



CREATING DENSE AREAS

Dense development creates vibrancy, reduces travel distances, makes walking and biking easier, and is fundamental to transit. Dense housing can also be absolutely livable, as in these row houses and flats in The Hague in the Netherlands. Many units have direct access to a small backyard while the building heights create pleasant streets that do not overwhelm pedestrians.

1.31 DENSE & STREET-ACTIVATING BUILDINGS

Building typologies support urban density and encourage street activity

Building density and typologies play a major role in promoting a walkable, vibrant urban environment at the street level. Dense building typologies supports transit, multimodal street design, human activity, and viable businesses. Mixed-use typology promote urban vitality by incorporating active street-level programming, a high degree of ground-floor transparency, and frequent, well-articulated entrances.

MEASUREMENT

Density and active uses facing the street are key measures of a building’s potential for street activation.

Density

Measured by dwellings per acre (or hectare), bedrooms per acre, or people per acre, among others. Density provides a sense of potential street activity and commercial demand.

Building Type Mix

Measurement of the amount of each category of building types in an area (e.g. single family homes, town homes, office tower, ground facing retail, etc.).

Street-Facing Program

As a gauge of activity and/or commercial visibility. Measured in a ratio of linear feet (or meters) of active, street-facing program compared to total street frontage.

RELATED URBAN DESIGN ELEMENTS

INFLUENCED BY

1.21/4.21 High Density Zoning & Platting
Density needs to be allowed so that denser building types are possible.

1.22 District-Scale Parking Mgt & Design
High minimum parking ratios often force low density building typologies that do not engage the street.

1.23 High District Land Use Mix
Mixed-use supports a range of buildings and uses to activate the ground floor.

1.32 Site-Scale Parking Design
Parking design often dictates building typology and density.

INFLUENCES

1.11 Robust Transit Networks
Density creates a concentration of riders and destinations, making transit feasible.

1.301 Pedestrian-Friendly Streets
Dense and street-activating building are key ingredients of walkable streets.

1.40 Active Street Edges
Dense and street activating program make street activation possible.

4.30 Dense & Energy-Efficient Building Types
Density influences massing and solar exposure, impacting overall energy use.

5.33 Site Design for Community Safety & Inclusion
Denser, more active and street-engaging buildings bring more activity and eyes on the street, making them safer.

IMPLEMENTATION

GREENFIELD



Low cost and medium difficulty

Building types and their densities are often market driven decisions in greenfield development with zoning limiting some market decisions. In markets that already have successful, dense development, this will be an easy proposition. In markets where dense typologies are unproven, this will be more difficult.

RETROFIT



Medium cost and high difficulty

In areas with zoned density restrictions or smaller lots, modifications to enhance density or large-scale street activation may be infeasible or politically difficult.

- 1 Buildings front directly onto the street, without parking as a barrier
- 2 Street-activating uses in a tall ground floor
- 3 A high-density mix of retail, residential, and office uses
- 4 Frequent entrances and a high degree of transparency
- 5 Vehicle and bike parking buffers sidewalk from traffic

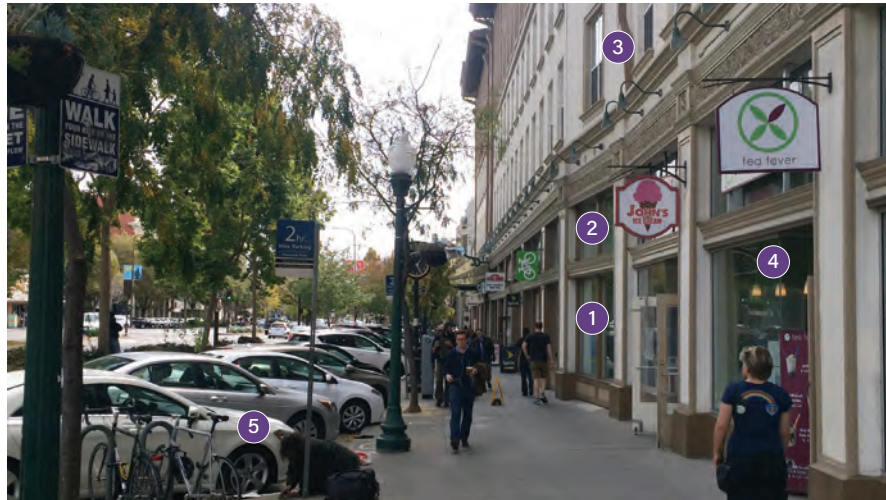


Figure 1: Layered space combines with street-activating elements to create a interesting and comfortable pedestrian experience. Berkeley, California.

RECOMMENDED APPROACH

Building typology and density should help generate activity in an area by enhancing street life, a flow of people, and—as possible—day and night functions to promote 24-hour activation. Mixed-use building typologies that allow the ground floor and upper floors to have different uses increase building activation and enable greater density of persons per acre (or hectare), either through high daytime occupancy rates or diverse 24-hour occupancy. Building typologies, with housing or other uses, should allow direct engagement with the street on the ground floor and should not be interrupted by parking. When parking is incorporated into a building, it should not dominate the ground floor interaction with the street.



Figure 2: Large setbacks and low density eliminate street activities other than driving.

TYPICAL APPROACH

Low-density and single-use buildings often dominate urban areas, limiting the volume of people, the potential mix of uses, and the overall level of activity. Cars often dominate ground-floor program either within the building itself or surrounding it, limiting building-street engagement and reducing street activity. Buildings that place housing on the ground floor often follow typologies that do not have direct entrances from the street, turning their backs on the street instead of engaging it.

Too commonly, when high-density buildings are added to low-density areas, there is minimal regard for the existing context. Buildings are markedly taller, larger, or lack architectural elements that support the pedestrian environment, such as front porches or clear and frequent entries.

IMPORTANCE

Dense and street-activating building typologies are important facilitators of multi-modal activity and urban vitality. Higher-density buildings increase the likelihood and amount of people spending their time in and around the building. If these spaces are filled with activity and people, the environment will be a more comfortable and inviting place, attracting more people to spend time.¹ Additionally, dense and street-activating building typologies complement walkable urban places and prioritize the pedestrian, encouraging people to choose walking, biking, and transit over the car.² Maintaining maximum occupancy and street activity increases the perceived safety of an area and the presence of more people in the vicinity can discourage crime and other threatening behavior.³

HOUSING TYPES & CHARACTERISTICS⁶

These common residential building types provide a variety of housing unit sizes and varying levels of density that are compatible with typical residential neighborhoods:⁷

Housing Type	Net Density (units/acre)	Description	Notes	Typical Unit Size	Lot Size	Unit Size
Cottage Cluster	15-20	4 units arranged around a common green	Massing can reflect neighborhood pattern of 50' lots	30'-26' x 25'	10,000	800-1,900
Courtyard Townhouse	20-25	8 units in 3 buildings	House like form of front units	24' x 28'	17,500	1,100-2,150
Cottage Court	20-25	8 units in 5 buildings arranged around a driveway	Similar to Cottage Cluster depending on zoning	30' x 27.5'; 30' x 27.5'; 27' x 38.5'	17,500	1,380-2,250
Rowhouse	20-30	5 rowhouse units with detached garages accessed by alley easement	Massing blends with single-family context	15' x 35'	10,000	1,050-1,300
Triplex Quadplex	25-35	3-4 units	Street frontage designed to reflect single dwelling house	15' x 32'	5,000	800-1,400
Townhouse Cluster	30-35	Two sets of paired townhouses, 4 units in total	Massing of joint units reflect 50' lots; cantilevered living space over vehicle areas optimizes site	15' x 31'	5,000	1,000-1,300
Shared Court Rowhouse	30-35	8 attached units grouped around a shared courtyard	Rowhouse cluster without minimum frontage requirement	20' x 27'	10,000	1,025
Courtyard Flat	35-45	18-20 stacked unit apartments	Provides strong edge to busy arterial streets; provides tuck under parking	30' x 40'	19,800	900-1,000

Table adapted from Parolek, *Missing Middle Housing: Cunningham, Portland Infill Design Toolkit*; Leupen and Mooij, *Housing Design: a Manual*; Fifield, *Housing Typologies*.

OFFICE TYPOLOGIES & CHARACTERISTICS

Office Type	Description	Notes	Typical Building Size	Stories	Typical Lot Size
Mid-Rise Slab	Open floor plans around one or multiple cores	Massing can reflect neighborhood pattern of 50' lots	60-150' x 60-200'	3-12	Varies based on parking
High-Rise Tower	Open floor plans around single core	Often point towers within larger parcel	100-200' x 150-200'	12-100	Varies based on parking

COMMON HOUSING TYPES

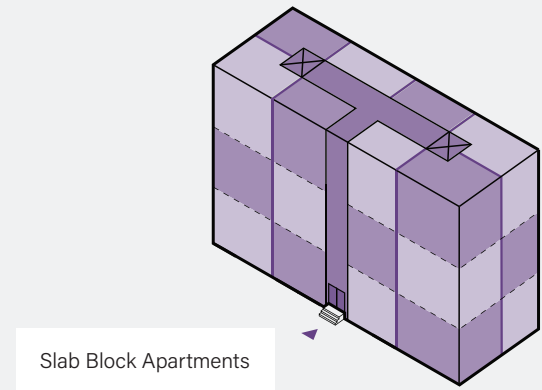
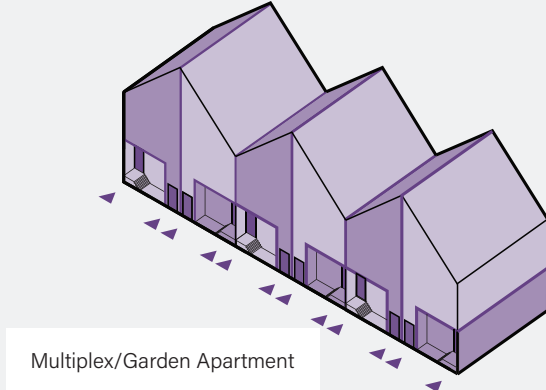
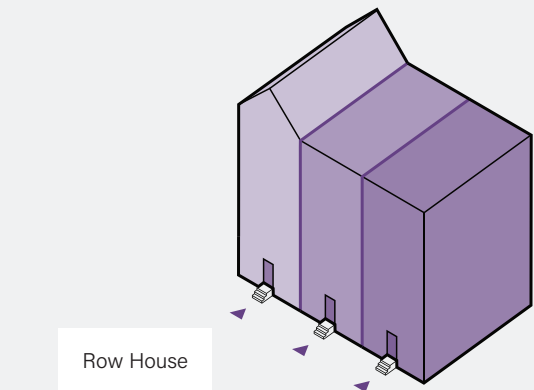
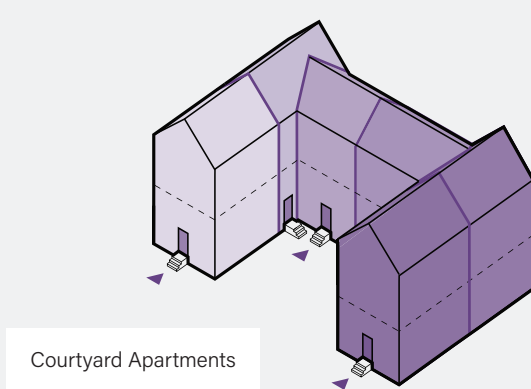
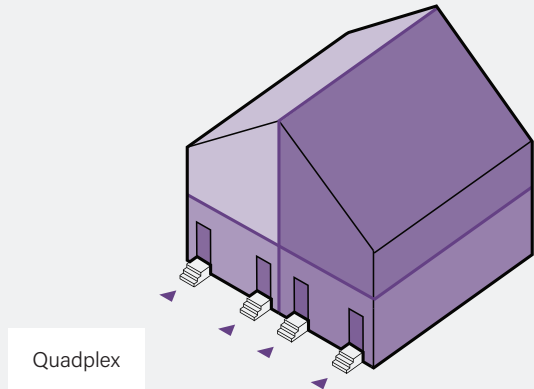
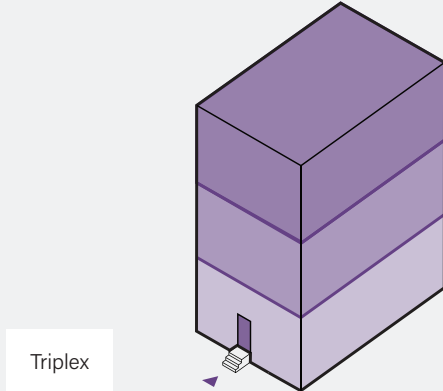
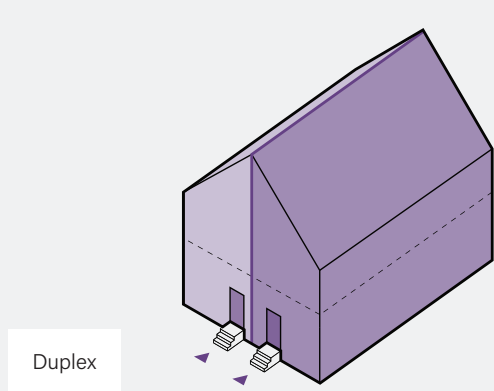




Figure 3: Dense, mid-rise buildings pour daily activity into the streets of The Hague.

BACKGROUND

Dense and street-activating typologies combine residential, commercial, and retail options to optimize density and use.

BUILDING MASSING

Commercial and retail building masses vary greatly and can accommodate a wide range of program. Looking at regional examples of higher-density buildings can help refine the dimensions that could work in an area.

In general, mixed-used building dimensions are governed by upper-floor uses which ultimately dictate ground-floor dimensions. Broadly, mixed-used buildings with commercial uses on the upper floors tend to have a wider massing and wider footprints. This is also true of buildings with parking in upper floors. Mixed-used building with residential units on the upper floors can have wider massing in courtyard typologies, but can have a narrower massing in bar typologies. The footprint of these buildings varies depending on whether upper floor residential bar massing is continued on the ground floor or if these residential bars are grouped and set on a larger ground-floor plinth.

CONTEXT, BUILDING HEIGHT AND TRANSITIONS

A common deterrent to mixed-use building construction is neighbor concerns about impacts a larger building might have on the broader context. Creating mixed-use buildings that are sensitive in terms of massing, building height and transitions can help alleviate this concern. Buildings should minimize the prominence of areas for vehicles, limit impervious surfaces, and, where possible, should provide usable outdoor space.⁴

The height of the buildings should provide for human scale in the overall streetscape and respect surrounding development. This can be achieved through variations in building heights and setbacks. Steps down in scale where larger buildings abut smaller scale development can also help create a continuous context and help avoid opposition to increases in density. Sidewalk widths can be increased where multi-story buildings are built close to the sidewalk with a minimum sidewalk width of 15 feet (4.6 meters) for buildings three stories or greater that are built to the sidewalk line.⁵

CONSIDERATIONS + CAVEATS

ELEMENT INTERACTIONS

- Context is important for the success of high density, street-activating typologies as a single building cannot change the character of an entire street or neighborhood. High speed and auto-dominated streets often limit the impact street facing, high density typologies can have in an area. In less walkable areas where the street system is not set up to support dense typologies, designers may need to setback buildings for pedestrian comfort and take an incremental approach to more complete neighborhood transformation.
- The density of the greater area will often dictate how much commercial or residential use is appropriate and potentially politically viable.
- Lot size and parking requirements often govern the potential to create dense, street engaging building typologies. Larger building lots and reduced minimum parking requirements facilitate higher-density buildings.
- While building typology can allow for active ground level program, the level of vitality will largely depend on the transparency, entrance locations and facade design.
- Parking location and overall site approach can limit or amplify the benefits of dense and street-activating building typologies.

POLITICAL ISSUES

- Low-density zoning with large minimum lot sizes or restrictions on accessory units are often a means to codify broader social exclusion goals, especially of lower-income households.
- Context often dictates the acceptability of density. Building dense typologies in areas dominated by low-density, low-mass buildings is often politically difficult due to public opposition, even if zoning allows for higher density.

OTHER ISSUES

- Mixed-use buildings are more complicated to design and require different experience and approaches from developers in both the development and management of the properties. This is often a barrier to creating more mixed-use development.

GUIDELINES FOR URBAN DESIGN

1. **Use building typologies that maximize density.**
 - b. Where possible, use residential, commercial office, retail, or mixed-use combinations that are at or near the maximum allowable density.
2. **Encourage a street-facing orientation for all buildings.**
 - a. Orient main entrances and primary building facade elements to the street.
 - b. Avoid buildings that turn their back on the street through the lack of a street-facing entrances, windows, or facade elements.
3. **Choose building typologies that place street-facing, active program on the ground floor.**
 - a. Where possible, place commercial and retail uses on ground floor. Provide floor to ceiling heights on ground floor between 15 and 20 feet (4.6-6.1m) to accommodate such use.
 - b. Select housing typologies that allow outward-facing units with direct street entry.
4. **Employ context-sensitive buildings designs.** Working with the existing context creates a more comfortable and inviting public realm and can help reduce opposition to projects that increase density. Building mass, height, language and scale all contribute to creating a context sensitive building.⁸
 - a. **Interrupt perceived building mass.** Reduce apparent bulk of building mass to provide a more human scale and improved integration with existing development patterns.
 - Break buildings into several smaller masses.
 - Create building modules with widths of 25 to 50-foot (7.6-15.2m), as often found in pedestrian-oriented environments.
 - Limit blank walls to no more than 30 percent or 20 linear feet (6.1m), of the facade of a building on any pedestrian way.
 - Use full-height recesses (typically at least 10 feet/3m deep) along the length of the building to break the building into smaller discrete masses.
 - b. **Incorporate building setbacks.** Articulate massing to improve pedestrian experience, increase solar access, and respond to existing development.
 - Break up buildings longer than 100 feet (30.5m) in length.
 - Locate taller portions of residential projects away from adjoining residential properties to preserve height transition and maximize light and privacy.
 - Step down building height adjacent to existing residential neighborhoods to support human scale.
 - Step back multiple story buildings from the street edge to enhance street feel and allow sunlight to reach street.

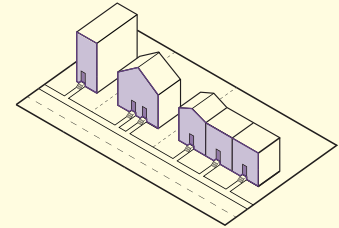


Figure 4: A mix of residential building typologies share a common front-yard setback and face the street.

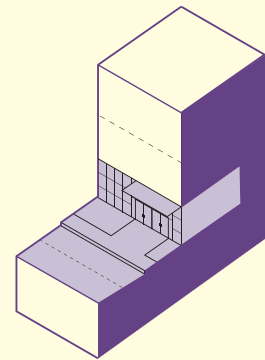


Figure 5: Ground-floor commercial spaces should include a high degree of transparency and engage the public realm.

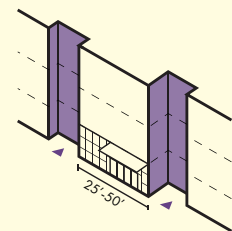


Figure 6: Design street-facing facades with 25- to 50-foot bays (7.5-15.2m).

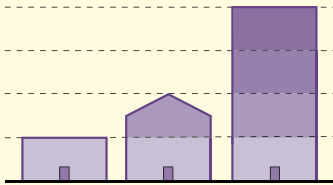


Figure 7: Incorporate transitions in scale when building heights are stepping more than two stories. This can be accomplished with interim buildings or design elements that stepdown in height.

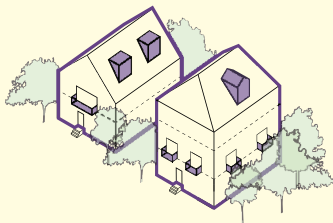


Figure 8: Use dormers to bring daylight and living space with the roof structure.

- Vary building height around parks to maintain maximum daylight/sky exposure and pedestrian scale.
 - Optimize taller building height and distinctive architectural design at major street intersections to establish a visual gateway to an area.
- c. **Incorporate transitions in scale.** Use design elements to minimize scale jumps between buildings.
- Step back above two or three stories in taller structures.
 - Use porches or balconies to complement vertical elements of taller buildings.
 - Use dormers to provide living space within the roof structure.
- d. **Complement development pattern when increasing residential density.** Complement existing development patterns to maintain neighborhood cohesion and consistency.
- Continue established rhythm along street frontages, such as echoing originally platting patterns.
 - Where feasible, maintain established setback patterns and continue topography of neighborhood, such as raised lots or the relationship of building to grade.
 - Divide massing of courtyard housing so that street-fronting units have house-like forms, integrating higher-density housing into neighborhoods of predominately detached houses.
 - Divide row house projects into paired units, with massing reflective of detached housing (e.g. paired units under the same roof form instead of separate gables for each unit).
 - Orient corner row houses so that each unit is oriented to a different street and appears as a distinct house.

KEY TERMS

BUILDING MASS

The general shape and overall bulk of the building.

BUILDING TYPOLOGY

A description of the organization and form of a building. Often used to categorize building forms such as a row house, apartment flats, or single-family homes.

SETBACK

Minimum or maximum distance a building is set from the front property line.

STEPBACK

Height and distance that a building must step back from the front property line at a set point above grade.

ADDITIONAL RESOURCES

Portland Infill Design Toolkit, 2020.

Live, Work, Play: A Toolkit for Mixed Development in Sunnyvale.

Alameda County Design Guidelines for Residential Mixed-Use Projects.

Auckland Design Manual.

Missing Middle Housing
www.missingmiddlehousing.com

SOURCES

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- 3 Colman Humphrey et al., "Urban Vibrancy and Safety in Philadelphia," *Environment and Planning B: Urban Analytics and City Science*, 2017, 2399808319830403.
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- 5 City of Sunnyvale, "Live, Work, Play: A Toolkit for Mixed-Use Development in Sunnyvale" (Sunnyvale, California: City of Sunnyvale Community Development Department, July 2015), <https://sunnyvale.ca.gov/civicax/filebank/blobdload.aspx?BlobID=23800>.
- 6 Daniel G Parolek, *Missing Middle Housing: Thinking Big and Building Small to Respond to Today's Housing Crisis* (Island Press, 2020); Cunningham, Bill, "The Infill Design Toolkit: Medium-Density Residential Development"; Bernard Leupen and Harold Mooij, *Housing Design, a Manual* (Rotterdam, Netherlands: Nai Publishers, 2011).
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