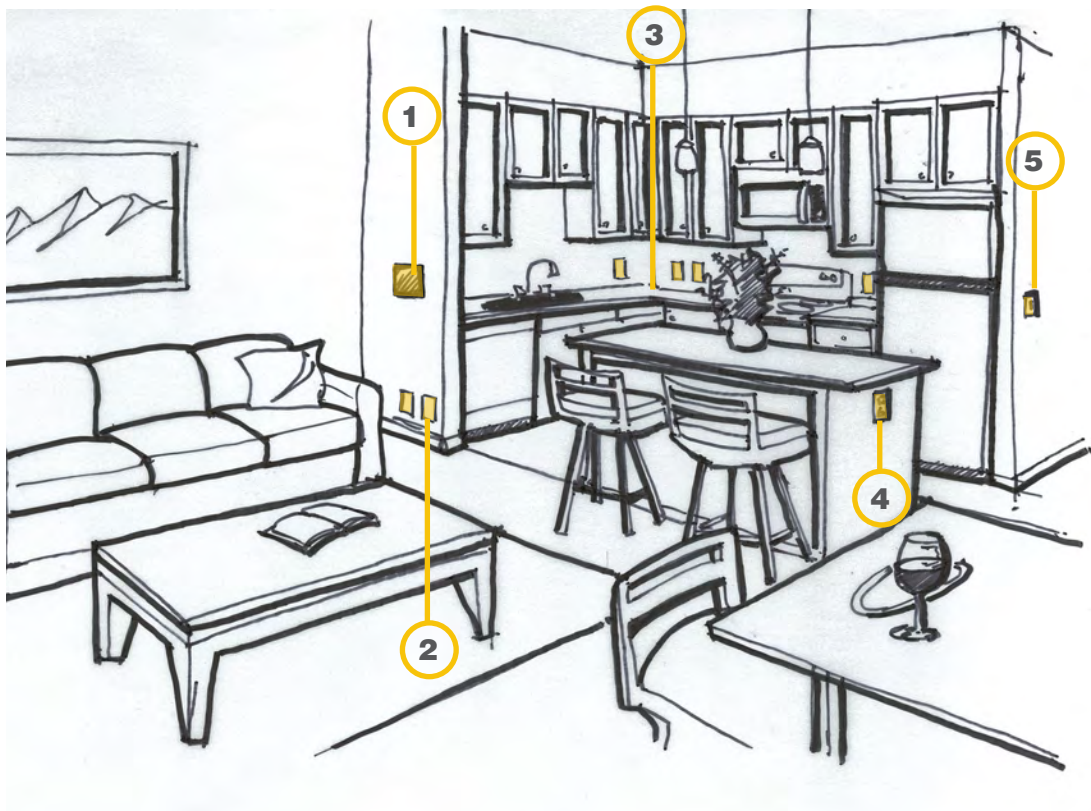
1. **EASY TO READ THERMOSTAT**

2. **WALL OUTLET AND PHONE JACK**

3. **COUNTER TOP OUTLETS**

4. **ISLAND OUTLET**

5. **ACCESSIBLE HEIGHT LIGHT SWITCH**

Ceiling fans provide additional control over comfort to suit occupant preferences.

HVAC

Aging residents can be sensitive to temperature and air movement. Selection of HVAC systems should allow **individual control over temperature** by occupants. System types vary from self-contained units housed entirely within the unit, to central building systems with distribution to individual units. Systems which provide air from a single source (PTACs, for example) can make it difficult to provide even temperature distribution through all rooms in the residence. Baseboard heating and in-floor radiant systems generally take longer to change temperature and may be perceived as "not working" due to the lag. Consider switched radiant ceiling panels in bathing and dressing areas to provide immediate warmth as needed. Avoid systems which create **strong air currents**. Drafts may be uncomfortable to aging residents. Place vents at perimeter walls (instead of ceilings) throughout the space in locations where they can be **readily opened or closed**. Adjustable direction and speed ceiling fans can give residents additional climate control and can also be used in the winter to help destratify the air. Provide exhaust fans in bathrooms with adequate capacity to **exhaust steam and odors** quickly. Fans should not be excessively noisy. Consider interlocking with the light switch or controlling via an occupancy sensor.

Mechanical equipment can produce **unwanted noise**. Consider sound levels and frequencies. Where possible, locate fan coil units above bathrooms or closets, as remote as possible from sleeping and living areas. Use sound dampeners and acoustic construction to isolate noise and vibration. Locate air conditioning condensers away from operable windows and exterior gathering areas.

HVAC CONTROLS

Thermostats, heating, cooling, ventilation and other climate controls should be located in a **well-lit area, at an accessible height.** Provide **large, easy-to-read** thermostat controls. Thermostats with wireless remotes allow temperature control from anywhere in the residence. Talking thermostats accept voice commands and can control temperature from across a room. Pre-programmed settings, or home automations systems set for aging residents preferences, adjust automatically without the user constantly needing to manually adjust temperature. Temperature settings will vary depending on whether or not residents are at work during the day. Residents who are gone during the day can typically turn down settings while they are away. Home automation systems can combine HVAC, lighting and security systems into a single remote control system.

EMERGENCY PREPAREDNESS

Due to physical limitations, reduced cognitive response and specific medical needs, aging residents may present a unique challenge during emergency situations. Alarms and evacuating residents can cause confusion, and residents with limited mobility may have trouble getting out of the building. Avoid locating the building in a flood zone or other hazardous location. **Potable water sources and emergency power should be provided in a central community space** where medications that require refrigeration and medical equipment that requires electricity can be stored during a loss of power. Emergency generators could be smaller in size to power only that portion of the building. Specify life safety systems (smoke and CO detectors, fire alarms etc.) with both **audible and visual** alerts. Homes may be wired for emergency alert systems to connect to fire, police, and EMS at the touch of a button.

Aging residents may present a unique challenge during emergency situations.
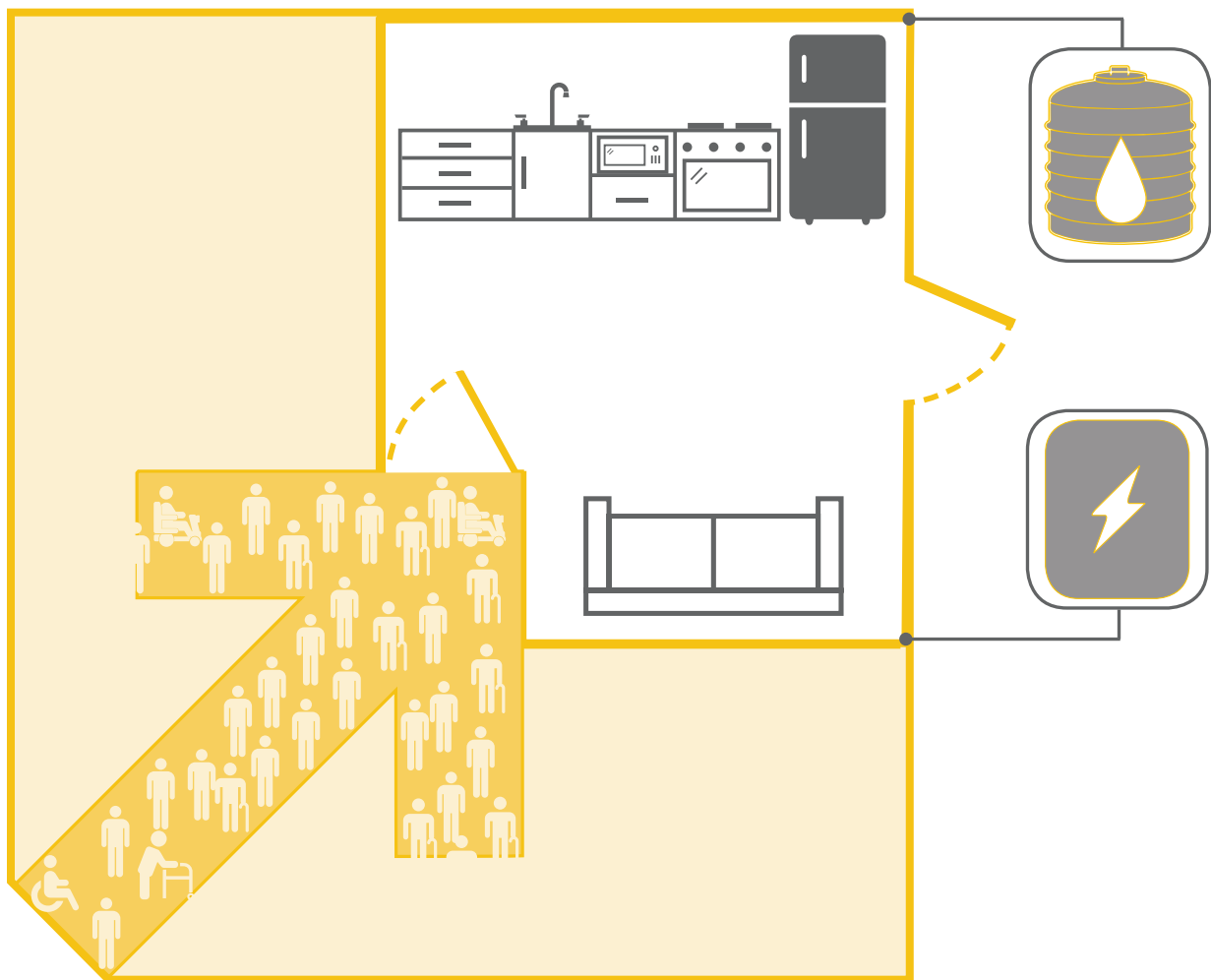
A large community room can be used as a gathering place for residents in an emergency. Provide back-up power, potable water and refrigeration.

3.0 GENERAL BUILDING TOPICS

3.0 GENERAL BUILDING TOPICS

WINDOWS

Larger windows provide a stronger connection to the outdoors and bring in more daylight to offset electric lighting. Natural light and views have been shown to speed healing and improve mood. A **lower sill height** will provide better visibility and connection outside. Garden level units may have higher sills that make window operation more difficult and the view may be partially obstructed. The window opening could be enlarged but generally this is an expensive renovation. If the sill height is too low residents must bend down to operate the window.

EASE OF OPERATION
Ease of operation varies by window type. **Sliders require less strength** than single hung which require lifting, or casement which can be harder to crank depending on the style of hardware. Windows should have **easily operable locks and hardware** that minimizes grip or pinching motions. Operable windows can provide natural ventilation and regulate temperature. Window limiters are a safety feature for individuals with early dementia. However, window limiters may be in conflict with fire egress requirements.

Residents can adjust blinds to achieve the desired light level and reduce glare.

WINDOW COVERINGS

Window coverings provide individual users the ability to **reduce glare, heat gain and provide flexibility to meet desired light levels** for individuals with light sensitivities.

- **Blinds -** Blinds are able to adjust to produce different light levels. Blinds may also be used to direct light up towards the ceiling where it can be reflected off the ceiling and light the room. The view is reduced when blinds are partially or fully closed.

- **Shades -** Shades can be automated or manual and come in varying degrees of opacity, including black out shade options. But once the shade fabric is selected there is no flexibility in the amount of light allowed through the fabric. Electronic shades are the easiest window covering to operate, however they are the most expensive option. Shades provide more complete coverage for glare than slats on blinds.

- **Draperies -** Drapes are used less frequently for multifamily applications and have similar qualities as shades. Users may have trouble finding the center of draperies to open them or may get caught in the fabric.

- **Cords -** Blinds and shades can be challenging to raise and lower by a pull cord. A circular chain mechanism is easier to operate and requires less grip and movement. Cords or chains can be a hazard if individuals become tangled.

3.0 GENERAL BUILDING TOPICS

Main entry doors can be renovated with an automatic door system and wall mounted actuator.

DOORS

AUTOMATIC ENTRANCES

Automatic entrances provide **hands-free access** for residents carrying packages, using walkers or wheelchairs. Doors that slide apart give extra wide clearance and avoid door swing which can be an obstruction to maneuver around or can knock someone off balance. Adding automatic door openers may be a less costly option for retrofits than replacing doors with motion sensored sliding doors. Hands-free door access can also be helpful in other areas of the building where residents are typically carrying items, such as the trash room or laundry.

DOOR TYPES AND CLEARANCES

Proper door selection can increase the maneuverability of residents within the unit. **Sliding doors provide more clearance** than swinging doors and residents don't have to maneuver around the **door swing**. Barn doors and pocket doors with handles allow residences to use the full width of the doorway for access. Avoid pocket doors that require residents to grasp the door in the pocket and pull it out, this is difficult for residents with limited hand motion and strength. Barn doors are easy to retrofit in an existing unit. Plan door swing to not blocking access along corridors. **Bi-fold doors can reduce the accessible width** of hallways. Doors with glazing aid residents with memory loss by providing a view into the room. **Glazing and sidelights** are also helpful to maintain views into common spaces and amenity areas.

Barn doors slide out of the way to maximize the door clearance.

HARDWARE

For ease of use select hardware that minimizes grip, twisting or pinching needs. **Lever handles or doors that push open** allow the resident to use their body weight to help open the door. Avoid door knobs that require a twisting motion. **Large loop pulls** are appropriate for barn doors. Locate hinges on the exterior of rooms so doors swing out and hinges are accessible if the door is locked. This will allow caregivers to be able to open the door if someone were to fall up against the door. This is especially important in the bathroom where there is little room to maneuver. Provide low or flush door thresholds and transitions at doorways.

3.0 GENERAL BUILDING TOPICS

4.0 UNIT LAYOUT AND GENERAL FINISHES

4.0 | UNIT LAYOUT AND GENERAL FINISHES

Clock Tower Lofts | Denver, CO

4.0 UNIT LAYOUT AND GENERAL FINISHES

OVERVIEW

The layout of a living unit and the finishes within it can dramatically impact a resident's ability to live independently. Creating spaces that allow fluid movement by residents with mobility devices fosters greater confidence and prolongs independence. Floor plans should lend themselves towards an intuitive furniture arrangement, yet allow for ease of movement from one space to the next. Finishes should be appropriate for the room they are chosen for while incorporating smooth transitions between materials of different thickness or color. Attention to these details will foster an environment with greater usability which builds continued strength to age in place.

4.1 | PLAN LAYOUT

SPACE PLANNING

As residents age it can be harder to remain mobile. Plan for **all spaces necessary for daily functions to be on a single level** (bedroom, kitchen, bathroom) and **exceed accessibility clearances and clear turning space requirements when possible.** Avoid any steps within a single level. New construction of multi-story units can provide flexibility by incorporating flex spaces on the first level, such as a study, which can later be converted into a bedroom. When renovating an existing multi-level unit a lower level study may not exist, another option is to convert a portion of the living room for use as a bedroom, similar to a studio layout. **Spaces should be adaptable to allow for the ability to repurpose space as needs change.** Open plan or studio layouts allow flexible spaces for varying needs. Storage for mobility devices such as wheelchairs, walkers and scooters, is helpful if extra space can be designated in the floor plan. Additional storage throughout the unit is beneficial so residents don't have to travel as far to access items they need for daily tasks. **Plan extra space for caregivers or spouses where daily tasks are performed and an individual may require help.** Bathrooms are particularly tight and an area where assistance might be needed. Centrally locating the bathroom within the unit reduces travel distances from all rooms for quick access. Also locate phone jacks throughout the unit in accessible locations to reduce the distance a resident will need to travel to reach a phone and answer it. Plan a **clear path with extra wide hallways** throughout the unit, and minimize dead end halls. Rooms with more than one entrance create a loop layout which can be helpful for residents with early signs of dementia so they don't become stuck in a dead end corner which can cause confusion and disorientation.

If only a portion of units will be renovated to accommodate aging residents, **disperse the units among the different unit types** to provide choices in layout and number of bedrooms.

Opening walls to maintain the view between the kitchen and the living room allows a caregiver to maintain a visual connection with aging residents in the other room.

VISIBILITY

Good visibility can be maintained throughout the unit with either open floor plans, wall cut outs or glazing in doors. A **clear line of sight** between rooms allows spouses or caregivers to maintain a **visual connection** with aging residents who may need assistance. Daylight and visibility to the outdoors can improve mood and help residents feel connected to the larger community. Visual cues are especially important for residents with impaired hearing. A view at the door will alert residents of visitors.

4.0 UNIT LAYOUT AND GENERAL FINISHES

4.2 | OVERALL UNIT FINISHES

FLOORING

Smooth, hard, durable surfaces (wood, concrete, vinyl) are good choices for aging residents with decreasing mobility. Consider the **slip resistance and ease of maintenance** when selecting flooring. In addition to improving indoor air quality for residents, installing smooth, hard flooring reduces tripping and allows greater mobility for older adults because they are more easily able to shuffle feet on hard surfaces.

Carpet is often desired in the bedroom for comfort and warmth. If hard surface flooring cannot be used throughout the entire residence, **limit carpet to small areas and select easy to clean, short pile carpets** for these areas. Carpet is more difficult to roll across and textured or large loop residential carpets may catch on the wheels of wheelchairs. Carpet may wear more than hard surfaces and spills are harder to clean. Transitions between flooring types can be a tripping hazard, so carefully consider transitions between dissimilar materials. One option for carpet is to recess the carpet into the floor to maintain a level surface with hard surface flooring. Area rugs placed on hard surfaces can also present a tripping hazard or may slide causing a resident to fall.

Incontinence and reduced balance can lead to more spills, so flooring which is water resistant and easy to clean will reduce the need for frequent replacement. Use of carpet may add to maintenance costs if carpet frequently needs to be replaced. Medium to dark colors will be better at hiding stains. Reflective surfaces on appliances and countertops, such as stainless steel, not only can have glare issues, but they also act like a mirror reflecting objects and surfaces in the background which can be disorienting.

COLOR/TEXTURE

Color gives visual cues about materials, transitions and edges. Contrasting colors for countertops, cabinetry and different types of flooring help residents recognize each as a separate surface. Colored borders on countertops can identify the edge. Patterned carpet can be distracting or interpreted as obstacles on the floor. Select low pile carpet with neutral tones to reduce tripping.

MAINTENANCE
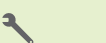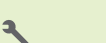
Select durable, cleanable surfaces for walls, flooring and countertops. Non-porous, smooth flooring with fewer joints are easier to clean and have less crevices for dirt to get trapped in. Curved cove base around the perimeter of the bathroom/kitchen, or backsplashes with curved joints, are also more accessible for cleaning than trying to get into a 90 degree corner. Consider materials that do not require harsh chemicals or processes for cleaning. Use washable higher gloss paint in high use areas such as kitchens and bathrooms.

UNIT INTERIOR FLOORING MATRIX

The below matrix explores the relative comparison of selected interior flooring materials based on care, hazards and ease of mobility.

GLARE* : Dependant on color variations and flexibility.

MATERIAL	COST	LOCATION	CARE	HAZARDS			EASE OF MOBILITY		
			MAINTENANCE FREE	LEAST GLARE*	SLIP RESISTANCE	TRIP RESISTANCE	FEET	WALKER	WHEELCHAIR
LUXURY VINYL TILE	$ $	KITCHEN DINING ROOM	🔧🔧🔧	●●	🏃🏃	🚶🚶🚶	!!!	🚶🚶	♿♿
SHEET VINYL	$ $	BATHROOMS	🔧🔧🔧	●●	🏃🏃	🚶🚶🚶	!!!	🚶🚶🚶	♿♿♿
TILE (PORCELAIN CERAMIC)	$ $	BATHROOMS	🔧🔧	●●	🏃🏃	🚶🚶	!!	🚶	♿♿
CARPET	$ $	BEDROOMS LIVING ROOM	🔧🔧	●●●	🏃🏃🏃	🚶🚶	!	🚶	♿
WOOD	$ $	LIVING ROOM BEDROOM	🔧	●	🏃	🚶🚶	!!	🚶🚶	♿♿
POLISHED CONCRETE	$	WHOLE UNIT	🔧	●	🏃🏃	🚶🚶🚶	!!!	🚶🚶🚶	♿♿♿
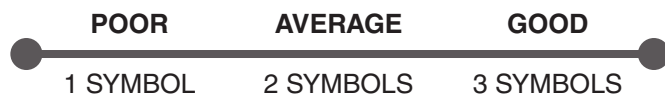
POOR	AVERAGE	GOOD
1 SYMBOL	2 SYMBOLS	3 SYMBOLS

4.0 UNIT LAYOUT AND GENERAL FINISHES

5.0 ROOM BY ROOM CONSIDERATIONS

5.0 | ROOM BY ROOM CONSIDERATIONS

Flatirons Terrace | Boulder, CO

OVERVIEW

The desire to maintain independence in executing common daily living practices within a resident's home is the largest contributor to successful aging in place. By considering the details of individual rooms in terms of their functionality, the design will directly impact the livability of a home. Easy and accessible storage for clothing, as well as simple solutions to wash clothes, increases the capacity for a resident to continue dressing themselves. A convenient and accessible kitchen can encourage self-reliancy while cooking. A bathroom that is practical and safe can increase a sense of dignity by continuing to allow individuals to independently bathe. These and many other considerations outlined in this chapter will allow residents to safely reside in their homes for an increased period of their lives.

5.1 | INTERIOR ENTRYWAY

Eliminate fumbling at the door by freeing hands and using sconce lighting to reduce shadowing on the door lock.

SECURITY AND SAFETY

The **primary security point** for any residential unit is the front entry and door. The
following are design considerations associated with resident safety and security:

- Residents need an **adequately lit** front entry that is free of
  obstructions, to be able to enter the unit safely.
- Residents need **visual and audible cues** when visitors or deliveries are at the door.
- Entry design should provide a clear view of people at the door and audible
  communication methods for residents with impaired vision.
- When opening the door residents need a place to put items they
  are carrying so hands are free to unlock the door.
- Avoid tripping hazards by keeping items off the floor. A coat closet
  can hang garments and store a mobility device.
- Interior entry flooring for townhomes and walk-up buildings (where resident entry
  doors connect directly to the outside) should be **moisture and slip resistant.**
- Providing a place to sit and take off shoes in the entry will prevent moisture from
  being tracked further into the unit where it can be a slip hazard, and prevent dirt
  and debris from being tracked in which can improve indoor air quality. Built-in
  shoe storage at the entry gives residents a convenient place to put soiled shoes
  and they are easy to find again when a resident needs to leave the unit.
- Lighting should be immediately accessible when entering the unit and located to prevent
  shadowing of the door lock.

Design features for unit entries are described on the following page.

5.1 | INTERIOR ENTRYWAY

COAT CLOSET

1 Wet coats and shoes can be immediately be stored in an entry coat closet. A bench with shoe cubbies is another alternative to shoe storage that encourages residents to take off their shoes at the entry rather than tracking in moisture and dirt.

SHELF

2 A built-in shelf near the door allows residents to set down packages and **use both hands** for opening the door without having to bend down to pick up objects they were carrying off the floor.

LOCKED DROP BOX

3 For security a through-wall locked drop box could be provided at the door for deliveries of medications or other supplies. This allows a resident to access deliveries from the inside of the unit without opening the door to a stranger.

VISIBILITY

4 **Visibility of visitors** is important for security. A window next to the door, a sidelight, or glazing in the door will allow a view outside. A peephole in the door offers greater privacy as resident can see out but visitors cannot see in. Dual-height peepholes will allow residents in wheelchairs or scooters to view out.
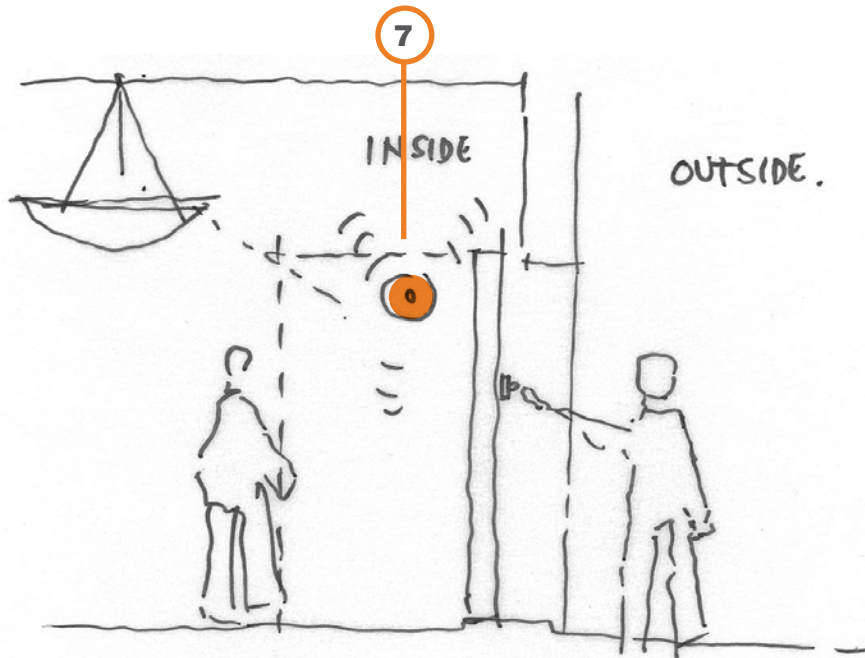
NON-SLIP FLOORING

(5) Moisture from the weather can be blown or tracked into the unit entry creating a potentially slippery surface. Select flooring for the entry that is **moisture and slip resistant.** Walk off mats can aid in removing moisture and dirt from shoes but can be a tripping hazard if not recessed into the floor.

LIGHT SWITCH

(6) The **light switch should be immediately available as the resident enters the unit** or design entry lighting with an occupancy sensor. Locate lighting fixtures to provide clear lighting on the floor to illuminate any tripping hazards such as rugs, mail or shoes left on the floor. Lighting located too far back in the unit may cast a shadow from resident on door locks or drop box, preventing them from clearly seeing their task.

DOOR BELL

(7) For residents with hearing or visual impairments the doorbell should have an **audible and visual** component. Visual notification of visitors or calls, such as a flashing light, and the ability to communicate via text can help improve communication. An intercom for visitors will help residents with poor vision more clearly identify who is at the door. Locate doorbell at an accessible height for wheelchair users.

5.0 ROOM BY ROOM CONSIDERATIONS

5.2 | LIVING ROOM

An open floor plan can accommodate many different furniture arrangements to serve varying needs. Selecting a single neutral flooring type will eliminate issues with flooring transitions.

FLEXIBILITY/FURNISHINGS

The main living space should be a large, **flexible** space to accommodate different types of furniture arrangements and have enough **space for clearances** around furniture. If built-in cabinetry will be provided in the living room area, provide lower height shelving or base cabinets accessible for residents in wheelchairs. Visibility into cabinetry through open shelving or glass doors is helpful for remembering what is stored.

FLOORING

The living room flooring area often is a **transition point for different flooring types**. Flat flooring transition strips help eliminate tripping hazards. Changes in flooring **color** can be used to alert residents of surface changes when traveling to adjoining rooms. A single, neutral-colored, continuous flooring type throughout the unit is best for mobility. Area rugs can be tripping hazards as feet can get caught on the edge. Refer to the flooring section in 04 Unit Layout and General Finishes for more information.

Security — 🔒

Lighting — 💡

Heating — 🌡️

Cooling — 🌀

Audio — 🔊

Video — ▶️
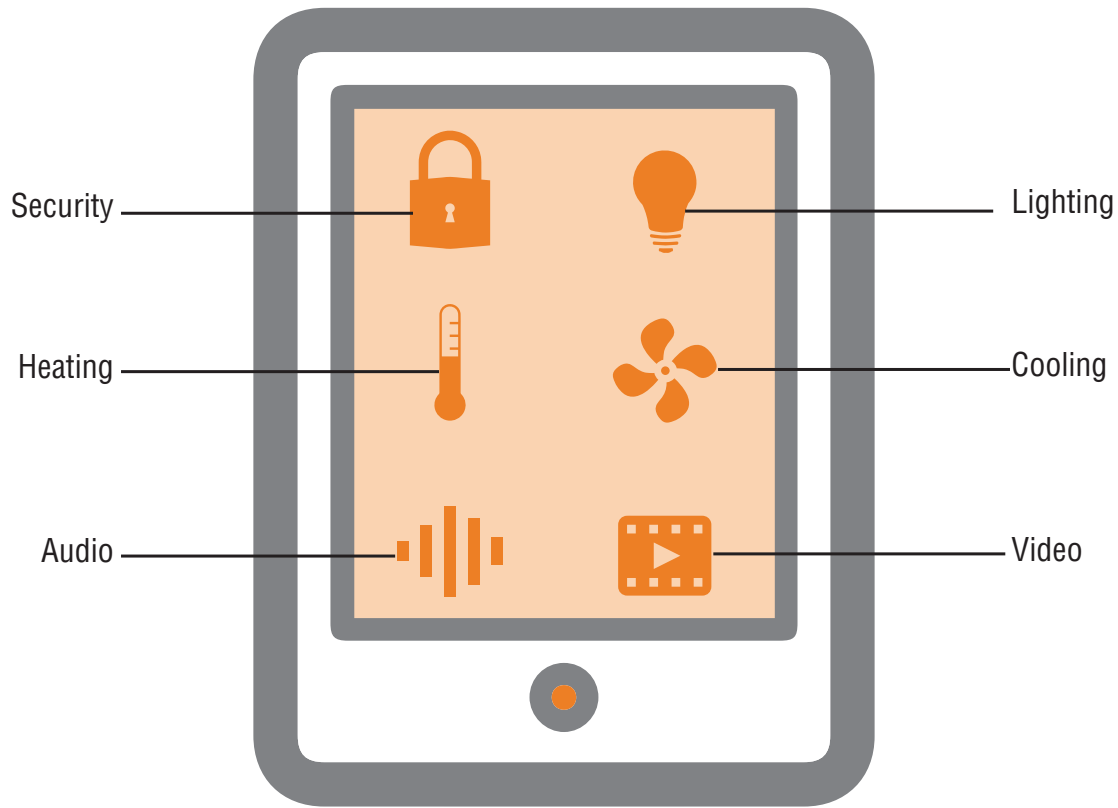
A home automation system with a wireless remote can allow users to control systems from anywhere in the unit.

HOME AUTOMATION

Aging residents may have trouble getting around and in and out of furniture. While universal remote controls that can control heating/cooling, lighting, television, security and even answer the phone can be an expensive feature, they are a very **helpful tool for someone with mobility issues.** Remote controls should have large text and simple buttons with graphic icons to quickly identify functions. Remote controls can coordinate a variety of controls into a single button for a particular scenario. For example, there may be a single button for when a resident is going to sleep that turns off all lights, turns off the television, locks the door, and adjusts the heating/cooling to the night setting. Wiring can be retrofitted into existing units but planning for wiring during new construction is less costly. Ensure controls are **simple and easy to understand**, high tech solutions may overwhelm less technologically savvy users.

5.0 ROOM BY ROOM CONSIDERATIONS
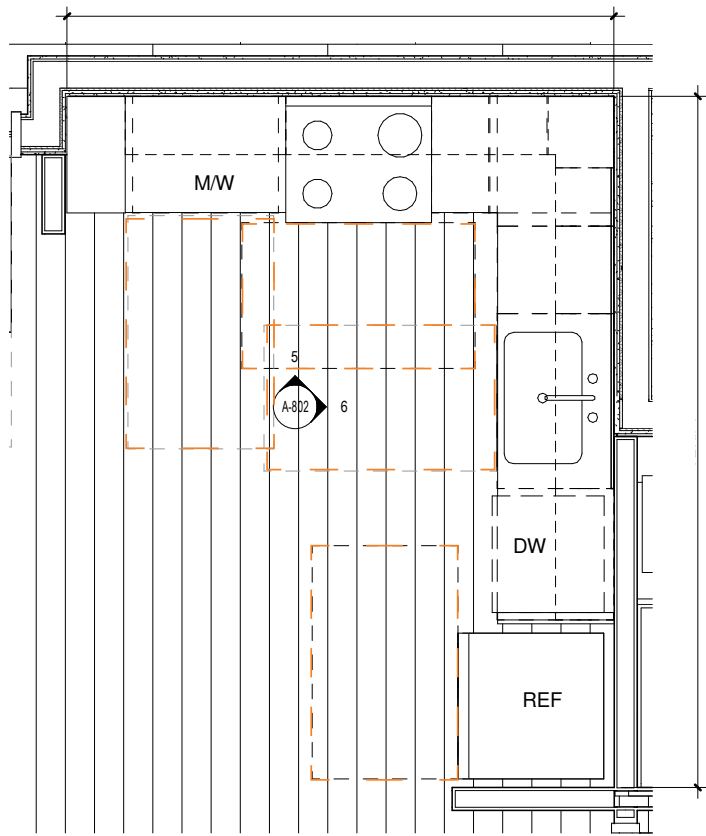
Exceed required minimum floor clearances when possible. Analyze the layout for potential conflicts between appliances.

LAYOUT

Aging residents may need extra space to perform daily tasks. Exceed minimum code required floor clearances for turning radius and room width in the kitchen and around furnishings in the dining room. Kitchens should include a pantry or full height cabinet so stored food does not have to be lifted into upper cabinets. Review the layout for clearances when appliances are open to avoid conflict between appliances or lack of space to operate appliances. It is good practice to co-locate the sink next to the dishwasher for ease of loading. Provide **open counterspace near appliances** for tasks such as pulling items out of the refrigerator or setting down hot food dishes from the oven. Continuous countertops between appliances, such as in a "U" or "L" shaped kitchen, allow residents to use the counter to assist in maneuvering from appliance to appliance.

Exceed minimum code required floor clearances for turning radius and room width in the kitchen and around furnishings in the dining room.

Glazed cabinet doors provide visibility of items enclosed.

Items in open cabinets are easier to access and visible without the need to open the cabinet door. Slide-out cabinet organizers provide easy access to items at the back of the cabinet.

5.0 ROOM BY ROOM CONSIDERATIONS

CABINETRY

(1) OPEN SHELVING
Open shelving or glass cabinet doors provide visibility of contents for residents with declining memory. Labels on cabinet doors are an alternative for solid doors.

BASE CABINETS
Base cabinets with drawers are easier to access than bending down and reaching into a cabinet through a door. Roll-out trays or lazy susans can be retrofit into cabinets with doors for better access. Plan for **removable base cabinets** for the sink and work spaces to provide knee space for residents using wheelchairs.

UPPER CABINETS
For better reach **lower the top height** of upper cabinets or design pull-down shelving within upper cabinets. Standing on a stool or step ladder to access high cabinets can be dangerous for aging residents with reduced balance.

HARDWARE
Loop cabinet pulls are the easiest for aging residents to grasp. Avoid round knobs or drawers/cabinets without hardware which are pulled open at the edge. Bar pulls can hook a shirt and cause a resident to loose balance.

LOCKABLE CABINET
If a unit is shared with someone with early signs of dementia, a lockable cabinet for cleaning products, medications or food sensitivities may be desirable.

LIGHTING

(3) Undercabinet lighting is best for illuminating tasks without the shadowing that can occur from general lighting above. Overhead lighting levels should be **appropriate for cooking prep work**.

APPLIANCES

(2) MICROWAVE
If possible, the microwave should not be located above the stove. Instead, **locate the microwave on the counter or integrate into the lower cabinetry** where it is reachable. For safety the microwave could be located behind a lockable roll door or cabinet.

OVEN
While most standard ovens are accessible, a wall mounted oven is at a height that requires less bending and lifting, which reduces risk of injury.

APPLIANCE SAFETY
Avoid gas appliances, electric or induction stove tops are better for safety. Appliance hot surface indicators, kill-switches or a lockable cover can be provided for the stove for residents sharing a unit with spouse who has early signs of dementia. Locate the switch in a non-obvious location or inside a locked pantry.

ACCESSIBLE APPLIANCES
Appliances should be **accessible** by both residents with a wheelchair/scooter, or standing without excessive bending. Side by side refrigerator/freezers are the most accessible, but units with freezer at the bottom are also an option. Raise the dishwasher to reduce bending. Drawer dishwashers mounted under the counter are typically more expensive but are located at an ideal height for both standing or seated users. All appliances should have **easy to read controls located on the front face**. Push button controls are preferable to knobs, which require a twisting motion.

PLUMBING FIXTURES

(4) Ensure the sink width from back to front is not too great that the faucet is unreachable by a resident in a wheelchair. Specify faucets with **mixing valves/ anti-scald protection, lever handles and pull-out spray faucets for ease of use**. Consider a faucet with limited rotation to prevent spills. Pedal controls or sensor faucets provide hands-free control. **Cover exposed hot water pipes** to prevent burns.
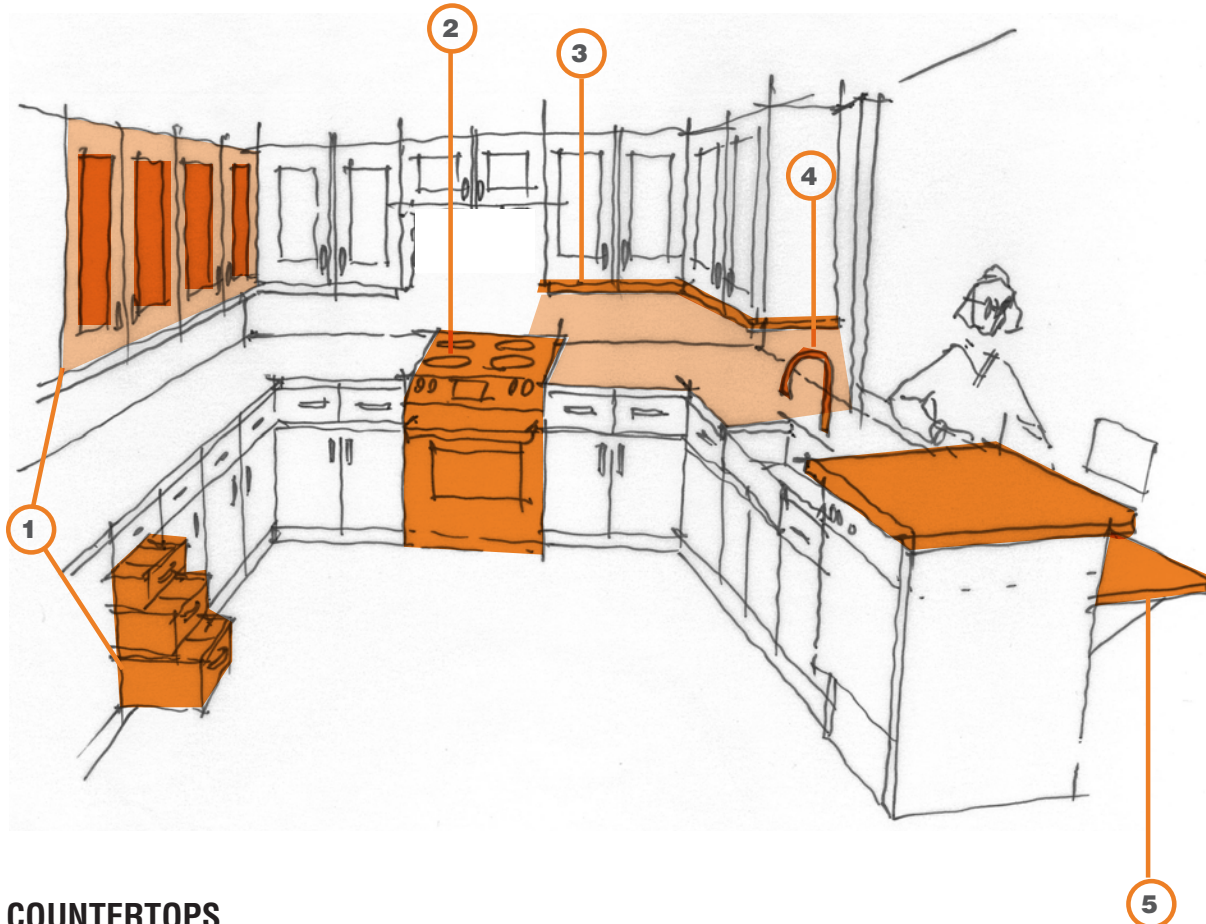
COUNTERTOPS

SURFACES

⑤ Identify the **edge of work surfaces** with colored edge striping. Minimize glare on counter surfaces by specifying medium tone colors and lower sheen to reduce reflectivity. Differences in tone on horizontal and vertical surfaces can help residents with poor vision differentiate between surfaces. Rounded corners can reduce injury if a fall should occur.

MULTI-LEVEL WORK AREAS

Adjustable height or **multi-level work areas** benefit residents in wheelchairs or aging resident who may tire easily and need to sit while performing tasks. A lower height breakfast bar is more accessible for all types of aging residents as bar height seating can be difficult to sit in.

5.0 ROOM BY ROOM CONSIDERATIONS

5.4 | BATHROOM

LAYOUT

A safe, functional bathroom is essential in order for residents to be able to age in place. When locating bathrooms in the unit ensure **bathrooms are centrally located and that there is a full bath on the main level of multi-story units.** Additional space for storage may be needed for aging residents for personal items and incontinence supplies to reduce travel distance to reach items needed for daily tasks. Where space allows, bathrooms can integrate a full height cabinet or shallow storage cabinet above the toilet. **Exceed clearances** for turning radius and space in the shower whenever possible to accommodate a resident plus a spouse or caregiver.

CABINETRY

Standard cabinetry typically does not accommodate residents using a wheelchair or scooter. Specify a wall hung sink and/or cabinetry with a counter height that will accommodate seated residents. Plan for **removable base cabinets at the sink** or provide a design with a recessed area for knee space in the initial layout. Base cabinets with pull out drawers are easier to access than bending down and reaching into a cabinet through a door. If storage will be provided above the vanity, consider open shelving or glass cabinet doors to provide visibility of contents for residents with declining memory.

Improve the safety and visibility of countertops by selecting materials that meet the needs of aging residents. Identify the **edge of countertop** with colored edge striping. Minimize glare on counter surfaces by specifying medium tone colors and lower sheen to reduce reflectivity. Rounded countertop corners can reduce injury if a fall should occur.

HARDWARE

As people age they lose flexibility and strength in their hands. **Loop cabinet pulls** are the easiest for aging residents to grasp. Avoid round knobs or drawers/cabinets without hardware which are pulled open at the edge. Bar pulls can hook a shirt and cause a resident to loose balance. If a unit is occupied by someone with early signs of dementia a lockable cabinet for cleaning supplies or medications may be desirable.

ACC-13

18" MIN

ACC-10

18" MIN

2' - 1 1/4"

12
15   A-812   13
14

ACC-11

ACC-12
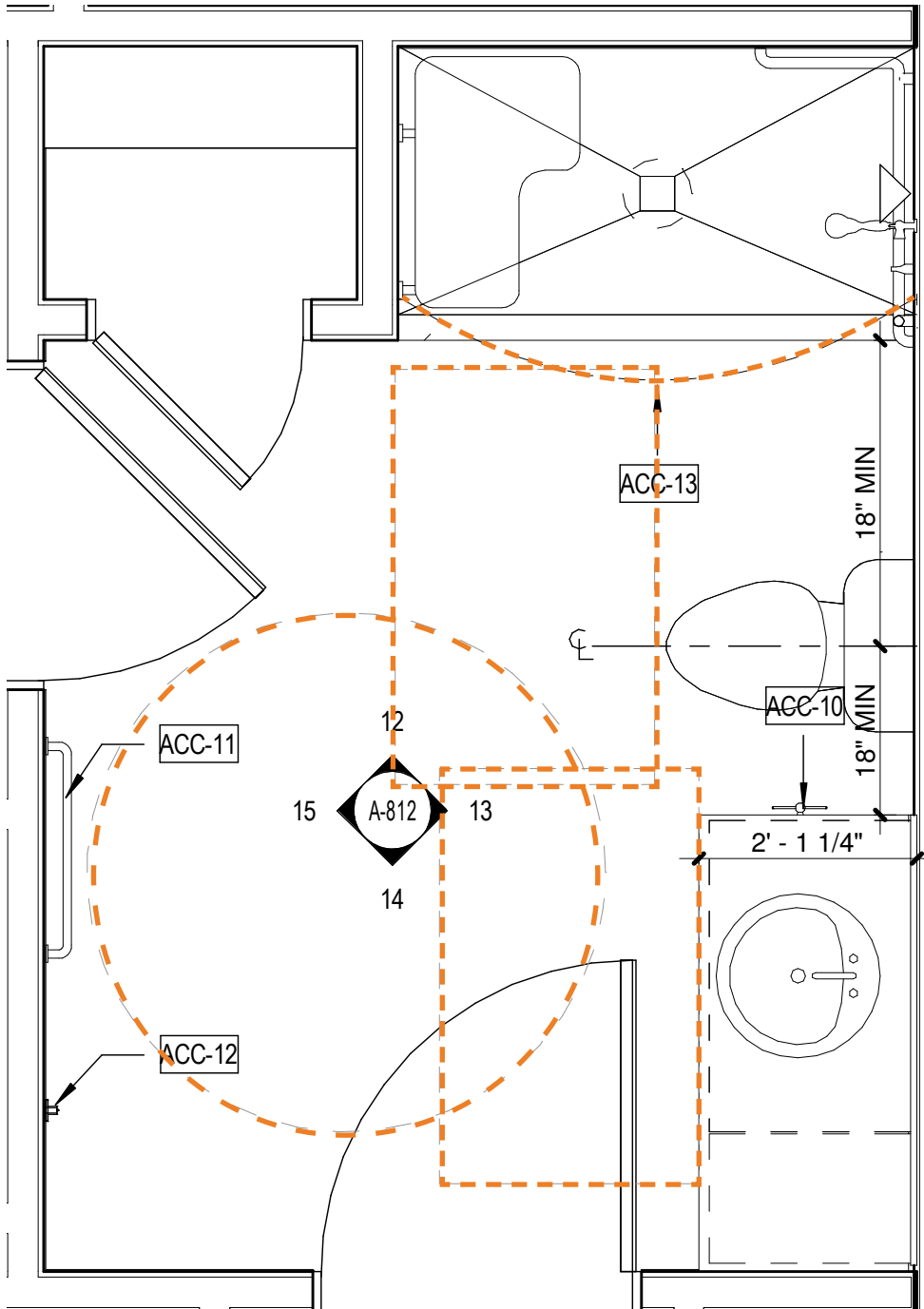
Exceed the required minimum floor clearances and provide space for caregivers if unit layout allows.

5.4 | BATHROOM

ACCESSORIES

Bathrooms tasks such as accessing the shower, tub or toilet require movements that can throw a resident off balance and cause a fall. Wet surfaces contribute to accidents. **Reinforce bath accessories** with backing inside the wall and choose sturdy products that can support a falling resident who may grab accessories to try to regain balance. For convenience install towel bars and robe hooks near the shower/tub. Also **install grab bars** with backing in the shower/tub and at the toilet. Grab bars may be installed at a future time in units where they are not currently needed. Install backing during construction so walls do not need to be opened during a later renovation. Mirrors should be hung at an appropriate height to accommodate residents sitting or standing. Mirrors which are angled downward or are adjustable to tip down can provide seated residents a view. Choose a toilet paper dispenser which can easily be restocked with one hand.

Install grab bars in the shower for extra support while bathing.

Install backing during construction so walls do not need to be opened during a later renovation.

Reduce maintenance with seamless flooring and easy to clean surfaces.

FINISHES

Flooring can become wet in the bathroom, ensure selected flooring is specifically **slip-resistant in wet conditions**. Smaller tiles with more grout lines are more slip-resistant than larger tiles in the shower. Bathroom rugs can be a slip hazard.

Prioritize the **cleanability of surfaces** when selecting materials for flooring, walls, and counters. Materials with fewer joints are easier to clean, such as welded seam sheet vinyl. Curved integral cove base helps eliminate tight corners which collect dirt and are hard to clean. If installing tile, epoxy grout is more resistant to contaminant collection.

5.0 ROOM BY ROOM CONSIDERATIONS

ELECTRICAL

Wet locations require extra safeguards when dealing with electricity. Install GFCI outlets for safety in wet locations and avoid placing outlets directly adjacent to sinks where they may get wet. Confirm outlets above cabinetry will be **within reach** of residents in wheelchairs. Outlets can also be placed along the front of cabinetry for better reach. For additional safety consider an emergency call button or pull cord. Locate the button low on the wall where it is reachable from the floor between the shower/tub and toilet area where falls are more likely to occur.

LIGHTING

The day typically begins and ends in the bathroom. Ensure **adequate lighting is provided to perform daily tasks**. Locate a lighting fixture above the shower/tub where extra light is needed for bathing tasks and general lighting may be blocked off by shower enclosure. Heat lamps above the shower/tub are an appreciated convenience by aging residents who get cold quickly. Walk in tubs must drain before a resident is able to exit which provides a cold experience for a wet resident sitting in open air. Ensure the mirror is well lit with integral lighting in the mirror or light on multiple sides to eliminate shadows. **Night lighting** can aid residents trying to locate the bathroom in the middle of the night. Manufacturers also offer toilets with integral lighting, but they are typically costly.

PLUMBING FIXTURES

Specify fixtures with safety and convenience in mind. Ensure the sink width from back to front is not too great such that the faucet is unreachable. Specify faucets with **mixing valves/anti-scald protection and lever handles** for ease of use. **Cover exposed hot water pipes** to prevent burns. Pedal controls or sensor faucets provide hands-free control. Consider faucet with limited rotation to prevent spills. Avoid pedestal sinks which provide little space for laying out personal items and the pedestal can be an obstruction for seated residents. A wall mounted sink or sink with removable base cabinet will provide the needed clear space underneath. Provide an elongated, accessible height toilet.

SHOWER/TUB

Aging residents may require assistance when bathing. Where possible size the shower and tub area to have **room for a caregiver** and the resident. A **seat** can be helpful for both tubs and showers.

SHOWER:
- Design the shower with **curbless entry and a wide door** so a wheelchair may roll in.
- Shower curtains can be a hazard if a resident grabs them when falling, instead provide a hard sided enclosure with a door or opening.
- Provide a **handheld shower head** with offset controls to avoid spray when turning on the shower.
- A trench drain will allow the shower to slope in a single direction rather than the floor sloping from all directions towards a center drain.

TUB:
- Consider adding textured strips to the bottom of the tub.
- **Lower height or walk-in tubs** are easier for aging residents to get in and out of. A lower height tub may be more appealing for units designed for younger residents with families who will age in place over time.

Glazed shower enclosures are safer than shower curtains which may rip off the shower rod if a resident grabs them during a fall. A roll in shower eliminates the need to step over a shower curb which can cause a resident to slip.

5.0 ROOM BY ROOM CONSIDERATIONS

5.5 | BEDROOM

LAYOUT

The bedroom should be away from the central activity zone to promote sleep. Plan enough space in the bedroom to **maneuver around the bed and typical bedroom furnishings**. Bedrooms should be sized for a bed and dresser at minimum. The bedroom should be in **close proximity to the bathroom** so there is a clear line of sight between the area for the bed and the bathroom. **Night lights** or a light switch near the bed and along the pathway to the bathroom can aid navigation at night. A phone jack near the bed can be helpful so aging residents don't have to struggle out of bed to find the phone and to answer it in time. Many older adults still use land line phones as they are not comfortable with the new cell phone technology.

Provide a clear line of sight between the bed and the bathroom.

CLOSET DESIGN

Storage within the unit should be maximized. A closet may be used to hang garments and also to store other household items. **Preserve turning clearances outside hallway closets and confirm that doors don't obstruct access.** Make sure the door opening for walk in closets is **wide enough** to accommodate walkers, wheelchairs and scooters and residents have the **ability to turn around** inside. **Adjustable shelving and rods** can be lowered for residents using wheelchairs or scooters. Walk in closets should have a light fixture.

A solid-colored, medium tone carpet is a good balance between safety, light reflectivity and hiding stains.

CARPET

Carpet adds a feeling of warmth to a bedroom. Select **low pile carpet** with neutral tones to reduce tripping and to provide a firmer surface for rolling wheels. Patterned carpet can be distracting or interpreted as obstacles on the floor. Refer to the flooring section in 04 Unit Layout and General Finishes for more information.

5.6 | IN-UNIT LAUNDRY

LAYOUT

Locating the laundry area near the bedroom and closet will reduce the travel distance aging residents need to carry soiled laundry. A direct pass through between the laundry room and bedroom shortens the distance even further. In a multi-story unit a laundry shoot could be planned into the design to avoid carrying laundry down stairs. A laundry shoot or designated area in the laundry room can be easily checked by a laundry service. **Preserve turning clearances outside hallway laundry closets and inside a laundry room.** Make sure the door opening for the laundry room is wide enough to accommodate walkers, wheelchairs and scooters. Bi-fold doors on a hall laundry space can reduce clearances and block passage. Also provide lower height storage for laundry supplies such as detergent, hangers and an iron. Nearby folding space is a nice convenience.

> **Locating the laundry area near the bedroom and closet will reduce the travel distance aging residents need to carry soiled laundry.**

Residents in wheelchairs or scooters need lower access to appliances. Provide a front loading washer and dryer with controls located on the front panel.

FRONT LOADING MACHINES

(1) **Raised height, front loading washers and dryers** are best for accessibility and reduce bending to load clothing. **Controls should be located on the front of the appliance.** For appliances located in a hall closet, pull the washer and dryer forward to align with the face of the wall for easier access for wheelchair users. Front loading combination washer/dryer units are available if space is tight.
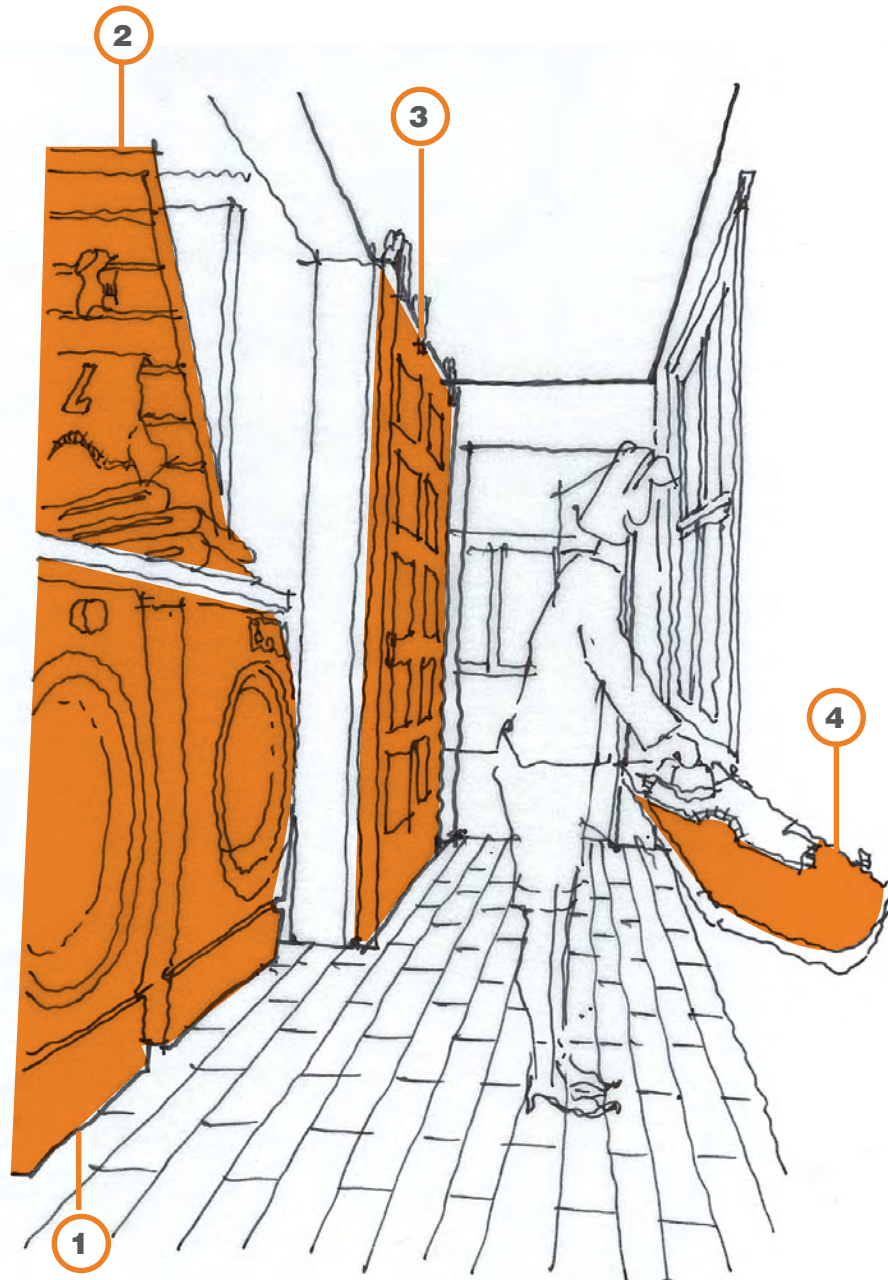
FOLDING/HANGING SPACE

(2) Layout the laundry area for ease of tasks. Provide **multi-height counterspace** adjacent to appliances for unloading laundry and for folding space. To air dry clothing furnish multi-level or adjustable hanging rods.

BARN DOORS

(3) Barn doors slide to the side and preserve the hall clearances for laundry room closets.

WALL MOUNTED IRONING

(4) For areas with limited space a wall mounted fold out ironing board can be supplied.

5.0 ROOM BY ROOM CONSIDERATIONS

5.7 | INDIVIDUAL GARAGE/CARPORT
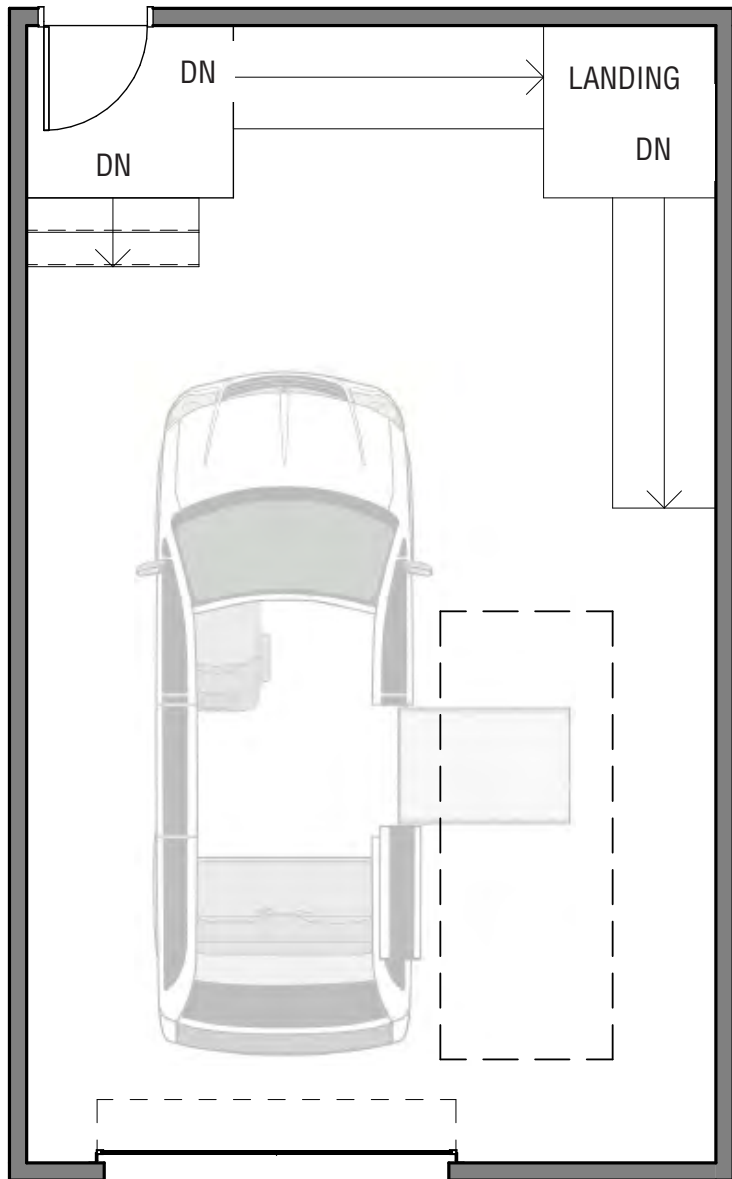
A ramp can be added to an existing garage where the door is higher than the garage floor.

ACCESSIBILITY

Older residents may need extra space to get in and out of vehicles. Plan extra large garages to accommodate **oversized vehicles and lifts** with access aisles. Increase the overhead door opening size to a minimum of 8'-0" height to have enough clearance for vans. Design for access into the unit to be at the **same level** as the garage/carport level. If level changes are unavoidable, a ramp may be installed to provide access into the unit.

Ideally the garage floor surface would be at the same elevation as the interior floor.

5.0 ROOM BY ROOM CONSIDERATIONS

6.0 INNOVATIVE TECHNOLOGY

6.0 | INNOVATIVE TECHNOLOGY

OVERVIEW
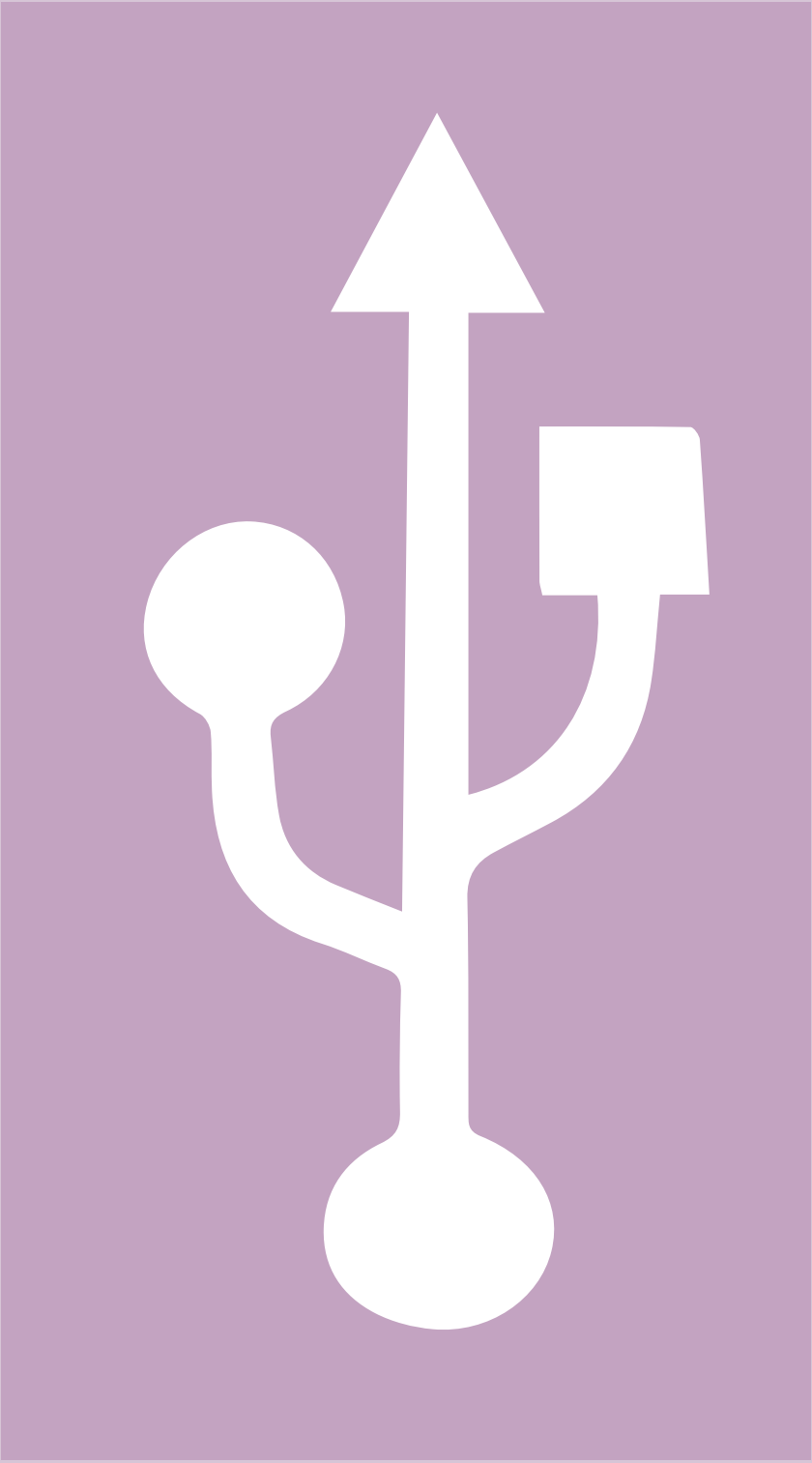
Technology is constantly advancing providing incredible opportunities to create a safer and more stimulating environment for successful aging in place. Artificially intelligent pets and humanoid robots can both assist in the tasks of daily living as well as provide a level of social interaction. Automatic medication dispensers can aid residents with the intake of their daily doses of medication by ensuring the right quantities and types are taken at the appropriate time. Additional technologies allow customization for individual users which increases the accessibility of homes and encourages residents to prolong their independence.

DESIGN IMPLICATIONS

Aging residents may stop venturing out as often and therefore miss out on the connections they would normally get through everyday tasks. Pets have mental and social benefits for aging residents. The bond with a pet can reduce feelings of isolation or loneliness. Pets can give a resident purpose. **Artificial intelligence pets can fill the desire for companionship but don't need amenities** such as outdoor dog runs, pet washing stations or extra space within units. There are no real consequences if an Artificial Intelligence pet is temporarily forgotten. Care is a lower cost than a live pet. Live pets take additional space and care that may not be realistic for older adults. Artificial Intelligence pets will need a power port to keep them functional.

Artificial Intelligence pets give companionship without the added burden of taking care of a live pet.

6.0 INNOVATIVE TECHNOLOGY

6.2 | ELECTRONIC PILL DISPENSER
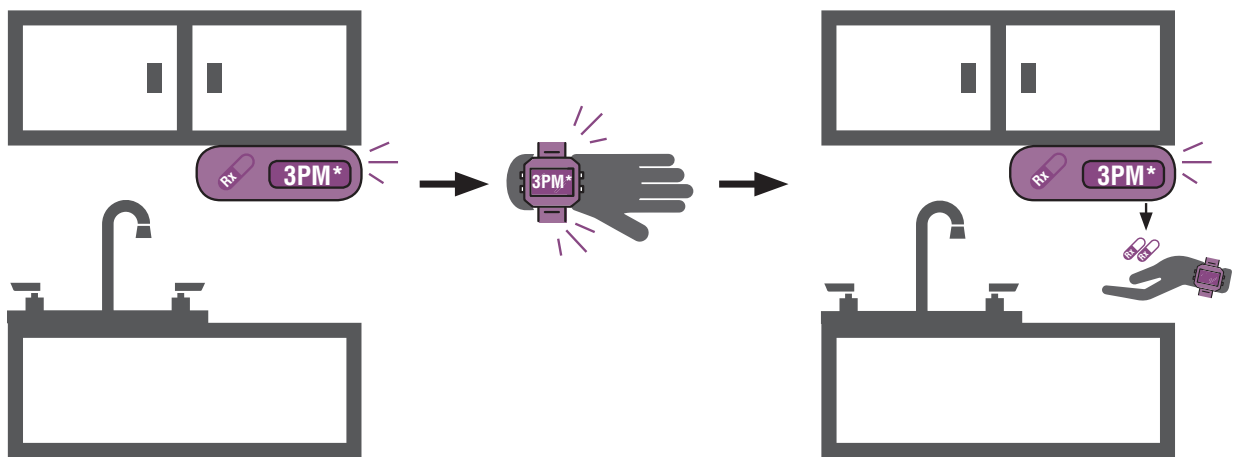
SAFETY

The dangers of medication mismanagement cause numerous deaths each year. Electronic pill dispensers are a safety feature for residents with memory loss. Pill dispensers are typically located in a bathroom or kitchen and refilled by a caregiver. Since pill dispensers are often large to accommodate a week or more of medication they can take up a lot of counterspace. Consider creating a wall mounted shelf, niche, clear drawer or directly mounting them to the wall to preserve space on the counter for other items.

Electronic pill dispensers are a safety feature for residents with memory loss.

6.0 INNOVATIVE TECHNOLOGY

6.3 | WANDERGUARD

Door Controller

Tag Signal

Exiter Field
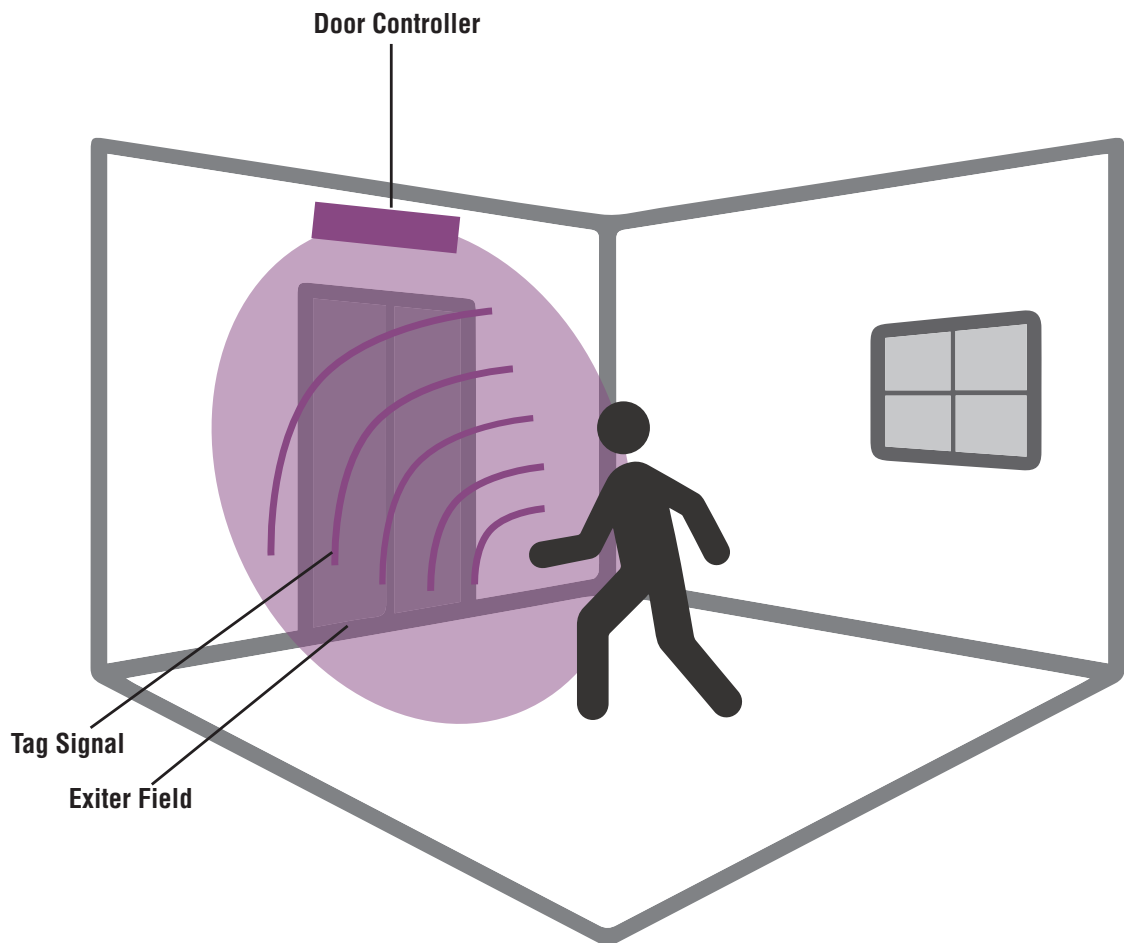
SAFETY

Aging residents with early signs of dementia may **wander out of the building and become disoriented,** possibly putting themselves in danger. A Wanderguard system tracks identified residents wearing bracelets or key chain tags without restricting their movement. The system uses GPS to track residents once they have left the building. The system is tied to unit or building doors and is part of a home automation or building security system that alerts a caregiver when a resident leaves so they can monitor their movement.

The Wanderguard door controller is connected to a sensor based bracelet on a resident's arm.

A Wanderguard system tracks identified residents wearing bracelets or key chain tags without restricting their movement.

6.0 INNOVATIVE TECHNOLOGY

6.4 | SENSOR BASED TECHNOLOGY

TRACKING

New **wearable technology and smart home technology** is allowing aging residents to remain independent longer. Wireless sensors throughout the home or wearable sensors allow family members or caregivers to **stay connected from a distance without disrupting the residents daily routine**. Wireless information is sent back to a dashboard where daily patterns are tracked. The system can be programmed to recognize changes in the pattern (not getting out of bed, frequent trips to the bathroom etc.) to pick up on **early warning signs** of health issues. Changes in a pattern do not necessarily mean there is a problem as there are normal circumstances that would show up as a pattern change. A lack of activity could mean a problem, or that the person is sitting quietly reading. Notification of a change allows a caregiver to check in with the resident to make sure everything is OK.

SLEEP

A simple sensor under the pillow can detect when a resident went to bed, how long they are there, or **if they haven't gotten out of bed yet which may signal a problem**. The sensor deactivates when the resident gets up. Wrist monitors can track more complex sleep patterns such as REM cycles.

ACTIVITY

Motion sensors in rooms throughout the unit **detect activity** so caregivers know the person is up and about. Door monitors or a sensor on a key chain detects when a resident goes out. Caregivers can be alerted if the **front door is left open**, especially at odd hours. A lack of motion in the unit when the sensor does not detect that the resident has left, could signal a fall or health issue. Sensors can also gauge socialization by tracking how often a resident is leaving the unit. Wrist trackers are able to monitor number of steps and distance traveled, and sensor socks can track gait and any changes in gait. A voice activated wrist band can give directions back home and can be equipped with on call emergency services.

EATING

To track eating habits a sensor can be placed on the door to the refrigerator or pantry. While the sensor can't tell what the person ate, it could be used to tell if a resident **skipped a meal or is making frequent trips** to the kitchen to eat. Some applications allow users to proactively log food intake to monitor nutrition.

MEDICATIONS

A door sensor can track when a resident opens the medicine cabinet. More sophisticated systems s**ync with an automatic pill dispenser and can send reminders** if someone hasn't taken their medications. Voice activated wristbands can be set to remind residents when it is time to take medications and operate outside of the home when the resident is out and about.

PERSONAL HEALTH

A variety of types of wearable sensors can monitor health. Stickers attached directly to the skin can **monitor heart rate, blood pressure and sleep.** Sensors in the bathroom are able to **track toilet flushing or length of time** in bathroom. Wrist trackers can be used proactively to log exercise or hydration. There are even sensors for fall prevention - a smart garment uses 3D sensors to detect a fall in progress and deploys wearable air bags.

HOME SAFETY

Unattended appliances where a task was started and then forgotten can become hazards. Sensors can monitor the stove and shut it off if the temperature gets too hot or is left on too long. Water leak sensors can detect flooding in a laundry room, bathroom, or kitchen. Temperature sensors can be placed on faucets to make sure they don't get too hot or to monitor the temperature in the home to ensure it isn't too hot or cold.

6.0 INNOVATIVE TECHNOLOGY
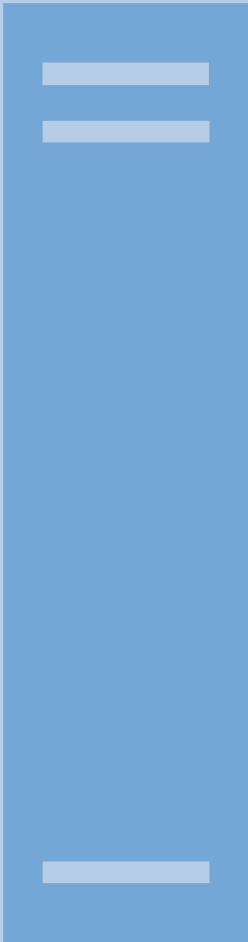
7.0 APPENDIX

7.1 RESOURCES

GENERAL AGING IN PLACE

Aging-in-Place Recommendations for 2015 Enterprise Green Communities Criteria
http://www.enterprisecommunity.com/resources/ResourceDetails?ID=0101079 and the Existing

Enterprise Aging-in-Place Toolkit & Charrette Toolkit with added language for communities pursuing aging in place strategies
http://www.enterprisecommunity.com/solutions-and-innovation/enterprise-green-communities/resources/charrette-toolkit

Enterprise Aging-in-Place Existing Building and Site Evaluation Checklist
http://www.enterprisecommunity.com/resources/ResourceDetails?ID=0101080

Aging in Place – A Toolkit for Local Governments by AARP
http://www.aarp.org/content/dam/aarp/livable-communities/plan/planning/aging-in-place-a-toolkit-for-local-governments-aarp.pdf

National Aging-in-Place Council
http://www.ageinplace.org/

National Institute on Aging
https://www.nia.nih.gov/

Design for Aging & Aging-in-Place Toolkit by American Society of Interior Designers (ASID)
https://www.asid.org/content/design-aging#.Vsetd00m6Uk

Design for Aging Knowledge Community – American Institute of Architects (AIA)
http://network.aia.org/designforaging/home

National Association of Home Builders Aging In Place Remodeling Information Site
https://www.nahb.org/en/consumers/homeownership/aging-in-place-vs-universal-design/aging-in-place-remodeling.aspx

APA: Planning Aging-Supportive Communities
https://www.planning.org/publications/book/9026902/

SPECIFIC TOPICS

Handbook for Designing Roadways for the Aging Population by the Federal Highway Administration
http://safety.fhwa.dot.gov/older_users/handbook/

Flooring Slip Resistance: Products that meet ANSI/NFSI B101.1-2009
https://nfsi.org/certifications/certified-products/

GENERAL BUILDING RESOURCES

International Code Council
http://www.iccsafe.org/

National Fire Protection Agency
http://www.nfpa.org/

ACCESSIBILITY /UNIVERSAL DESIGN

2012 Enterprise Green Communities Single & Multifamily Universal Design Specifications
http://www.enterprisecommunity.com/resources/ResourceDetails?ID=0084050

Americans with Disabilities Act
https://www.ada.gov/

Fair Housing Authority
http://portal.hud.gov/hudportal/HUD?src=/program_offices/fair_housing_equal_opp

Universal Design
http://www.universaldesign.com/

AGING HEALTH

Alzheimer's Association
http://www.alz.org/

Alzheimer's Foundation of America
http://www.alzfdn.org/

Arthritis Foundation
www.arthritis.org

Silver Sneakers
https://www.silversneakers.com/

OZ ARCHITECTURE FEATURED PROJECTS

Images not listed below are owned by OZ Architecture.

ARIA APARTMENTS | DENVER, CO
Photographer: Lana Rimboym
- Wayfinding Signage, Pg. 38
- No Smoking Signage, Pg. 75

THE CARILLION | BOULDER, CO
Photographer: Fred J. Fuhrmeister
- Common Area, Pg. 19
- Dining Room, Pg. 21
- Exterior Site, Pg. 26
- Exterior Entry, Pg. 39
- Fitness Room and Pool, Pg. 72
- Casual Dining, Pg. 78
- Recessed Deck, Pg. 85
- Unit Layout, Pg. 103
- Unit Bathroom, Pg. 125

CLOCK TOWER LOFTS | DENVER, CO
Photographer: Thorney Lieberman
- Interior Layout, Pg. 100

CHAFFEE PARK | DENVER, CO
Photographer: Brian Sendler
- Senior on Bench, Pg. 50
- Mail Room, Pg. 62
- Library, Pg. 70
- Pergola, Pg. 71
- Elevator, Pg. 80

CREEKSIDE LOFTS | DENVER, CO
Photographer: Cheryl Unger
- Kitchen Layout, Pg. 116
- Open Kitchen Cabinets: Pg. 116

HIGHLANDS GARDEN | DENVER, CO
Photographer: OZ Staff
- Exterior Seating Area, Pg.28
- Ground Level Entry, Pg. 40
- Fence and Courtyard, Pg. 49
- Common Area, Pg. 56
- Patio and Path, Pg. 87

FIRST CHAIR VAIL | VAIL, CO
Photographer: OZ Staff
- Wayfinding Signage, Pg. 79

FLATIRON OFFICE PARK | BOULDER, CO
Photographer: Scott Dressl Martin
- Barn Door, Pg. 97

FLATIRONS TERRACE | BOULDER, CO
Photographer: Ed LeCasse
- Front Facade, Pg. 12
- Facade and Sidewalk, Pg. 35
- Courtyard, Pg. 50
- Living Room, Pg. 108
- Interior Entryway, Pg. 110

FRAISER MEADOWS | BOULDER,CO
Photographer: James Ray Spahn
- Common Area (left), Pg. 19
- Multi-Purpose Room (right), Pg. 19
- Game Room, Pg. 64
- Dining Room, Pg. 67
- Seating Area (left), Pg. 78
- Studio Layout, Pg. 94
- Unit Bathroom, Pg. 123

Photographer: Lana Rimboym
- Exterior Entry, Pg. 96

MORNINGSTAR | GLENDALE, AZ
Photographer: Mark Boisclair
- Pathways of Light, Pg. 46
- Courtyard (top), Pg. 50
- Memory Care Garden (left), Pg. 50
- Common Area, Pg. 72
- Multi-Purpose Room, Pg. 78
- Studio Layout, Pg. 126

PATHWAYS VILLAGE | GRAND JUNCTION, CO
Photographer: Julie Edwards
- Ceiling Fan, Pg. 91
- Shower Grab Bars, Pg. 122
- Full Shower, Pg. 124

SILVER GARDENS | ALBUQUERQUE, NM
Photographer: Rose Romero
- Front Entrance, Pg. 42

PHOTO CREDITS: ADDITIONAL CONTRIBUTORS

SHAW CONTRACT GROUP
- Carpet Samples, Pg. 76
- Bedroom Rendering, Pg. 127

GLIDEWARE
- Broom Closet, Pg. 116
- Sliding Drawer Pg. 116

JOY FOR ALL PETS
- Cat Prototype, Pg. 136

DHM DESIGN
Photographer: Carl Zoch
- Therapy Path, Pg. 52

GRAPHICS

All graphics are original designs developed by OZ Architecture.

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