C

Housing Patterns

This section of the Pattern Book provides an outline of typical Neighborly Habitat House types, allowing for appropriate selection according to neighborhood location. Six housing types are illustrated: single-family detached houses, single-family attached houses, mansion apartments, townhouses, apartment buildings, and mixed-use buildings. The basic elements of each type are reviewed here. The Architectural Patterns section should be consulted when designing a new house or transforming an existing plan.

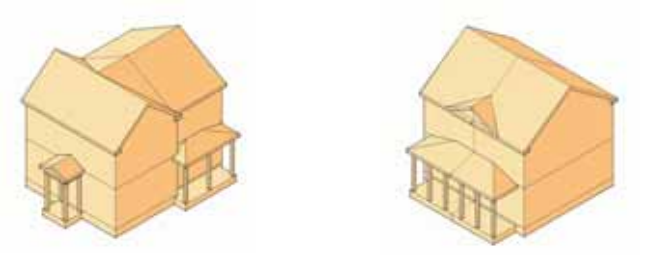
Strategies for green building, visitability and accessibility, and ancillary structures and parking are also addressed in this section. These recommendations apply to all housing types.

Housing Types

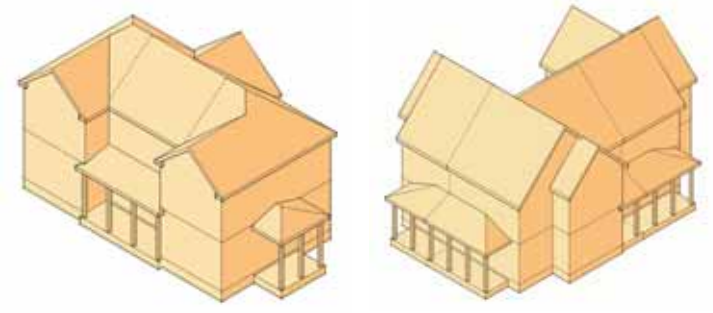
The six building typologies presented in this section are found throughout American neighborhoods. In many older neighborhoods, styles were adapted over time as certain patterns became popular. The following inventory of building types reflects various architectural styles and vocabularies. While there are many variations on house types, those illustrated here appear to dominate the most lasting and successful neighborhoods.

Single-Family Detached Houses

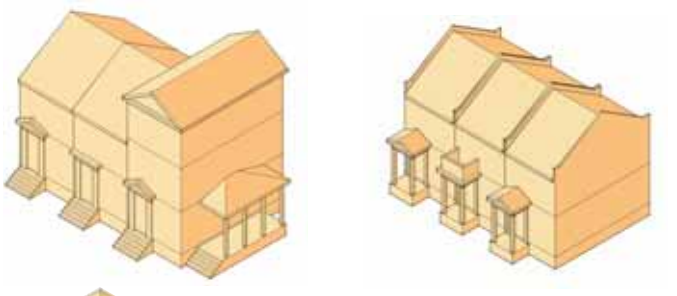
Single-Family Attached Houses



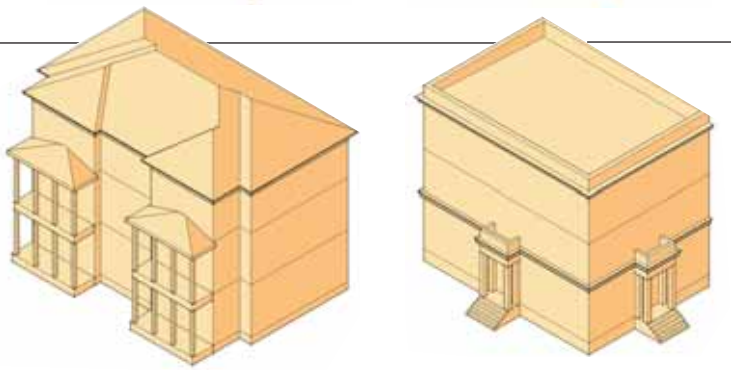
Mansion Apartments



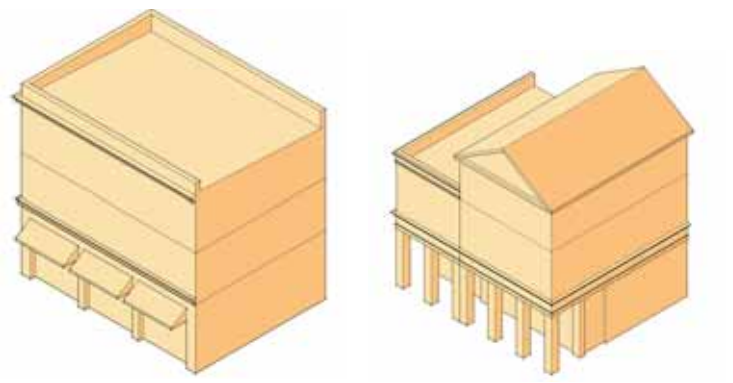
Townhouses and Stacked Flats



Apartment Buildings



Mixed-Use Buildings

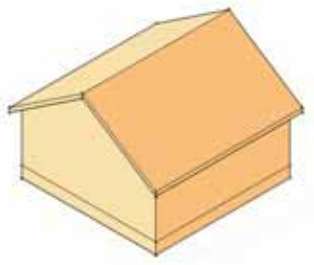


C

Components of a Neighborly House

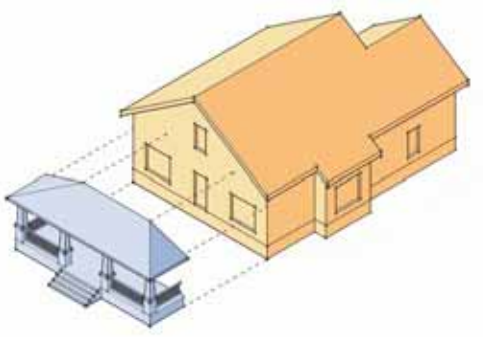
Main Body

Most traditional houses are distinguished by a Main Body that is always the most important form. Additional space is created through secondary additions to this Main Body. The first step in designing a house is to determine the Main Body Massing Type. This will guide the development of a new house plan or the modification of an existing house.



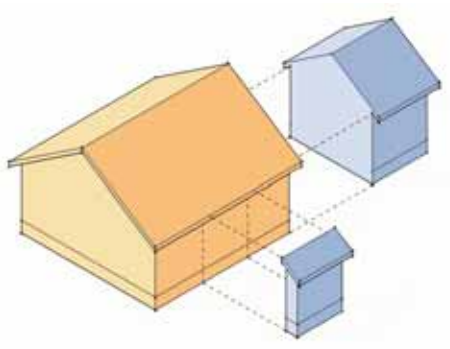
Porches

Porches are important elements in the neighborhood and find expression in almost every architectural style or vocabulary. Setting the appropriate column types, porch cornices, railing, and balustrades is key to establishing the character of the house. The Pattern Book offers options found within a particular style complete with sample profiles that illustrate the correct dimensions and components.



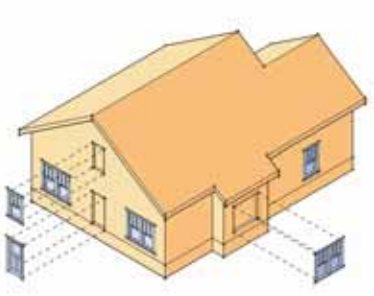
Wings

In general, additions are treated as Wings. Side wings can be either one, or one-and-one-half stories, set back from the front facade of the Main Body. Two-story additions can be added to two-story Main Bodies, but should be set back from the front facade and limited in width to a maximum of one-third the width of the Main Body. Side wings and rear wings can be added in many combinations.



Doors and Windows

Windows and doors are available today from a wide range of manufacturers and come in almost any shape and size. Correctly proportioned and detailed Doors and Windows are critical in reinforcing the style of the house. The Pattern Book illustrates standard window and door types used for each architectural style and special windows and doors used as accents.



Door and Window Composition

Once the massing and the floor-to-floor heights are determined, various Door and Window Compositions can be explored. Most styles have very definite patterns that were used to produce balanced or picturesque compositions. Window proportions, location, and spacing are all important and were well understood by early house builders.

Final Assembly

The Final Assembly of the various components should produce a house of recognizable character and quality no matter what the size. Appropriate materials are discussed in the Appendix. A series of illustrated possibilities within each style section demonstrates the effective application of the Pattern Book guidelines.

More than building new affordable houses, the mission is to help people build new lives. HABITAT FOR HUMANITY

Designing a Single-Family House

Step 1:

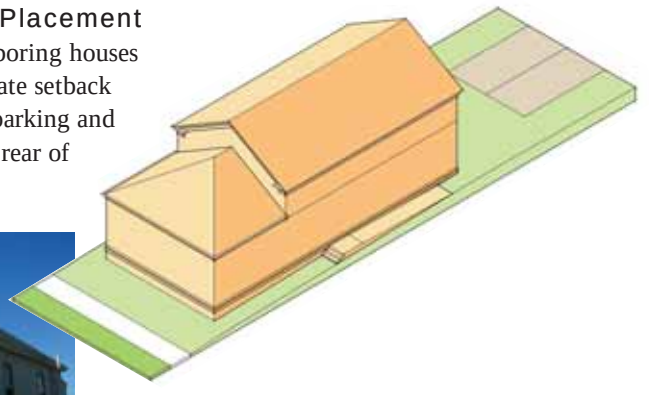
Analyze Historic Context

Observe and photograph existing houses in the appropriate neighborhood. Existing houses provide a wealth of information about the composition and make-up of neighborly houses. Record dimensions, bay spacing, and common patterns.

Step 2:

Determine Building Placement

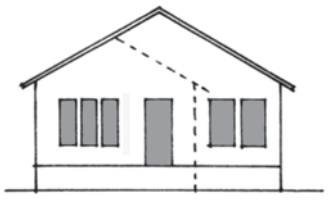
Use the setbacks of neighboring houses to determine the appropriate setback for the new house. Place parking and accessory buildings to the rear of the lot.



Step 3:

Determine Massing and Facade Composition

Choose an appropriate massing for the house based on the Architectural style. Consider different window and door compositions that create a public facade for the house.

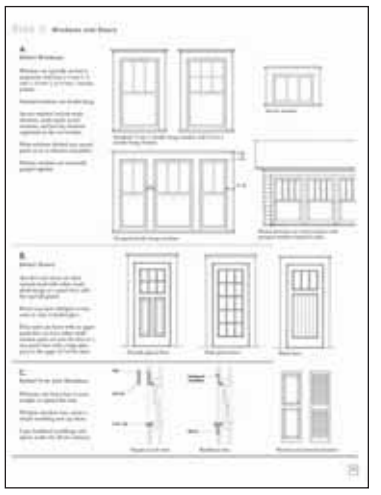


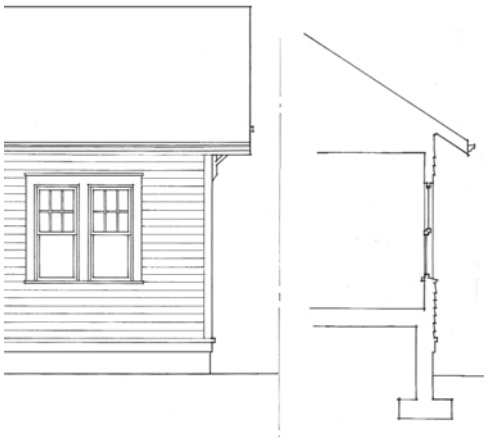
Door and Window Compositions

Step 4:

Compose Building

Design the more detailed elements of the house, such as the eaves and the types of windows and doors, using the Architectural Patterns section.



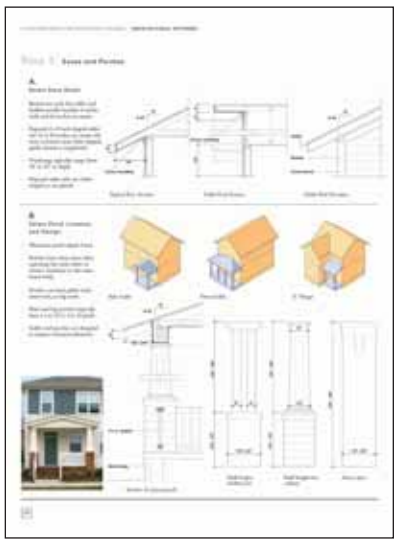


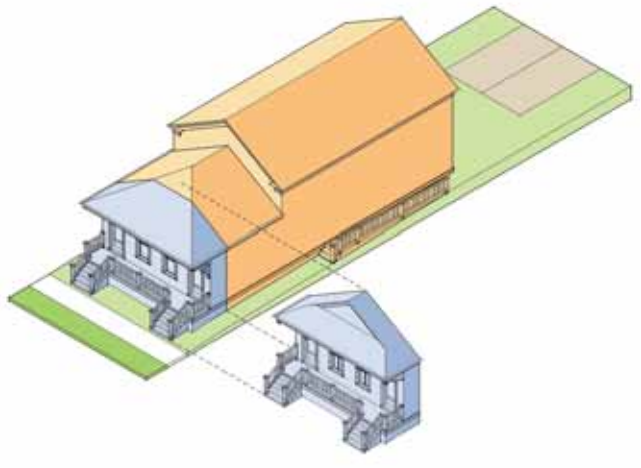
Typical Arts & Crafts Side Wing Elevation and Wall Section

Step 5:

Apply Building Elements

Review the building elements: the porch, windows, doors, and details, considering the whole composition of the house. The building elements should come together in a harmonious way.





C

Designing a Single-Family Attached Building

Single-Family Attached Houses, Mansion Apartments, and Townhouses

Step 1:

Analyze Historic Context

Observe, photograph, and measure the historic buildings in the area. New building details should relate to traditional building patterns. Take note of the building massing and profile, bay spacing, cornice details, windows, doors, and materials. Often historic patterns can be abstracted and simplified to become more affordable.

Regional Differences

Attached housing is more complex than single-family housing. This building type has many flexible arrangements and has been interpreted to meet the needs of different cities. Regional examples are often eclectic and vary greatly from one style to the next. The most successful designs draw from historic regional context.

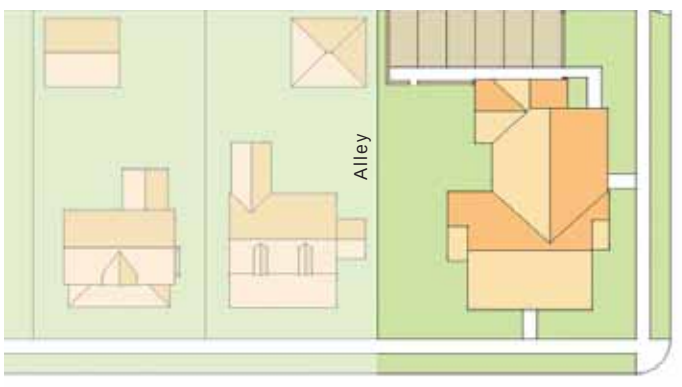
DESIGN TIPS

- Model mansion apartments on existing large houses in your neighborhood.
- Use setbacks and bay spacings to make a large multi-family building in scale with its context.
- Select materials and colors based on historic examples and those available locally.

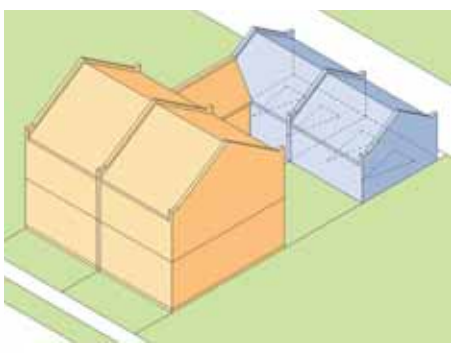
Step 2:

Determine Building Placement

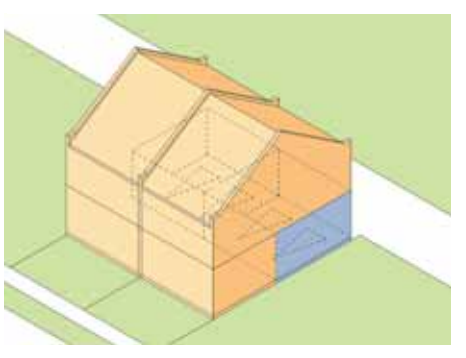
Buildings should be placed on their sites as guided by the setbacks of adjacent buildings and as is appropriate for specific zones. Landscaped front yards and gardens provide privacy for ground floor residents. Parking should be located behind the building. Parking spaces may be integral to the building (tuck-under), housed in separate garage structures, or open with structured or landscaped screening.



Plan Drawing of Mansion Apartment Placement on Lot



Attached and Detached Garages



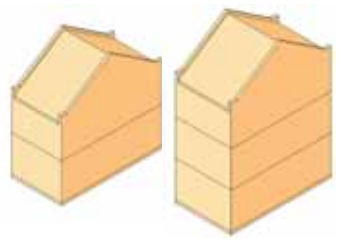
Tuck-Under Parking

Site Axonometric Drawing of Mansion Apartment Placement on Lot

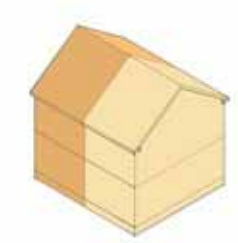
Step 3:

Determine Massing and Facade Composition

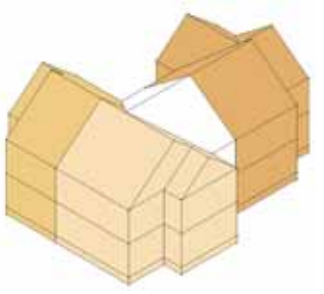
Single-family attached buildings are treated as either “big houses” within single-family detached neighborhoods or as attached, narrow houses in more urban settings.



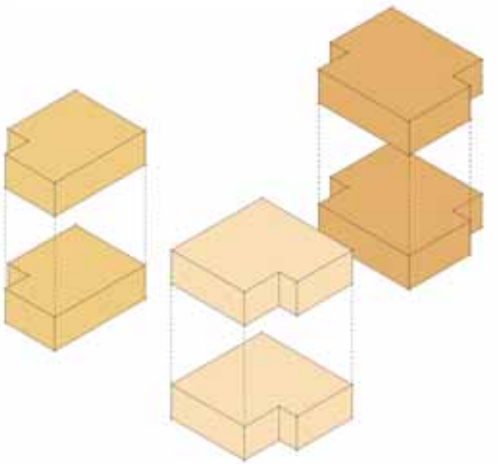
2-Story Townhouse and
3-Story Townhouse



Single-Family Attached Building



Massing of Mansion Apartment

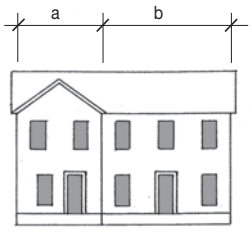


Apartment Units Expressed
as Separate Entities

Step 4:

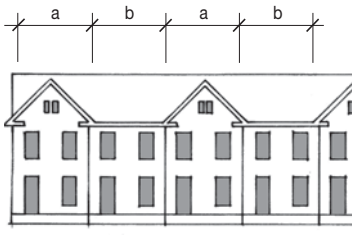
Compose Building

Large apartment houses are often composed in bays with repeating elements to create a rhythm and give scale to the building. Ground floor entrances to different residences are articulated and the composition of openings relates logically to the interior building plans. Special elements such as chimneys and bays may also enhance the composition. Townhouses may use compositional techniques similar to large apartment houses, but the rhythm of bays is usually determined by the size of one townhouse unit.

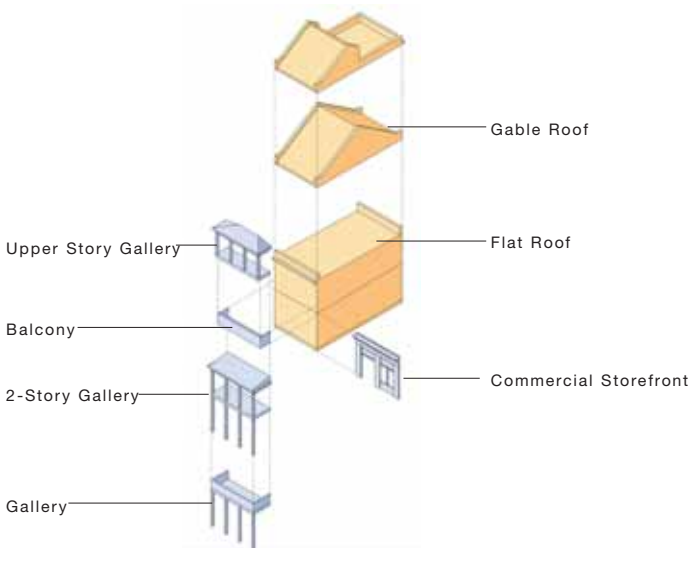


Two Bay Composition

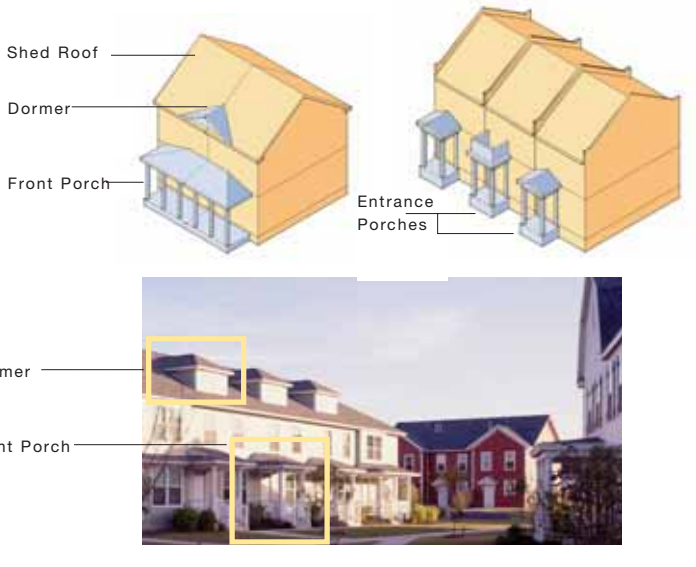
Illustrative Plan of Mansion Apartment



Townhouses Equal Bay Spacing



Roof and Porch Options



Building elements such as dormers and entrance porches

Step 5:

Apply Building Elements

Large-scale buildings should be articulated to create an effective urban space and to relate to smaller-scale buildings in the adjacent neighborhoods. Roof forms can vary from parapet expressions to sloped and mansard roofs. Balconies, porches, and galleries give the building a human scale, create shade, and provide outdoor spaces that contribute to the quality and character of the surrounding neighborhood.

C

Designing a Multi-Family Building

Apartment Buildings and Mixed-Use Buildings

Step 1:

Analyze Historic Context

Observe, photograph, and measure the historic buildings in the area. New building details should relate to traditional building patterns. Take note of the building massing and profile, bay spacing, cornice details, windows, doors, and materials. Often historic patterns can be abstracted and simplified to become more affordable.

Historic building with bay spacing, base, and windows identified

Architectural details from historic neighborhoods

Regional Differences

Apartment buildings and large multi-family buildings are much more complex than single-family houses. This building type has been interpreted in many different forms throughout the United States. Regional examples are often eclectic and vary greatly from one style to the next. The most successful designs draw from the historic regional context.

DESIGN TIPS

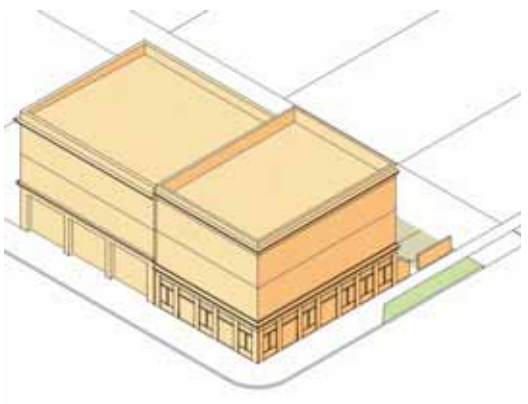
- Photograph historic details and compare to available products and proposed designs.
- Measure buildings, setbacks, and bay spacing.
- Select materials and colors based on historic examples and palettes.

Step 2:

Determine Building Placement

Buildings should be placed on their sites to create a continuous active street frontage. Buildings with ground-floor residential uses should be set back from the sidewalk to provide a landscaped front yard or garden. Ground-floor retail and public uses most often open directly to the sidewalk. Parking should be located behind the building. Parking spaces may be integral to the building (tuck-under), housed in separate garage structures, or open with structured or landscaped screening.

Residential Neighborhood Placement

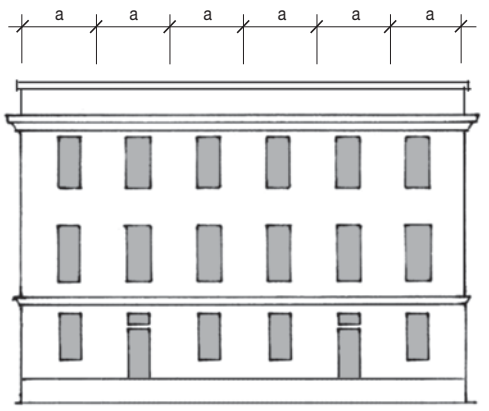


Mixed-Use Neighborhood Placement

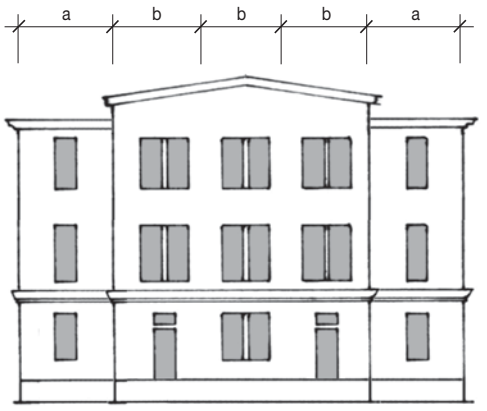
Step 3:

Determine Massing and Facade Composition

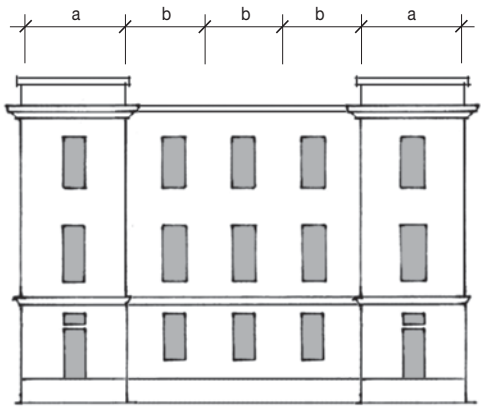
Multi-family buildings can have a variety of forms and compositions. Buildings can be articulated by changes in the roof or cornice profile, changes in the plane of the facade, or in window and door placement.



Repetitive Equal Bay Spacing



Emphasis on Center Bays



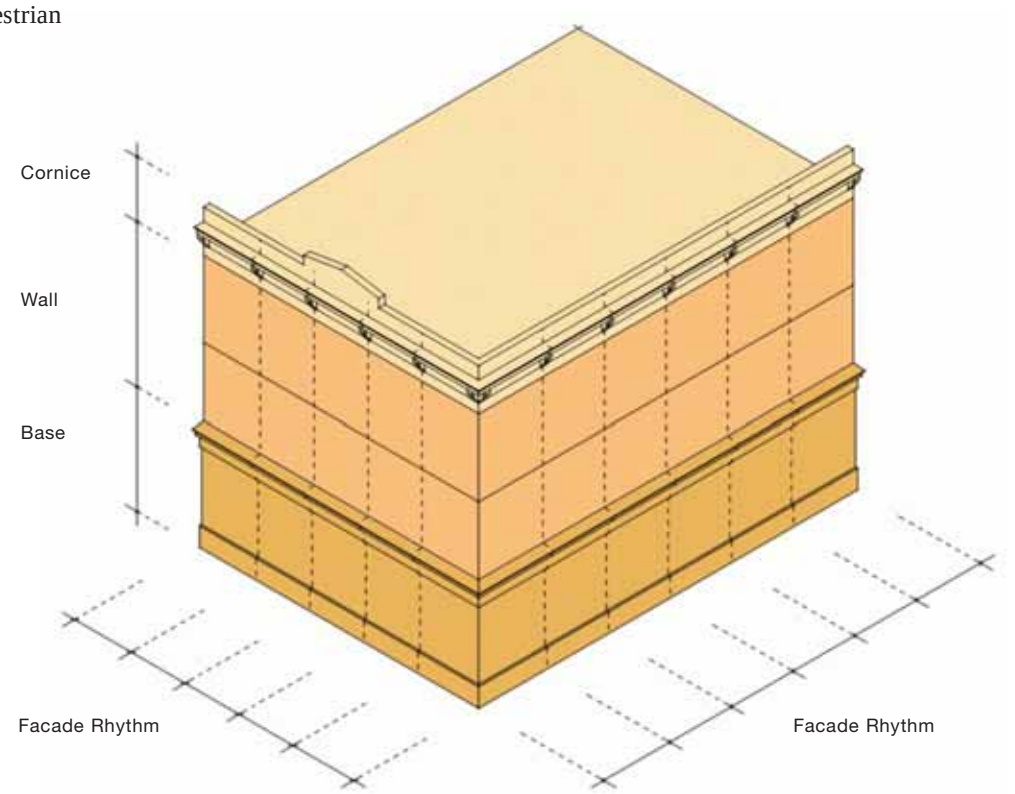
Emphasis on End Bays

Step 4:

Compose Building

Large apartment houses and mixed-use buildings traditionally are composed of a base, middle, and top. The ground floor is often taller or raised to contribute to the quality and feeling of the street and to relate to the surrounding buildings. The base of the building is often of a different material than the upper floors. The upper floors are typically simple with a regular pattern of windows. The top of the building is expressed with a cornice or roof form. These details vary greatly from one region to the next.

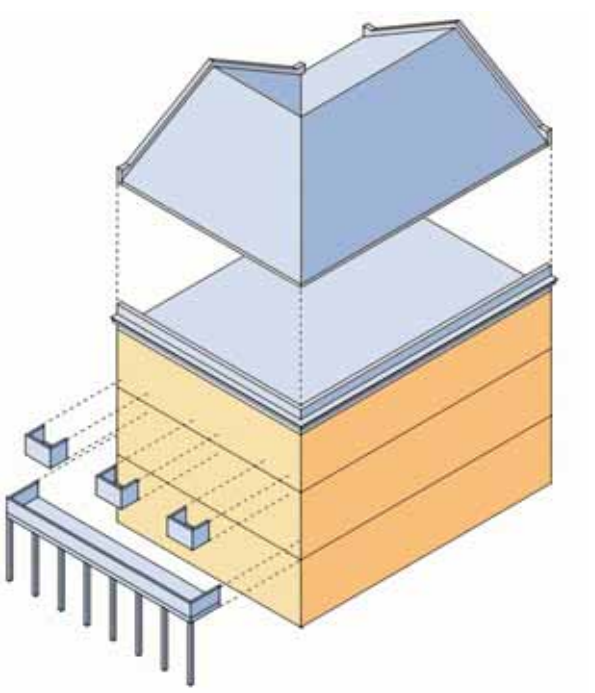
Large-scale buildings also need to be articulated into bays that create a rhythm consistent with the surrounding historic buildings. This facade rhythm also contributes to the quality of the pedestrian experience and helps to give a human scale to large buildings.



Step 5:

Apply Building Elements

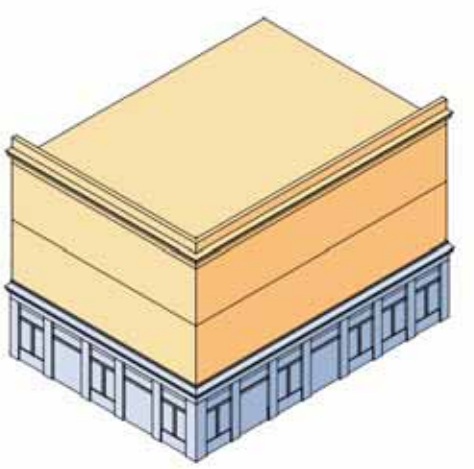
Large-scale buildings should be articulated to create an effective urban space and to relate to smaller-scale buildings in the adjacent neighborhoods. Roof forms can vary from parapet expressions to sloped and mansard roofs. Balconies, porches, and galleries give the building a human scale, create shade, and provide outdoor spaces that contribute to the quality and character of the surrounding neighborhood.



Step 6:

Optional Retail Elements

Ground-floor public or retail uses are often found in urban locations and provide the neighborhood with daily amenities. Historic building types tend to have a very regular pattern of large storefront openings, where wood trim frames large glass storefronts and double doors.



C

Designing a Storefront for a Mixed-Use Building

Step 1:

Analyze Historic Context and Nearby Retail Storefronts

Observe, photograph, and measure the historic buildings in the area. New building details should relate to traditional building patterns. New development should respect traditional ground-floor, floor-to-ceiling heights, shopfront cornice and string coarse heights, glazing patterns, material palettes, and detailing.

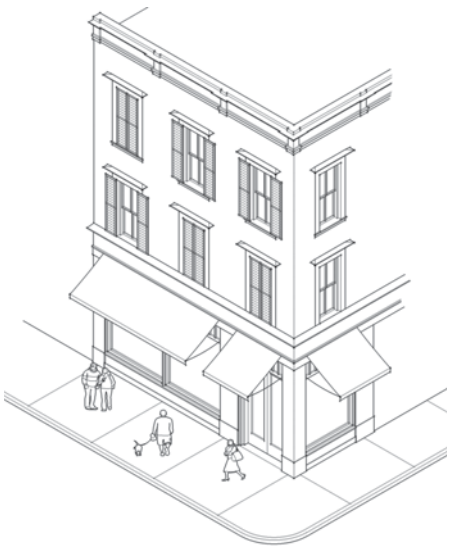
Architectural details from a historic mixed-use neighborhood

The process of documenting and recording helps establish the desired character of the streetspace.

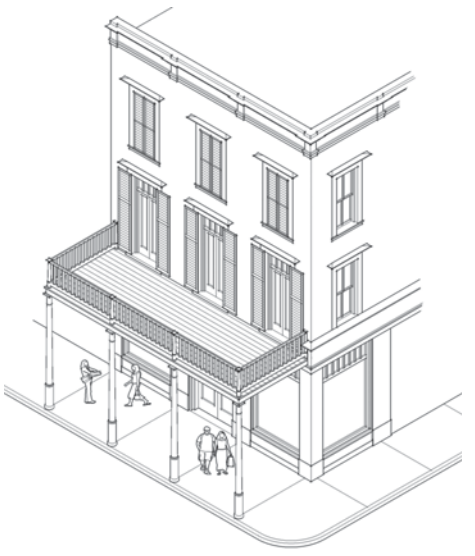
Step 2:

Select Storefront Typology

Chose the storefront option from below that best works for the site and program and most closely resembles the regional precedents documented in Step 1. Arcades, galleries, and awnings all provide shade and shelter from inclement weather. The shopfront typology can be further articulated using recessed entries, display windows, or french doors.



Shopfront



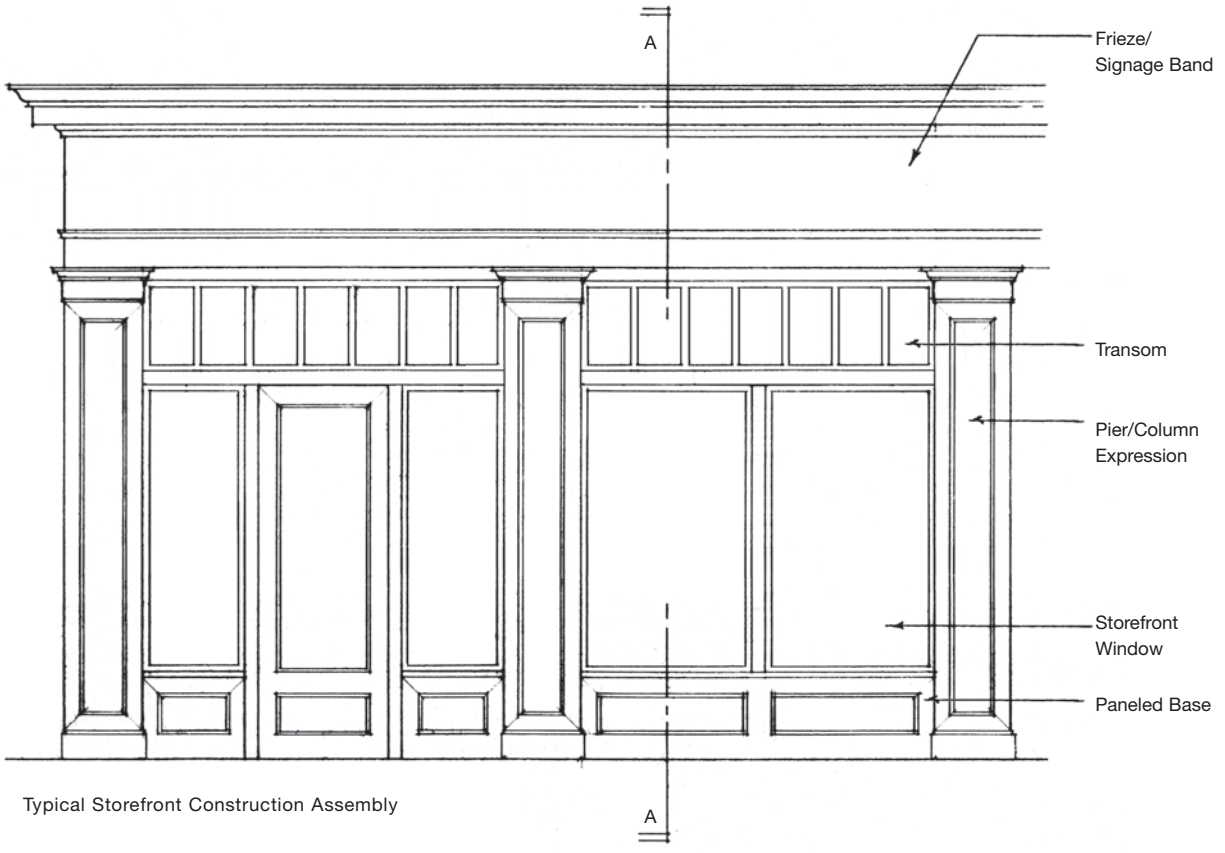
Gallery

Colonnade or Arcade

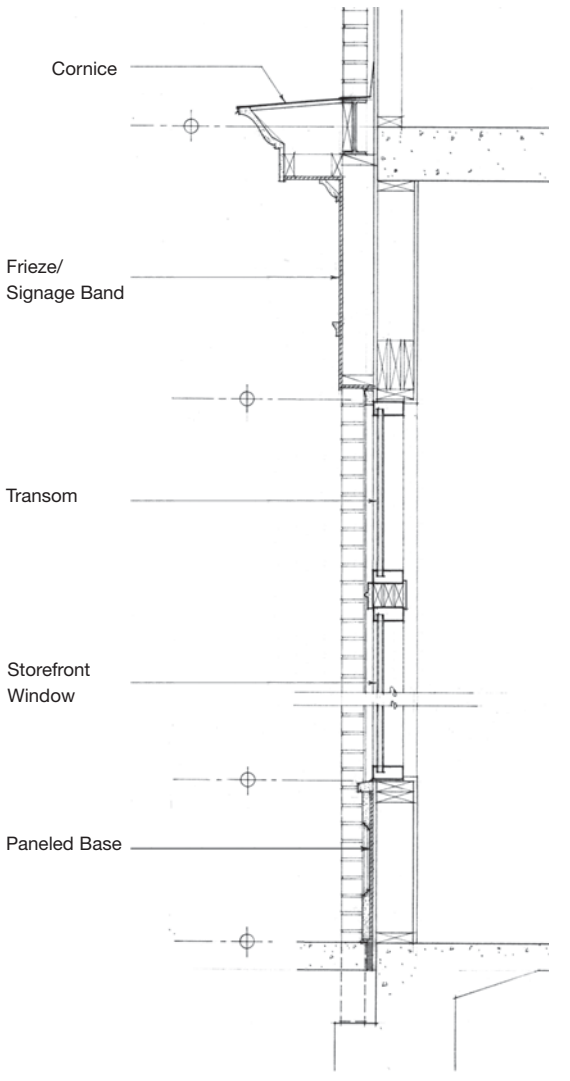
Step 3:

Determine Storefront Materials and Detailing

Storefronts are typically designed using millwork columns or masonry piers to trim large windows. Transom windows, recessed entrance doors, and french doors are all glazing elements traditionally used to articulate the storefront. The scale and alignment of these elements should be consistent with historic precedents and the surrounding context.



Typical Storefront Construction Assembly

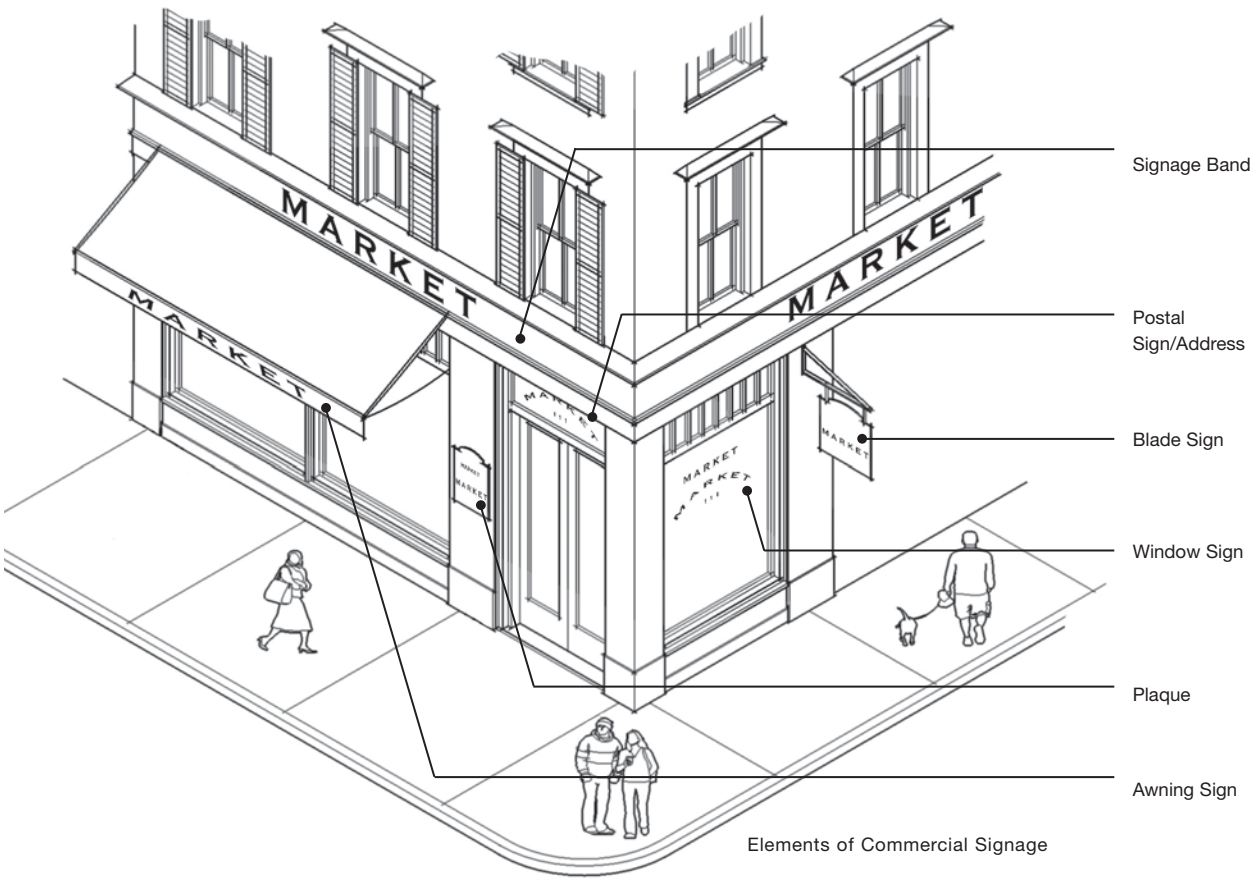


Typical storefront wall section
(section through A-A)

Step 4:

Apply Signage and Lighting

There are a variety of signage types including blade signs, signage bands, windows with etched or painted lettering, plaques, awnings, and banners. Signs should convey the identity of the retail tenant as well as enhance the character of the neighborhood. Exterior lighting should be designed so as to avoid excessive glare yet illuminate signs and provide a sense of security at night.



Elements of Commercial Signage

Signage

C

Strategies for Building Green

Building green is extremely important for the health of our environment, the strength of our communities, and the financial and personal health of those who live in the buildings.

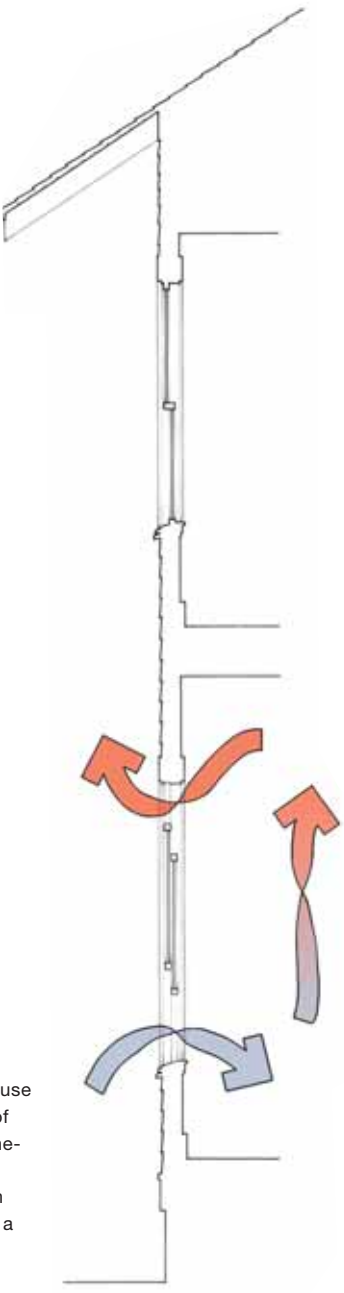
Building green does not have to increase the cost of a house. Many strategies are low- or no-cost solutions. Resource-efficient construction techniques can even lower the cost of construction while also reducing maintenance and utility life-cycle costs to the resident and increasing the durability and value of the house. Higher first costs can often be offset by incentive programs, alternative funding, and new financing strategies.

Green design strategies can be considered through the lifetime of a house, from design through construction, and for long-term maintenance. The methods included below can be utilized in any housing stage. Four basic strategy categories are discussed: Passive Design, Material and Construction Efficiency, Energy and Resource Efficiency, and Livability.

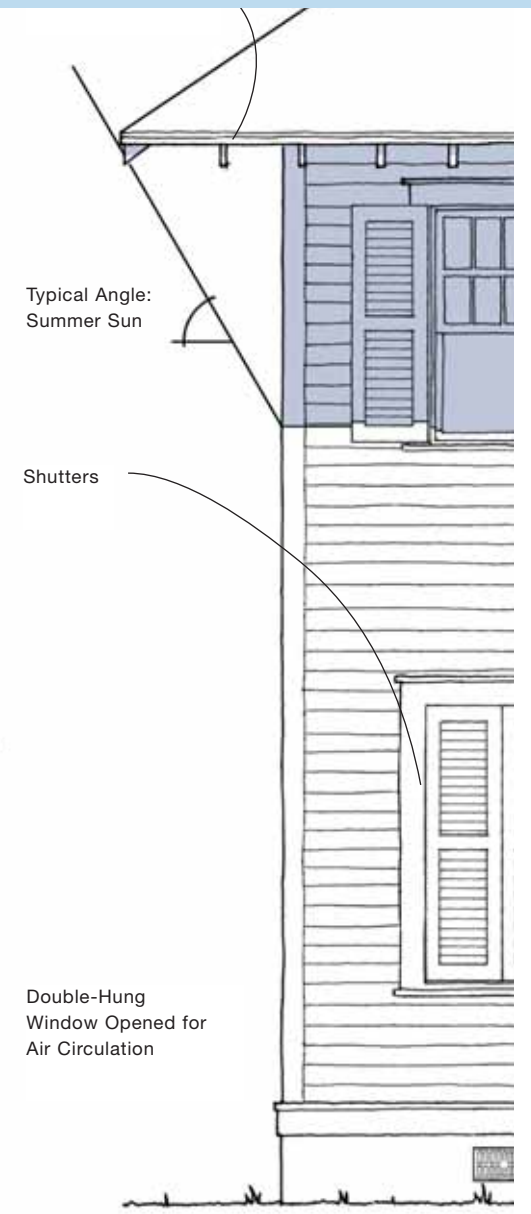
The strategies are recommendations for best practices. For more information on building green, consult the Resources page in the Application section. Many of these green building strategies are also discussed in the Landscape Patterns section.

A.
Passive Design Strategies

Passive Design employs non-mechanical, climate-responsive techniques to create comfortable indoor temperatures, provide natural day-lighting, and encourage natural ventilation without the need for electricity and fossil fuels. Passive heating, cooling, lighting, and ventilation should be considered early in the design process as they have a significant impact on the design of mechanical systems and the construction process.



Wall Section



Partial Front Elevation

Correctly proportioned overhangs and shutters provide shade, decreasing heat gain. Double-hung windows allow cooler air to enter through the raised bottom sash, while hot air escapes through the lowered upper sash. High ceilings allow hot air to rise above the occupied areas, increasing human comfort.

Deep overhangs for shade

Operable windows and shutters

A sensitively oriented house will take full advantage of passive solar energy benefits. This south-facing house has a broad porch that provides shade and a cooling effect during the mid-day heat.

1 Site Selection and Solar Orientation
Select a site with good solar exposure and airflow. Orient the long side of the house to within 22.5° of south when possible.

2 South-Facing Windows
Place windows on the southern facade for heat gain during cool months.

3 Natural Ventilation
Locate operable windows to allow for natural ventilation and airflow as a means of efficiently cooling the house.

4 Vegetated Shading
Establish deciduous trees, shrubs, or trellised plants to shade the house during the warmer months and allow sunlight in during the cooler months.

5 Porches and Architectural Shading
Correctly size and proportion porches and overhangs to shade windows on the heat-intensive southern and western facades.

6 Evergreen and Landscape Windscreens
Protect the house from prevailing winter winds with coniferous trees and shrubs.

7 Light-Colored Roof
Use a light-colored roof to minimize heat gain during the warmer months.

8 Insulation
Insulate the house well to help retain comfortable indoor temperatures. To protect the insulation from moisture, install a vapor barrier.

9 High Ceiling Heights
Ceiling heights of nine or ten feet provide space for hot air to rise above the living zone. This also allows for taller windows, which provide more natural ventilation and lighting.

10 Foundation Plantings
Plant small shrubs and groundcover around the house to shade pavement and keep the house and outdoor spaces cooler by reducing reflected heat.

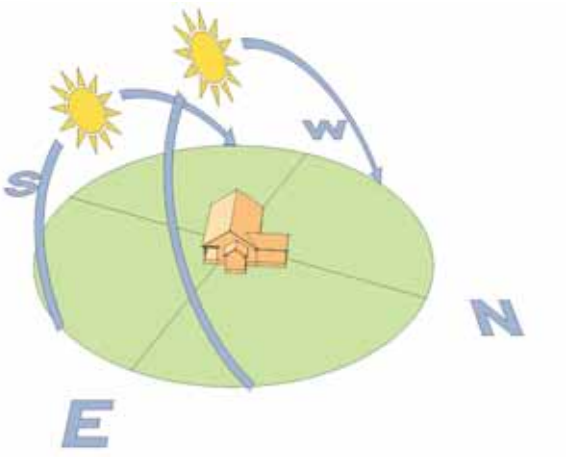
11 Shutters
Operable shutters can shade windows from the hot sun while allowing for cool natural ventilation. They also protect windows from harsh weather.

12 Natural Daylighting
Place windows to provide natural light throughout the day. Sunlight is free and energy-efficient; it creates a healthy, enjoyable indoor environment.

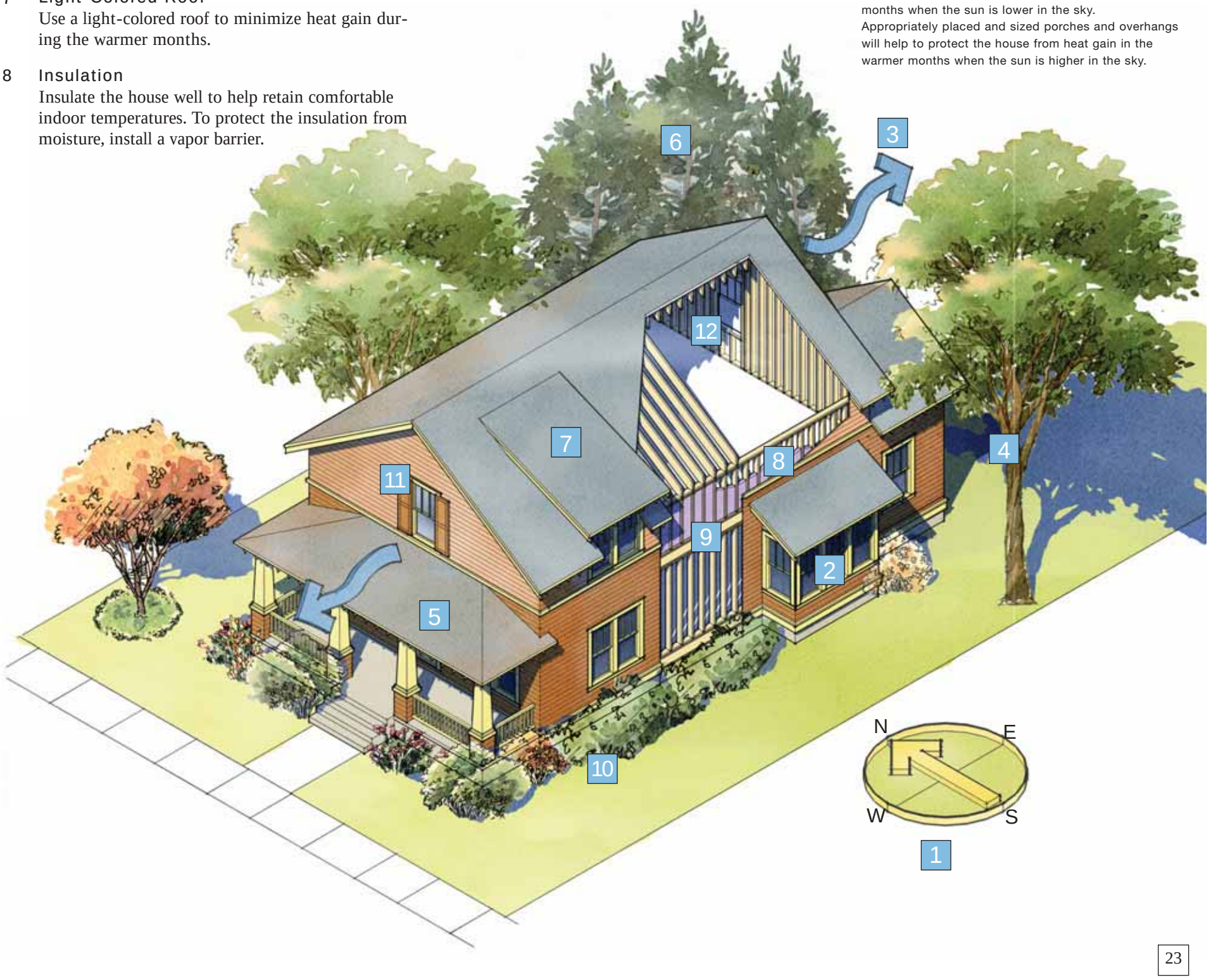
Thermal Mass
Walls and floors of significant mass (concrete or stucco) should be placed, sized, and surfaced to receive and absorb sunlight. Some of the light reaching these surfaces is converted to heat energy, which is stored in the mass and then released into the house when the temperature drops.

Minimize Air Leaks
Properly seal around all wall penetrations, windows, and doors with foam insulation or caulk, while still allowing for adequate air exchange to maintain indoor air quality.

Reduce Mechanical Heat Gain
Reduce the amount of heat gain from light bulbs, ovens, and other sources inside the house during the warm months. Use compact fluorescent light bulbs in place of incandescent bulbs.



Correctly orienting the house on the site can provide passive solar energy to warm the house in the cool months when the sun is lower in the sky.
Appropriately placed and sized porches and overhangs will help to protect the house from heat gain in the warmer months when the sun is higher in the sky.



C

B.
Material and Construction Efficiency Strategies

Efficient design and construction decreases and diverts construction waste, saves energy, and preserves valuable material resources. With proper design and planning, the following techniques can decrease construction time and costs while saving residents considerable money over the life of the house. Resource efficiency techniques should be considered in the design, construction, and landscaping of Neighborly Habitat Houses.

1 **Utilize Existing Topography**
Minimize the need for cut and fill site grading and expensive, energy-intensive site preparation.

2 **Preserve Existing Vegetation**
Select well-established trees, shrubs, and plants on site to maintain or transplant, reducing the need to plant new vegetation.

3 **Recycled Materials**
Specify renewable, reclaimed, and local materials when possible. This decreases the amount of energy needed to produce and transport materials.

4 **Optimum Value Engineering Framing**
Use OVE framing to reduce the amount of lumber needed for construction and to allow for more efficient insulation.

5 **Mechanical System Placement**
Design mechanical systems to make efficient use of materials. For example, place the bathroom near or above the kitchen to minimize the need for extra plumbing.

6 **Mechanical System Design**
Size the mechanical systems appropriately, taking into consideration the size, insulation, and passive solar design of the house.
Design the mechanical systems efficiently to reduce material inputs.

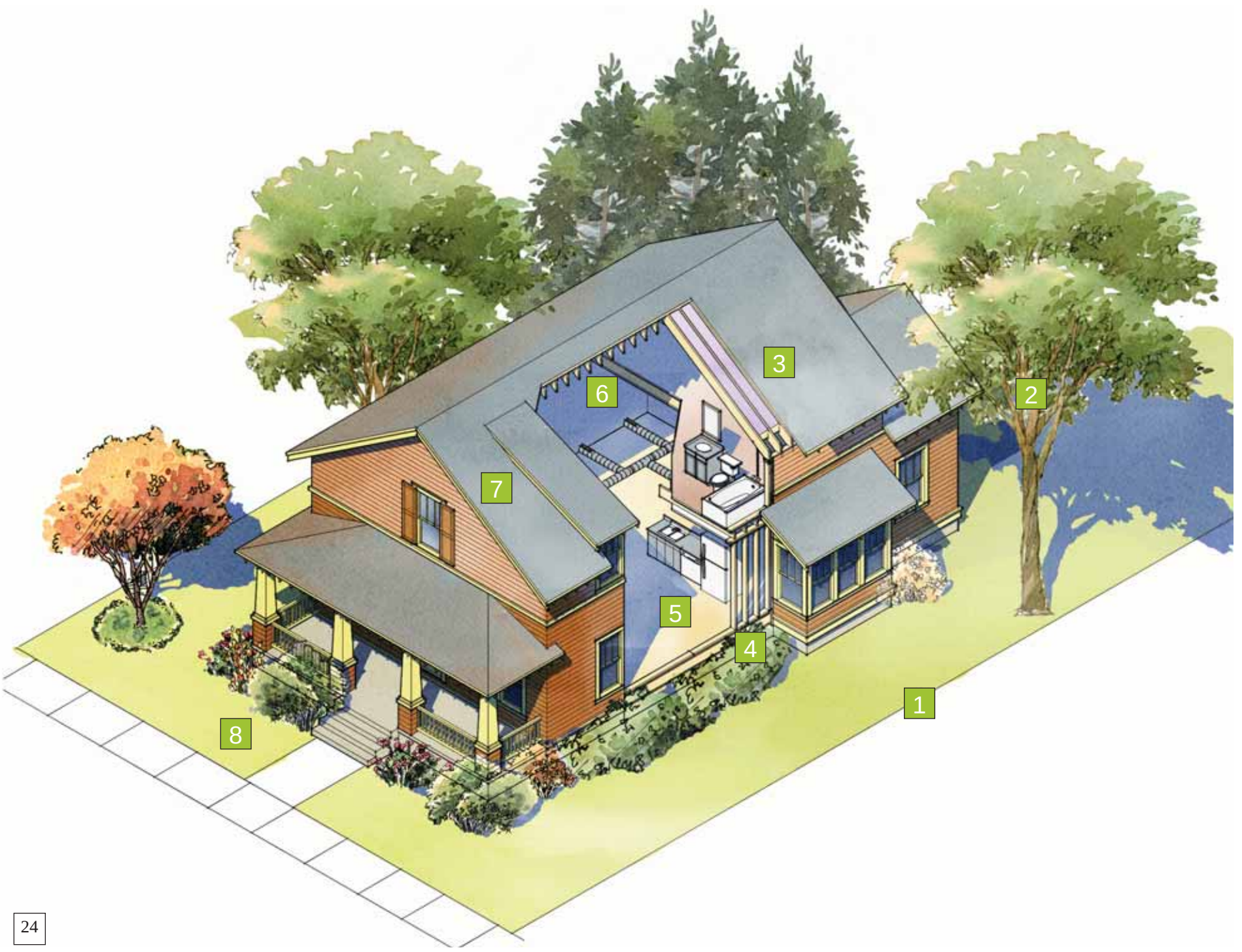
7 **High Quality Materials**
Use high quality materials with longer lifecycles. The greater initial cost is made up for in higher energy performance and reduced maintenance.

8 **Minimize Paving**
Minimize the amount of paved surfaces to reduce construction costs, materials, and runoff while increasing groundwater replenishment and the area for vegetation.

Minimize Size of House
Minimizing the size of the house inherently lowers the amount of material resources and energy needed for construction.

Minimize Construction Waste
Design and construct the house to avoid excess material waste. When possible, recycle materials that are not used during or are left over from construction.

Use Engineered and Certified Lumber
Use engineered (non-formaldehyde) and Forest Stewardship Council certified lumber to decrease the environmental impact on old-growth forests.



1 **Day and Task Lighting**
Make use of natural sunlight and task lighting as a means of conserving energy.

2 **Insulation**
Proper insulation reduces air leakage and preserves indoor air temperatures, thereby decreasing the amount of energy consumed by mechanical systems and decreasing energy bills.

3 **Ceiling Fans**
Utilize fans to circulate air and reduce the need for energy-intensive air conditioning.

4 **Well Sealed Ductwork**
Seal the ductwork to reduce air leakage into unconditioned spaces.

5 **Efficient Appliances and Plumbing Fixtures**
Reduce energy and water consumption by specifying Energy Star rated appliances.

6 **Efficient and Insulated Water Heater and Plumbing**
Reduce the energy used to heat water by insulating the water heater and hot water pipes. Solar water heaters drastically reduce energy consumption.

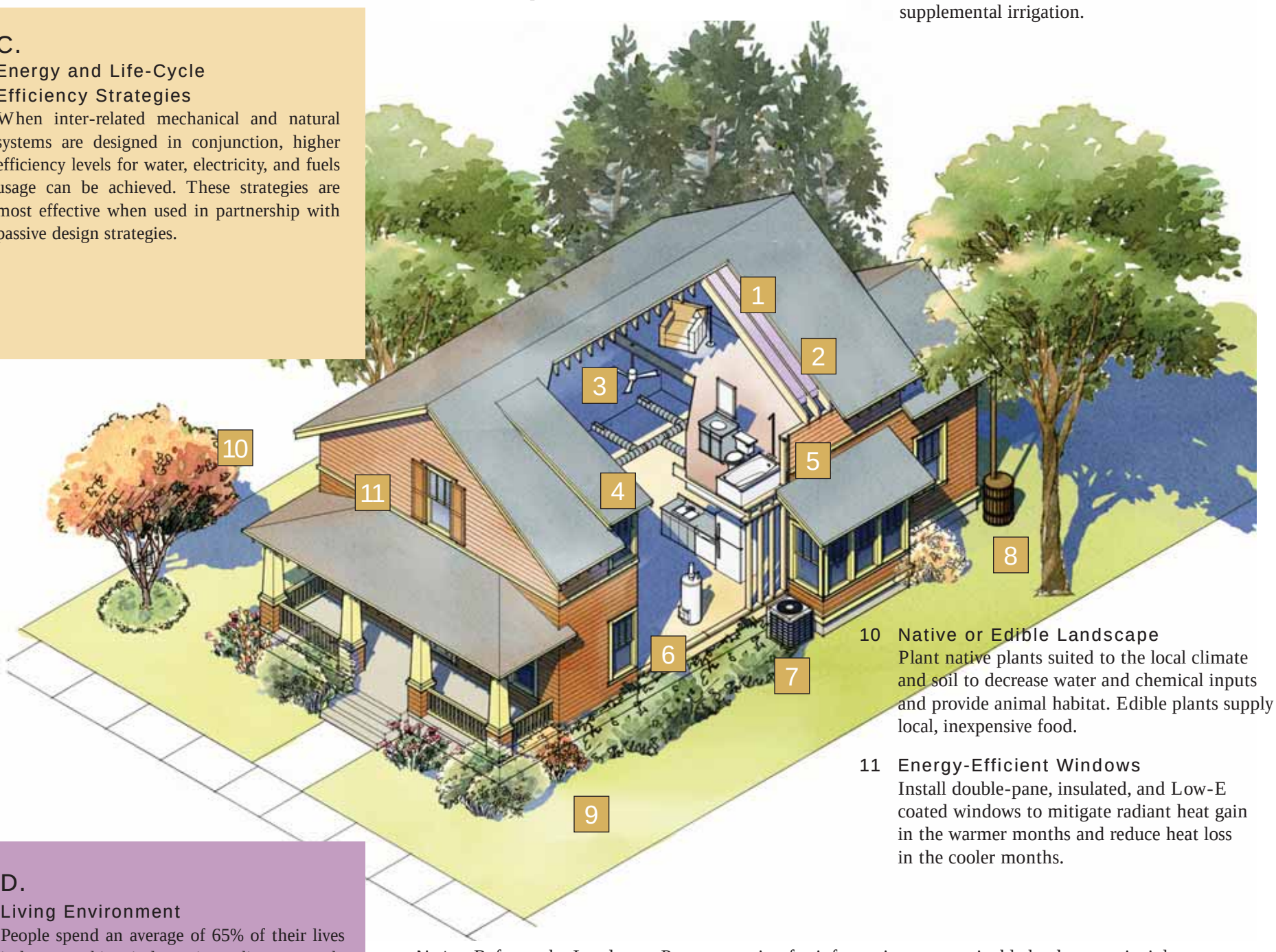
7 **HVAC System**
Size HVAC equipment appropriately by considering the size, insulation, and passive design strategies above. This reduces the cost and energy required to operate an over-sized system.

8 **Water Catchment and Greywater**
Use greywater or water collected from the roof in a rain barrel to irrigate landscaping. This reduces the need for freshwater and minimizes the impact on wastewater systems.

9 **Xeriscaping**
Utilize this method of landscaping to avoid supplemental irrigation.

C.
Energy and Life-Cycle Efficiency Strategies

When inter-related mechanical and natural systems are designed in conjunction, higher efficiency levels for water, electricity, and fuels usage can be achieved. These strategies are most effective when used in partnership with passive design strategies.



10 **Native or Edible Landscape**
Plant native plants suited to the local climate and soil to decrease water and chemical inputs and provide animal habitat. Edible plants supply local, inexpensive food.

11 **Energy-Efficient Windows**
Install double-pane, insulated, and Low-E coated windows to mitigate radiant heat gain in the warmer months and reduce heat loss in the cooler months.

D.
Living Environment

People spend an average of 65% of their lives indoors, making indoor air quality extremely important to the health of residents. Natural ventilation, natural lighting, and comfortable outdoor spaces add to the health benefits of Habitat houses.

Note: Refer to the Landscape Patterns section for information on sustainable landscape principles.

Low-Toxicity and Natural Materials
Choose building materials, furnishings, and finishes to affordably avoid PVC, formaldehyde, arsenic, chromium, and other toxic chemicals.

Ventilation, Humidity, and Mold
Install operable windows and mechanical ventilation/moisture control to improve indoor air quality and discourage mold growth.

Natural Light
Large, thoughtfully placed windows create a light-filled room without the use of electric lighting. Studies have shown that people thrive in naturally lit environments.

Garage
Detach the garage from the house, or provide adequate sealing and use separation to prevent toxic exhaust fumes from entering the house.

Natural Building Techniques
Consider natural building techniques and materials as a way to improve indoor air quality and avoid toxic materials.

Indoor Plants
Select indoor plants known for their beauty and ability to purify air.

Landscaping
Select vegetation and landscaping to avoid the need for toxic chemicals, fertilizers, pesticides, and herbicides.

Outdoor Spaces
Design the porch and landscape to provide comfortable outdoor living spaces and transitions to the outdoors.

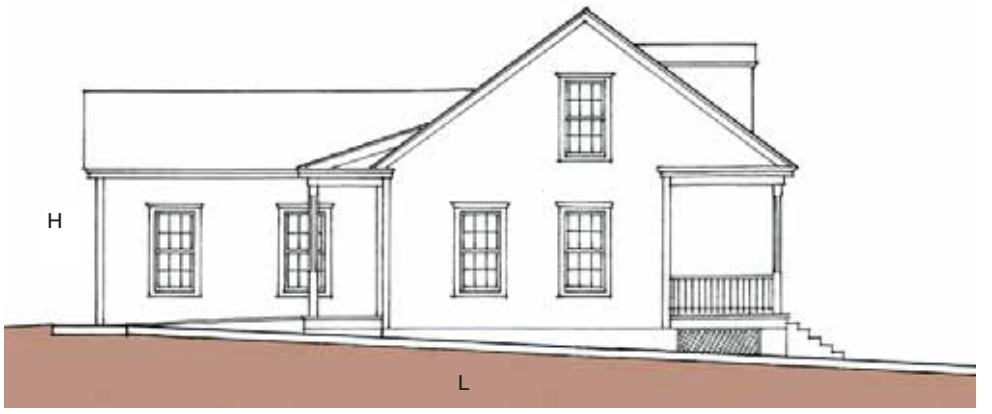
C

Designing for Visitability and Accessibility

Houses, like neighborhoods and public buildings, should be accessible for persons with physical disabilities. This requires careful thought when faced with areas of varying topography. Different conditions call for different solutions.

For sites where the first floor must be 1'-0" to 4'-0" above grade, visitability and accessibility can best be achieved through the use of site grading and one-grade level entry. Keeping site grades to 5% or less will reduce or eliminate the need for ramps. On steep sites, it is often possible to provide access without steps at the side or rear from an adjoining driveway or sidewalk. Where ramps are necessary, accessibility codes require that they have an 8.33% maximum grade and railings on both sides. In extreme cases, mechanical means such as small personal elevators, chair lifts, and porch lifts may be necessary.

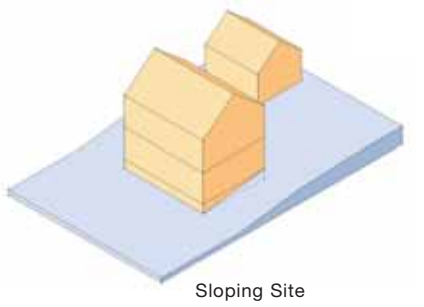
Inside the house, visitability—the most basic level of accessibility—includes circulation on the entry floor and into one bathroom accessible by a person in a wheelchair, with doorways offering a minimum 32 inches clear passage. When carefully planned, there is rarely a need to add space to the floor area of a house to provide visitability or accessibility. Visitability costs even less than accessibility, usually adding, at most, about $200–500 to the construction cost of a single-family house. It is a feasible strategy for all housing.



Cross-Section with Zero-Step Entry
If H = 2’ then L = 40’
If H = 4’ then L = 60’

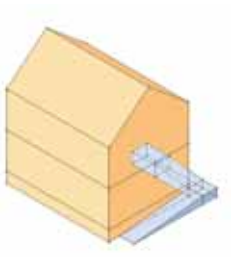
No ramps or railings needed if a walk or driveway can provide access from one end of the house.

Interior Stair Lift



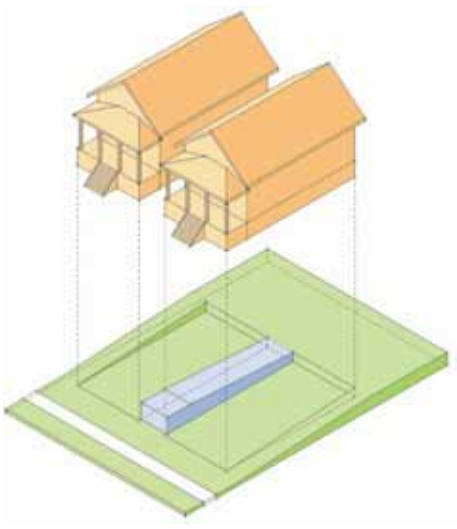
Sloping Site

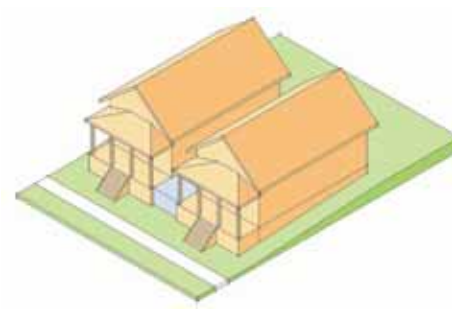
Interior Chair Lift



Exterior Ramp

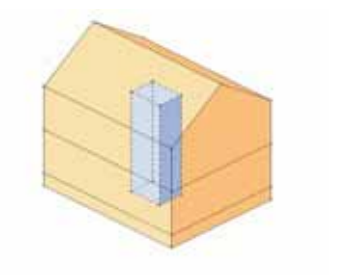
Embedded Ramp





Shared Ramp

Elevator



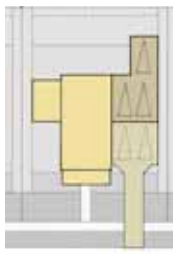
Small Internal Elevator

Designing Ancillary Structures and Parking

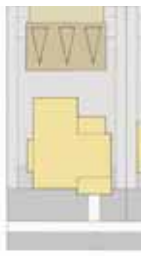
Parking for Single-Family Houses and Single-Family Attached Buildings, as may be required by local conditions

In some cases, a single-family house may be front-loaded or rear-loaded with a covered parking pad or a garage. When front-loaded, the garage is best placed back from the main face of the house, allowing for the main body and entrance of the house to remain prominent.

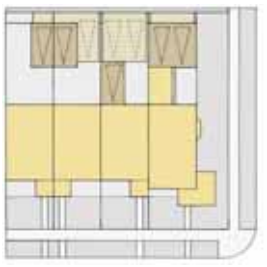
When rear-loaded, the parking pad or garage should remain at the back of the lot close to the alley or access lane, preserving a backyard. Garages should complement the main building in appearance and color. In general, single-family attached buildings are rear-loaded.



A front-loaded garage is set back from the front facade of the house.



A rear-loaded garage is placed in the back of the lot.



Single-Family Attached buildings with rear-loaded garages

In this example the garage is placed forward of the main body of the house, obscuring the front door.

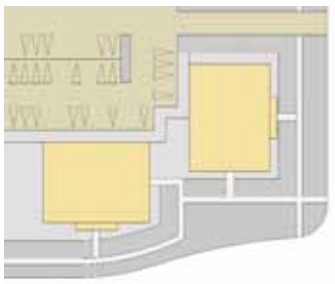
An alley provides access to parking for these single-family attached buildings.

When possible use existing changes in topography to address parking.

Parking For Multi-Family Buildings

Parking for multi-family buildings is best handled in small parking lots at the rear of the buildings. Incorporate garages to give scale to residential parking lots.

When planning a mixed-use building, explore shared parking strategies. On-street parking is an integral part of a comprehensive parking strategy in mixed-use environments.



Shared parking for multi-family buildings is located off-street at the rear of buildings.

Ancillary Structures

Ancillary structures, such as garden or storage sheds, should be placed in much the same way as parking structures, toward the back of the lot. They should complement the main building in appearance and color.

Integrate larger garages into residential parking in the rear of lots.