

Cluster housing alternatives: site layout strategies to address single family housing needs in
Kansas

by

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A REPORT

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MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture and Regional & Community Planning
College of Architecture Planning & Design

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Abstract

This research investigates how modular housing and site planning strategies can provide more single family housing options for middle income households in Kansas. Many middle income families fall between income thresholds, earning too much to qualify for housing assistance but unable to afford newly built conventional homes. "Missing Middle Housing" refers to smaller, diverse housing types such as duplexes, cottage courts, and courtyard apartments that fit within walkable residential neighborhoods. In Kansas, there is an estimated 42 percent gap between the number of households seeking these housing types and the available supply (National Association of Home Builders 2023).

Focusing on three communities: Strawberry Hill (Kansas City), Salina, and Cottonwood Falls, this research uses Area Median Income (AMI) data (U.S. Census Bureau 2023), precedent studies (Parolek 2020, Sim and Gehl 2019, Carney et al. 2023), and projective design proposals to compare traditional development patterns with more adaptable models. Many existing homes are too large for occupants, and zoning and land use policies often restrict the creation of smaller clustered units that better reflect today's household sizes and family types (Karim 2006, La Gory, Ward, and Mucatel 1981).

This study proposes planning strategies such as modular housing, shared open space, and flexible land use to better support community needs. These strategies respond to the current housing crisis by offering more attainable, adaptable options that middle income households are more likely to consider (Davis 2010, Webb 2014).

Cluster Housing Alternatives: Site Layout Strategies to Address Single Family Housing Needs in Kansas



ABSTRACT

This research investigates how modular housing and site planning strategies can provide more single family housing options for middle income households in Kansas. Many middle income families fall between income thresholds, earning too much to qualify for housing assistance but unable to afford newly built conventional homes. "Missing Middle Housing" refers to smaller, diverse housing types such as duplexes, cottage courts, and courtyard apartments that fit within walkable residential neighborhoods. In Kansas, there is an estimated 42 percent gap between the number of households seeking these housing types and the available supply (National Association of Home Builders 2023). Focusing on three communities: Strawberry Hill (Kansas City), Salina, and Cottonwood Falls, this research uses Area Median Income (AMI) data (U.S. Census Bureau 2023), precedent studies (Parolek 2020, Sim and Gehl 2019, Carney et al. 2023), and projective design proposals to compare traditional development patterns with more adaptable models. Many existing homes are too large for occupants, and zoning and land use policies often restrict the creation of smaller clustered units that better reflect today's household sizes and family types (Karim 2006, La Gory, Ward, and Mucatel 1981). This study proposes planning strategies such as modular housing, shared open space, and flexible land use to better support community needs. These strategies respond to the current housing crisis by offering more attainable, adaptable options that middle income households are more likely to consider (Davis 2010, Webb 2014).

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Master of Landscape Architecture

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Glossary

Community Land Trust (CLT)

A nonprofit that owns land to provide long-term affordable housing. Residents buy homes but lease the land, helping prevent displacement and preserve affordability.

Homeowners Association (HOA)

A community group that manages shared spaces and enforces property rules. HOAs support upkeep but can limit flexibility and inclusivity.

Missing Middle Housing

Smaller-scale housing types like duplexes and cottage courts that offer more affordable options between single-family homes and large apartments.

Urban Renewal

A past planning effort to redevelop older city areas, often through demolition. It improved infrastructure but displaced many low-income communities.

Reurbanization

A planning approach focused on reinvesting in existing neighborhoods to improve density, services, and walkability without expanding outward.

Inclusionary Zoning

A policy that requires some affordable units in new housing developments to support income diversity and prevent exclusion.

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01

Introduction

Many Kansas communities face a growing mismatch between available housing and how middle income households actually live. Traditional single family models are often too large, expensive, or restricted by zoning, leaving limited options for families who fall outside conventional categories.

This report explores how modular housing and site planning strategies can offer more responsive alternatives. By focusing on "Missing Middle Housing", smaller, adaptable, and accessible options, it proposes solutions that better reflect local needs. Through case studies in Strawberry Hill, Salina, and Cottonwood Falls, this research uses design as a tool to test site layout strategies. These strategies help identify better alternatives that respond to shifting demographics, support community goals, and address the housing gap for middle income residents.

PURPOSE

The purpose of this research is to evaluate how planning strategies and modular design can create more suitable single family housing for middle income households by comparing traditional models with alternatives that better reflect household needs in Kansas City (Strawberry Hill), Salina, and Cottonwood Falls.

PROBLEM

In many Kansas communities, housing remains unaffordable and poorly matched to the needs of middle-income households. While household sizes and living arrangements have shifted, zoning laws, code standards, and market incentives continue to favor large single family homes. Cities often resist smaller or modular housing due to unclear regulations and reduced tax revenue potential. Without a standardized system to support flexible and affordable development, many households including retirees, single adults, and multigenerational families are left without viable housing options (Karim 2006; La Gory, Ward, and Mucatel 1981).

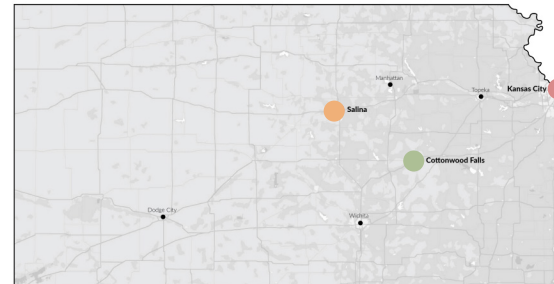


Figure 1. Map of Kansas, showing Salina (Orange), Kansas City (Red), and Cottonwood Falls (Green) (Perdomo 2025).

RESEARCH QUESTION

How can modular housing and site planning strategies deliver single family homes that better meet the needs of middle income households in Kansas?

Figure 2. Mindy Allen Art (Snawerdt 2025).



Housing Size Challenges in Kansas Communities

Despite local differences, many Kansas communities lack housing types suited to today’s families.

Urban (Kansas City, Strawberry Hill)

**Zoning eschews duplexes and fourplexes
→ Loss of moderdate density options**

Suburban (Salina)

**Large lot single family zoning
→ Less suitable for small families or retirees**

Rural (Cottonwood Falls)

**Aging population, shrinking households
→ Few small scale housing choices**

Figure 3. This research aligns housing design with real household profiles rather than outdated assumptions (Parolek 2020; Galster et al. 2008; La Gory, Ward, and Mucatel 1981).

02

Background

Changing demographics, industry, and land use policy have shaped housing across Kansas. Despite geographic and cultural differences, communities like Kansas City (Strawberry Hill neighborhood), Salina, and Cottonwood Falls face the same issue: most available housing does not reflect current family types or household size.

Due to zoning restrictions and redevelopment pressures, urban neighborhoods have lost housing types like duplexes and fourplexes (Parolek 2020). Suburban areas prioritize large lot single family homes, limiting options for small families, retirees, or single person households. Rural towns face aging populations and shrinking household sizes without adequate alternatives for smaller scale housing (Galster et al. 2008).

Most housing policies assume a "traditional" family model that ignores the needs of multigenerational households, couples without children, and individuals living alone (La Gory, Ward, and Mucatel 1981). This lack of variety reduces livability and long term usability, especially for middle income families. This research responds to these gaps by using local household profiles to guide design decisions, rather than relying on demographic trends alone.

A. Segregation

Historical Context

Urban land use in the 20th century was shaped by industrial growth, car oriented development, and exclusionary zoning. These factors reinforced racial and class segregation by concentrating commercial uses in city centers and pushing residential zones outward (Pattillo 2009). Zoning removed flexibility from housing design, phasing out small scale types that once supported extended families, shared households, and working class residents. As a result, housing variety declined and became increasingly disconnected from actual household needs.

Segregation Practices

Since the 1920s, exclusionary zoning and racial discrimination have resulted in limited access to housing for nontraditional household types. Duplexes, triplexes, and fourplexes were gradually eliminated through zoning bans and redevelopment policies (Pattillo 2009). These units once supported multigenerational living, shared caregiving, and flexible household size. Their removal reduced options for households that fall outside the "traditional" family model. Nelson frames this as the decline of middle housing, driven by regulatory and market resistance to smaller, shared units (Parolek 2020). As a result, most housing today reflects outdated assumptions about family structure and does not align with how people actually live.

Post WWII Housing Policies Influence on Housing Type

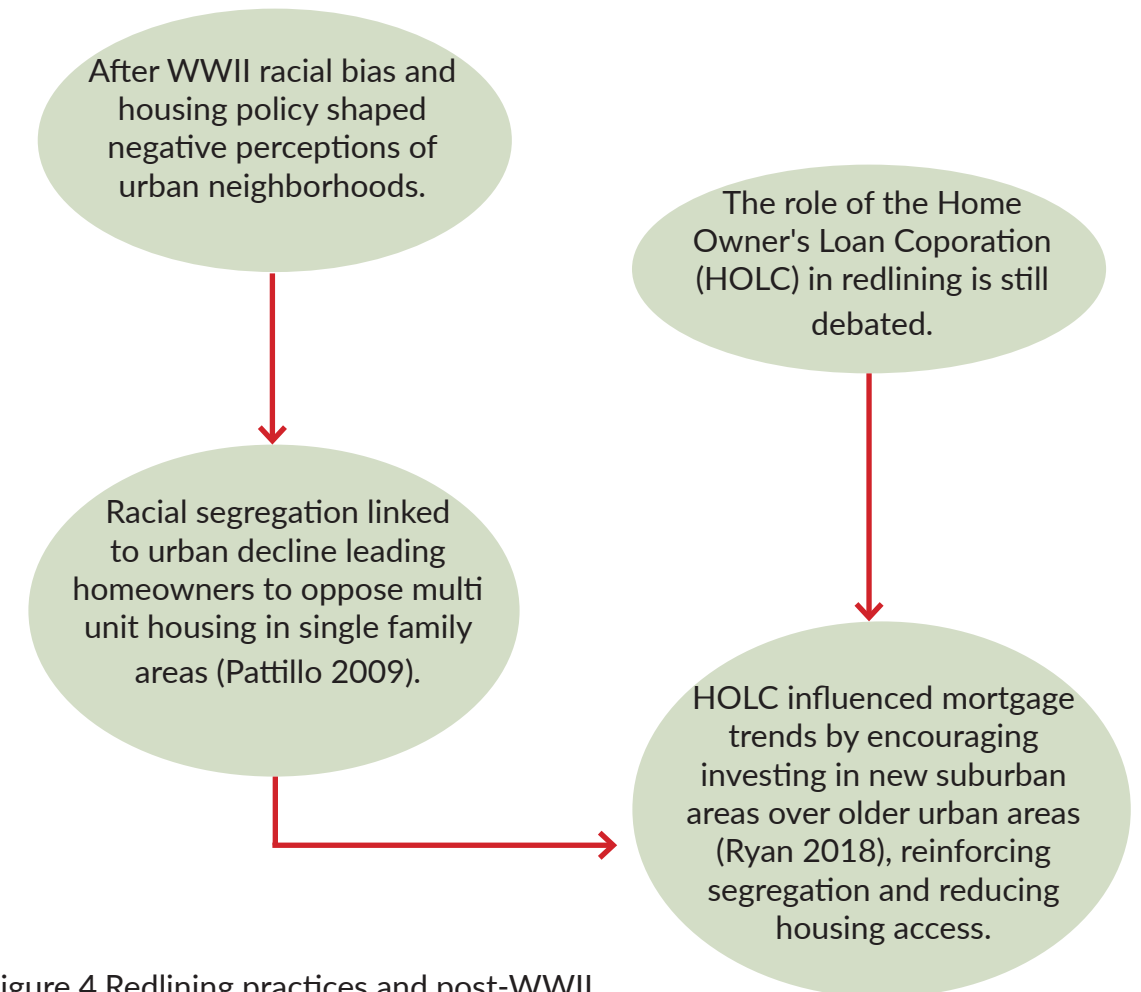


Figure 4. Redlining practices and post-WWII housing policies contributed to racial segregation and continue to shape current housing access limitations. Diagram by author; data sourced from Pattillo (2009) and Ryan (2012).

Key Historical Events

Decisions made in the early and mid-20th century shaped how neighborhoods look and what types of housing are allowed. Urban renewal projects and highway construction removed many older, small scale homes and replaced them with large developments or roads (Ware 2021, 94–95). Over time, this reduced the variety of housing types, especially smaller units that worked well for extended families or people living with roommates.

Government and Policy Roles

Government housing programs also focused heavily on building single family homes. Agencies like the FHA and VA made it easier to buy these homes but harder to get support for smaller or shared housing types like duplexes or triplexes (Ware 2021, 97–99). This limited the types of homes that were built and left fewer options for people who don’t live in a traditional nuclear family.

Community Responses

Some cities are starting to fix this by changing local rules to allow more types of housing. In Corvallis, Oregon, for example, the city updated its zoning laws to support different kinds of homes, not just single family houses (Small and Pager 2020). These changes are a response to growing recognition that many people need smaller, more flexible, and more affordable housing options.

How Past Policies Shaped Today’s Housing Limits and What Communities Are Doing About It

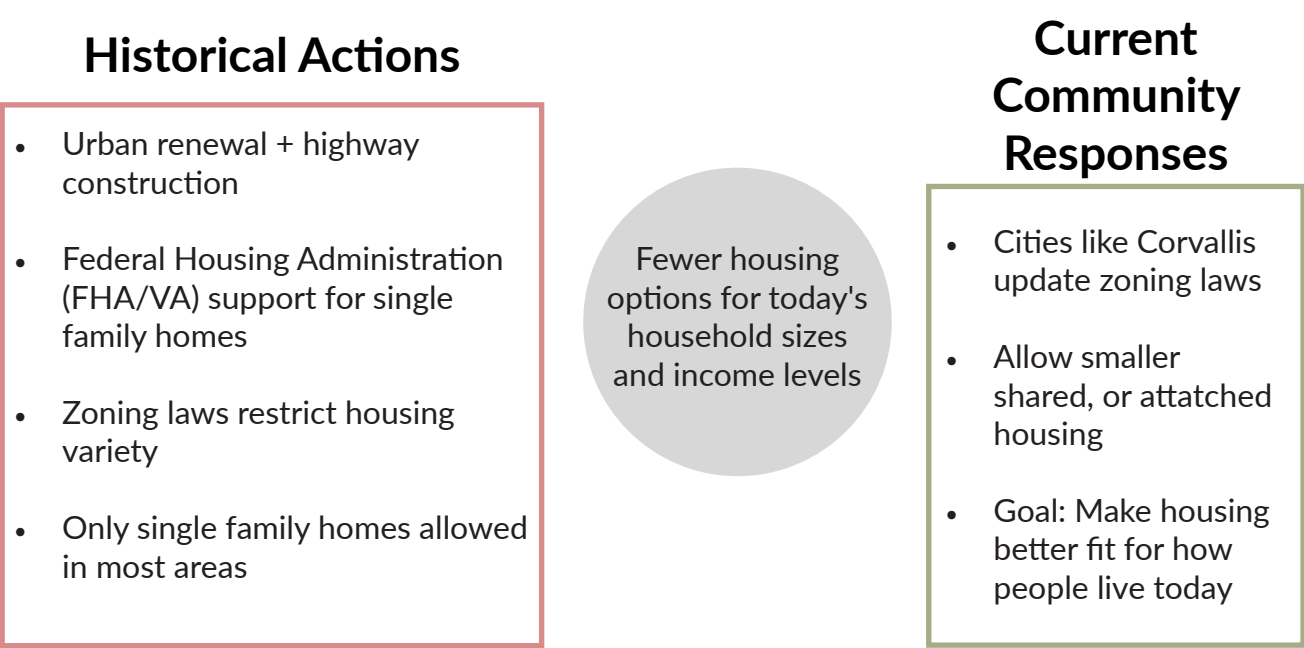


Figure 4.1Past policies shaped today’s housing limits and continue to influence what communities are doing to address them. Diagram made by author; data sourced from Small and Pager (2020).

C. Urbanism

Local Experiences/ Residential Interaction

As planning shifts to address the mismatch between housing supply and household needs, it is also important to consider how residential design can support daily life and social interaction. Beyond affordability, housing should support a sense of belonging and connection to place. Supporting local interaction strengthens communities and improves quality of life. Shibley (1998, 85–88) argues that urban planning should create opportunities for informal encounters, such as walking to nearby shops or attending events, which help build social networks and local engagement.

New Urbanism promotes walkable, mixed use neighborhoods where homes are integrated with public spaces, reducing dependence on cars and increasing community participation (Shibley 1998). These principles support planning approaches that move away from isolated single-family subdivisions toward more connected and flexible housing environments that better reflect how people live today.

Figure 5. Epic Art Clay Studio, across the street from the Kansas City, KS projective design. See page.78 (Perdomo 2025).



Placemaking

Placemaking uses design, art, and public space improvements to strengthen community identity and support everyday life. It relies on community participation and design strategies that reflect how people live and interact (Markusen and Gadwa 2010). When applied to housing, placemaking encourages a stronger sense of connection and belonging.

Webb (2014) expands the idea to include community led actions that promote inclusion and help create more supportive environments. In areas with limited housing options, placemaking can improve livability and strengthen ties between people and place.

This supports housing strategies focused on flexibility, interaction, especially for households that don't fit the single family norm.

Placemaking
Designing for Diverse
Communities

Understanding Community Identity

Placemaking begins with recognizing the cultural and historical narratives that shape a community's identity, ensuring development reflects local values and traditions (Markusen and Gadwa 2010).



Inclusive Public Spaces

Designing accessible and welcoming public spaces fosters social connection across age, ethnicity, and economic backgrounds, creating environments where everyone belongs (Webb 2014).

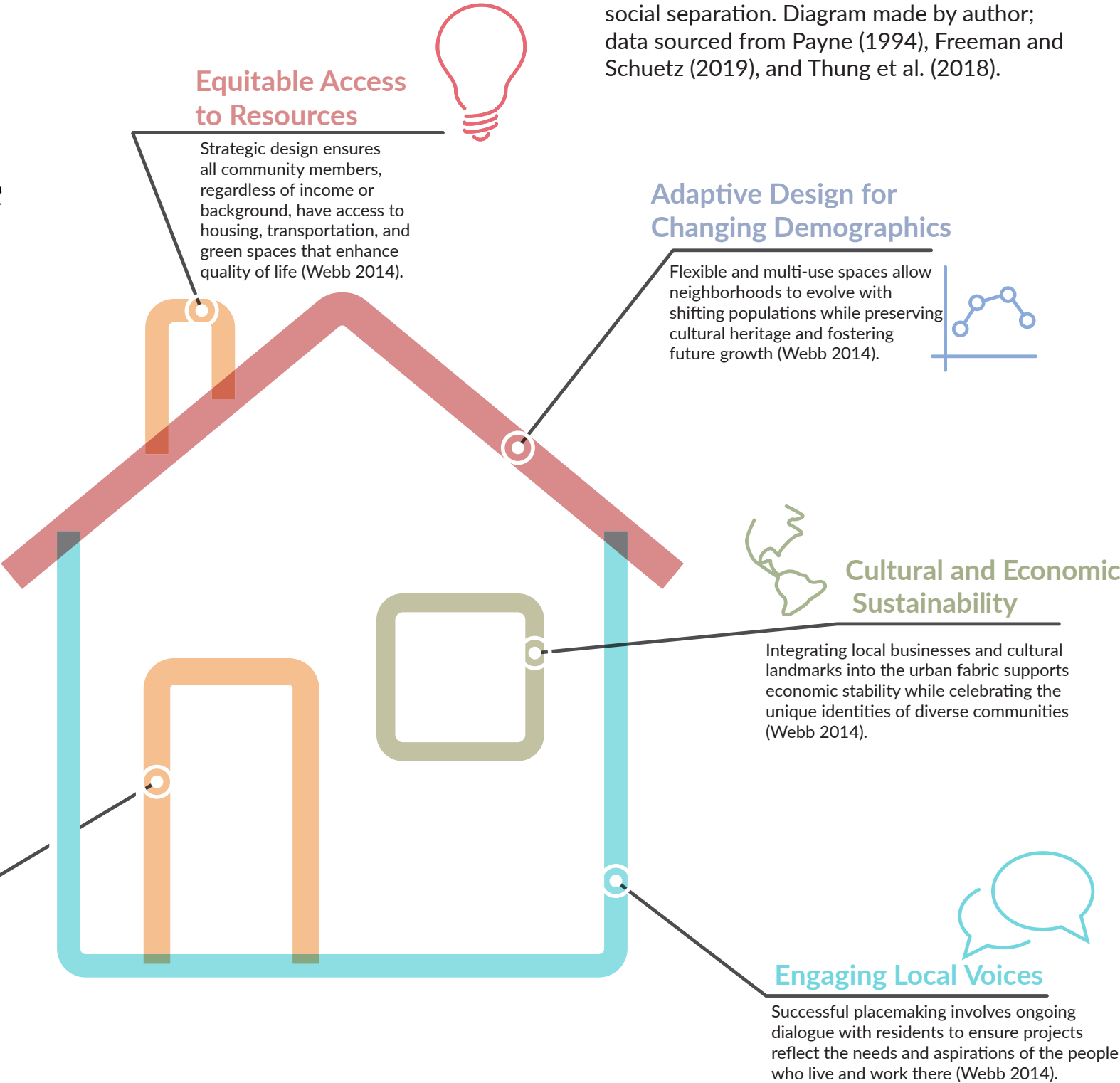


Figure 6. Migration by age influences housing demand and segregation. Mixed housing types and shared services can help reduce social separation. Diagram made by author; data sourced from Payne (1994), Freeman and Schuetz (2019), and Thung et al. (2018).

D. Reurbanism

Reurbanism Trends

Communities need housing that supports daily routines, including access to jobs, schools, and essential services. Many places grew by building away from town centers, often leaving older areas underused (Manis 1959). Reurbanism focuses on improving existing neighborhoods instead of expanding outward. This helps reconnect people with community resources and supports smarter land use.

Social and Economic Consequences

Long commutes reduce time for families and add stress to daily life. This has increased interest in housing near transit, schools, or main streets, even in smaller towns (Brisson 2005). These shifts show a growing need for housing that matches how people manage time and travel today.

See Appendix C. for more on context based planning in Kansas communities, see the example of Strawberry Hill: A historic, walkable neighborhood with mixed housing and strong identity that supports modular and infill strategies. Similar approaches in Salina and Cottonwood Falls show how new housing can fit existing form and meet household needs without large scale redevelopment (Shibley 1998).

Figure 7. Strawberry Hill street parking, Kansas City, KS (Perdomo 2025)



Figure 8. Kansas City, KS (Perdomo 2025)



Figure 9. Cultural hub example in historical downtown Salina (Snawerd 2025)



A. Modular Unit Configuration

Space Efficiency vs. Family Size

The CORE+ modular housing system demonstrates how adaptable housing design can better serve families with varying sizes and needs. Originally developed through a collaboration with the U.S. Department of Housing and Urban Development (HUD), a federal agency focused on national housing access, CORE+ was designed to provide affordable, efficient, and flexible living options (Carney et al. 2023, 37).

Modular housing refers to pre-fabricated units that are built off-site and assembled on location. This method reduces construction time and some costs while allowing for future expansion. CORE+ includes three key components:

- The CORE unit is a compact base module with a kitchen, bathroom, laundry, and sleeping loft, ideal for individuals or couples starting out (Carney et al. 2023, 42).
- The SPACE module adds flexible space for children, multigenerational living, or shared use (Carney et al. 2023, 43).
- The DWELL module allows for more expansion to accommodate larger households while remaining transportable (Carney et al. 2023, 43).

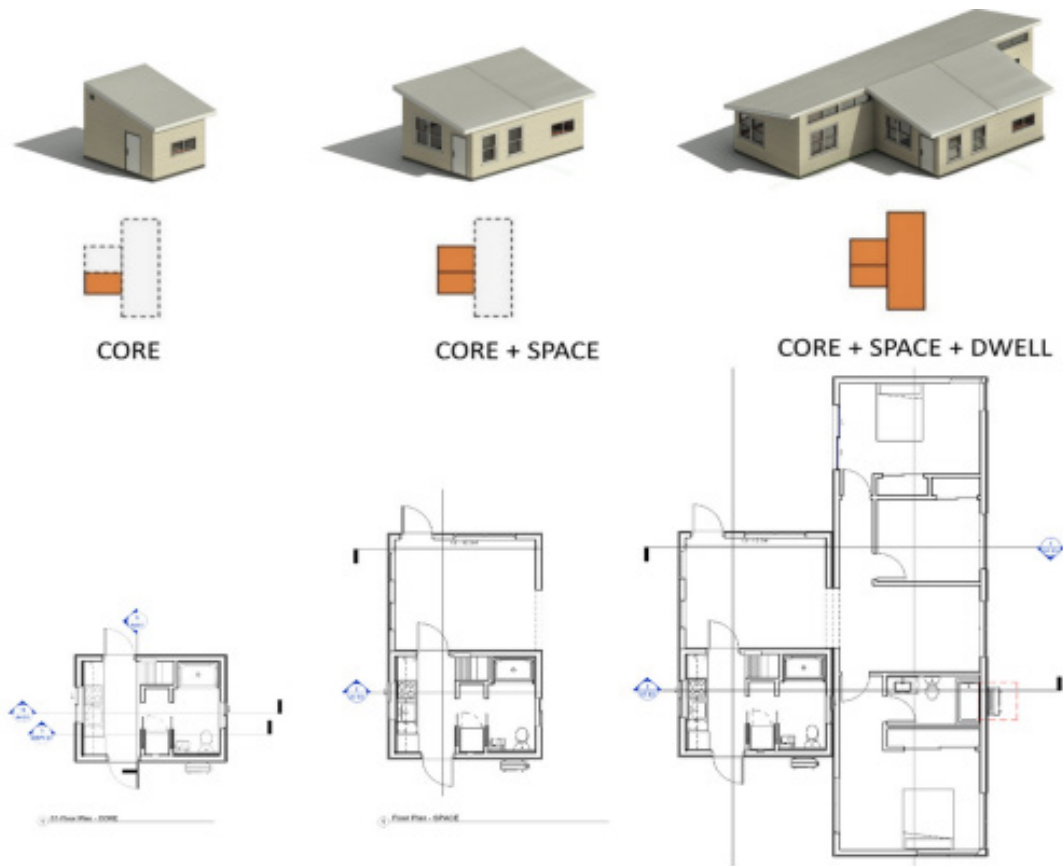


Figure 10. While not low cost, CORE+ offers a more affordable and adaptable alternative to traditional housing (Carney et al. 2023, 42)

Its ability to expand over time makes it especially relevant for middle income families facing limited options. As a precedent, it supports the goal of this research: to explore how planning and design strategies can create housing models that respond to different household needs across varied community contexts. (Carney et al. 2023, 42).

A. Modular Unit Configuration

Design Priorities for Modular Housing in Current Conditions

Modular housing offers more than reduced construction time, it responds to household size, land use, and site constraints that traditional housing often ignores. In Kansas, homes are often too large for today’s families and built in low density areas that prioritize cars over people, limiting walkability and shared space (U.S. Census Bureau 2023; Kansas DOT 2022).Neighborhood scale becomes problematic when zoning supports only large lot single family homes, leaving little room for smaller, flexible options. Cities tend to favor larger homes for tax revenue, and modular formats lack strong policy support. Despite these challenges, modular housing provides an alternative approach that better fits current housing needs of people. It offers flexible unit sizes, more efficient land use, and increased density. Design priorities include flexible layout, shared space, access, slope, parking, and walkability (KCMO Planning Dept. 2020; K-State Extension 2021). Landscape also shapes comfort, drainage, and social interaction (Kansas State University LA Dept. 2021). This research compares current housing conditions with modular alternatives to explore solutions that better reflect household needs and neighborhood function.

Planning Challenges and Modular Opportunities in Urban, Suburban, and Rural Kansas

This table compares how issues like zoning, walkability, and household size are unfit and appear across the three case study sites Strawberry Hill, Salina, and Cottonwood Falls, highlighting common planning barriers and modular housing opportunities.

Category	Kansas City (Urban)	Salina (Suburban)	Cottonwood Falls (Rural)
Household Size Fit	Many single adults, retirees, and small families; limited smaller unit options	Mostly 2-3 person households; dominated by oversized single family homes	Aging population and small households; lacks smaller, accessible home formats
Land Use Efficiency	Zoning prevents duplexes/ fourplexes; underused infill lots	Large lot zoning dominates; excess land per unit	Low-density layout with few shared amenities or clustered housing
Neighborhood Walkability	Narrow sidewalks, disconnected greenspaces, car focused street design	Some pedestrian routes, but homes are spread out; low walkability	Minimal pedestrian infrastructure; long distances to services
Zoning & Policy Compatibility	Zoning favors single family homes; modular homes are not clearly supported	Few code pathways for small units or alternative ownership models	Strict residential zones limit flexible or shared-use formats
Site-Specific Adaptability	Sloped lots with access and parking constraints; lacks shared open space	Sites are flatter but lack integrated greenspace or flexible layouts	Large plots with poor stormwater control and limited landscape design for comfort

Table 1. Planning challenges and opportunities in Kansas. Table made by author; data accessed from U.S. Census Bureau (2023), Statistical Atlas (2023), Kansas Department of Transportation (2022), KCMO Planning Department (2020), and Kansas State University Extension (2021).

B. Scalability for Modular Configurations

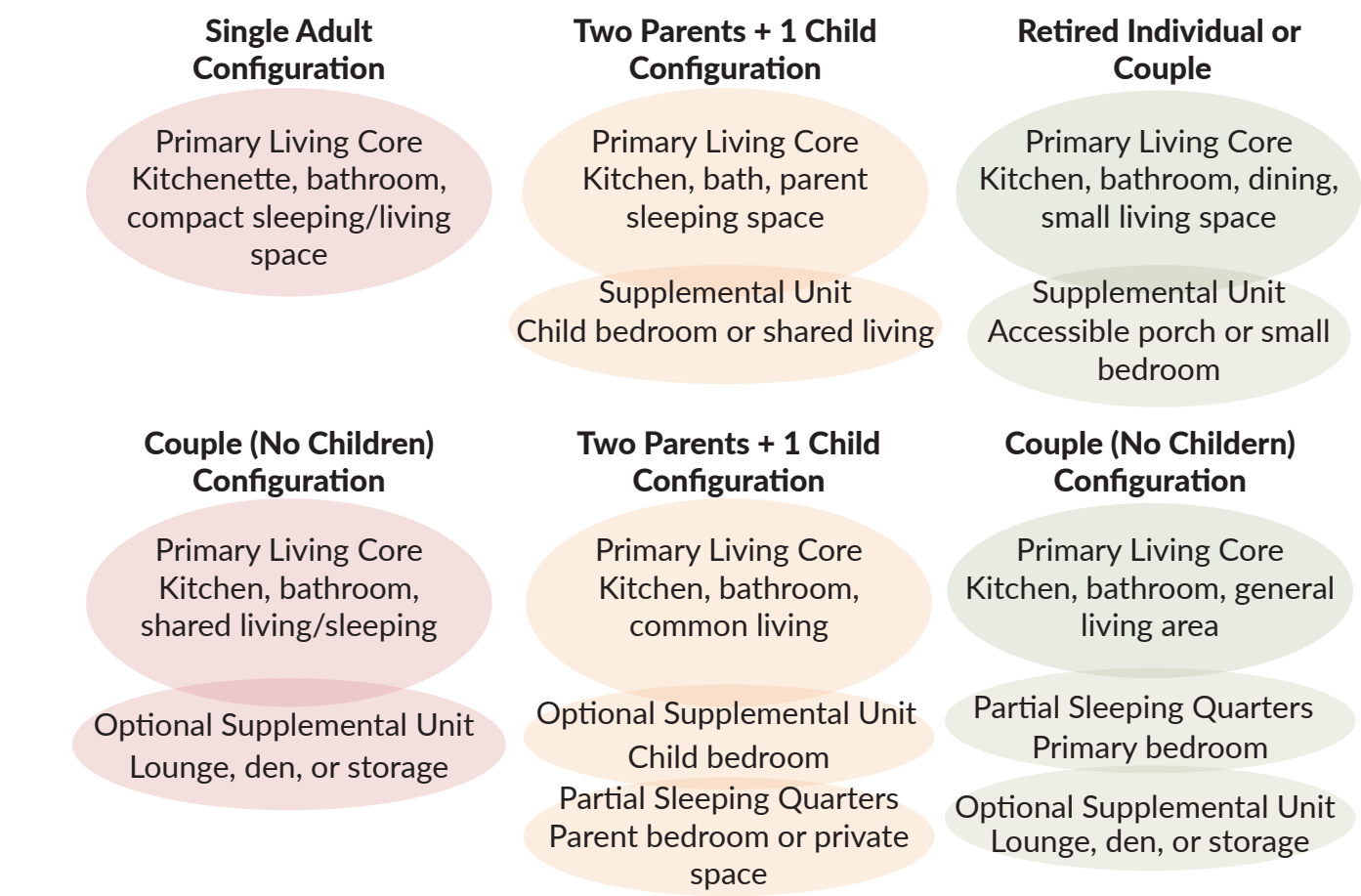
Modular Unit Add On

Housing needs vary by life stage. Younger adults often seek smaller, walkable units near work and services, while older adults may prioritize quiet, accessible layouts that support aging in place (Jayaram 2012). When planning only supports one type of household, it often excludes others (La Gory, Ward, and Mucatel 1981).

Modular housing can respond to these differences through flexible unit sizes that adjust with changing household needs. Smaller households like single adults may need compact, affordable layouts, while larger or multigenerational households require expanded space. Increasing density through clustered units also improves land use and supports transit access (Dannefer and Feldman 2017).

The adjacent chart illustrates how housing can scale across household types, from single adults to families, matching space to function while promoting long term livability.

Suggested Modular Configuration



Household Type	Recommended Unit Size (sq ft)
Single adult	800-900
Couple (no children)	900-1000
Single parent + 1 child	1300-1500
Two parents + 1 child	1400-1600
Retired Individual or Couple	1000-1200
Remote Worker or Business Owner	1100-1300

Table 2. Household type vs. recommended unit size. Table made by author; data sourced from Dannefer and Feldman (2007) and La Gory, Ward, and Mucatel (1981).

Figure 12. WHY NOT Tahoma
Biscuit Graffiti, Kansas City, KS
(Perdomo 2025).

03

METHODS

Figure 13. Neighborhood context
Kansas City (Perdomo 2025).



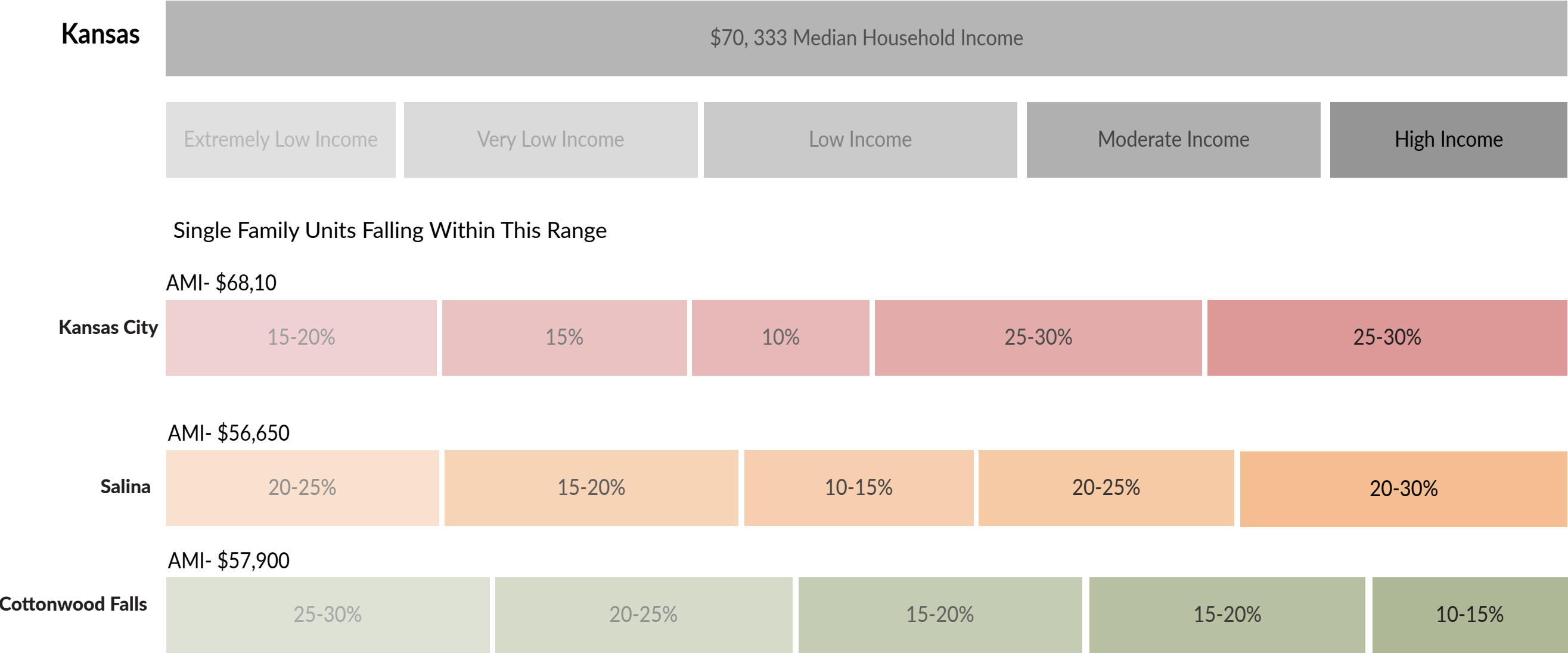
Demographic and Economic Context for Housing Design

Household composition and AMI data help identify where current housing supply falls short. Understanding household size, structure, and income levels in each community informs modular design strategies that better match real living patterns and affordability needs (U.S. Census Bureau 2023; HUD 2023; Galster, Booza, and Cutsinger 2008).

Methods

Average Median Household Income Across Kansas

Infographic highlighting income variation across Kansas using AMI data. Graphic made by author; data sourced from U.S. Census Bureau (2023).



What This Means for Kansas City (Strawberry Hill), KS

Nearly half of households in Strawberry Hill neighborhood are single person, with many others falling outside traditional family structures (Statistical Atlas 2023). This points to a mismatch between existing housing and current needs. Modular housing offers an opportunity to respond with smaller, flexible units that scale to different family types (Galster, Booza, and Cutsinger 2008). Strategic infill supported by inclusive planning can turn this composition shift into a strength by guiding design toward more adaptable and livable housing (Dannefer and Feldman 2017).

Strawberry Hill Household Composition

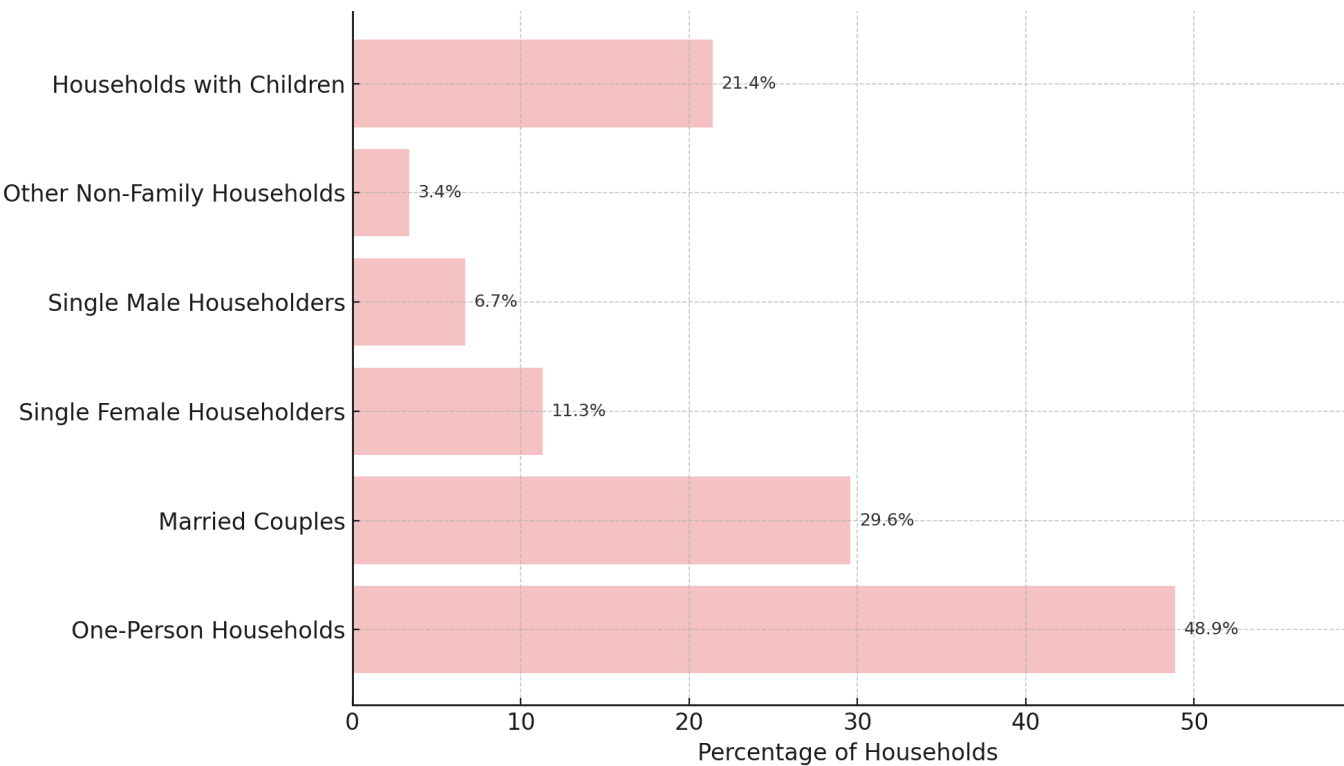


Figure 15. Infographic illustrating demographic data for the Strawberry Hill site. Graphic made by author; data sourced from U.S. Census Bureau (2023) and Statistical Atlas (2023).

What This Means for Salina, KS

Salina’s household composition shows an almost even split between family and non-family households, with the majority having no children. This supports the need for modular housing that can scale by household size and respond to different living arrangements (U.S. Census Bureau 2023; Point2Homes 2023). For this project, the data reinforces the importance of offering unit configurations that prioritize flexibility, compact design, and efficient land use to better serve middle-income residents (Galster, Booza, and Cutsinger 2008; La Gory, Ward, and Mucatel 1981).

Salina Household Composition

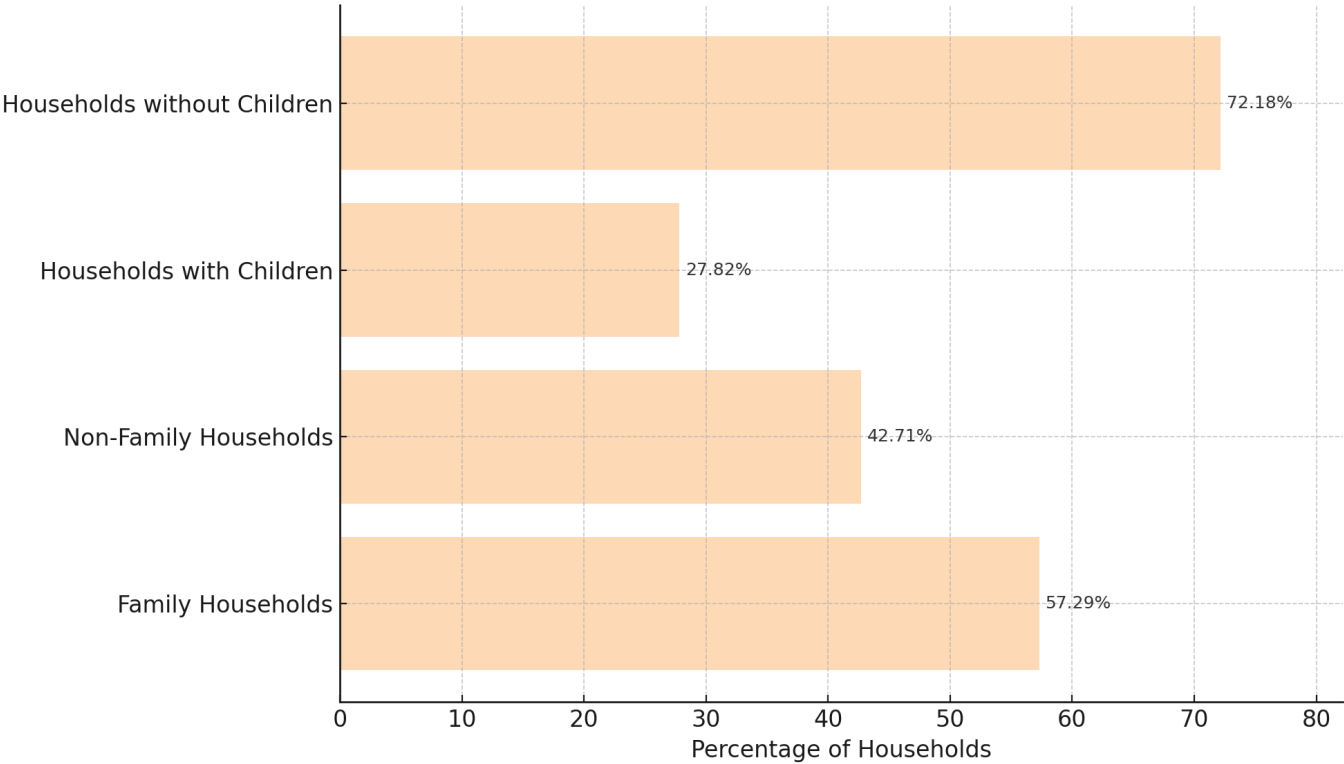


Figure 16. Infographic illustrating demographic data for the Salina site. Graphic made by author; data sourced from U.S. Census Bureau (2023) and Statistical Atlas (2023).

What This Means for Cottonwood Falls, KS

Cottonwood Falls shows a mix of household types, with a share of non-family and one person households alongside traditional families (U.S. Census Bureau 2023). This distribution supports the need for housing that is not one size fits all. In a rural context with limited housing stock and land efficiency concerns, this project proposes modular units that scale with household size offering smaller layouts for individuals and adaptable configurations for families while addressing long-term affordability and space use (Galster, Booza, and Cutsinger 2008; La Gory, Ward, and Mucatel 1981).

Cottonwood Falls Household Composition

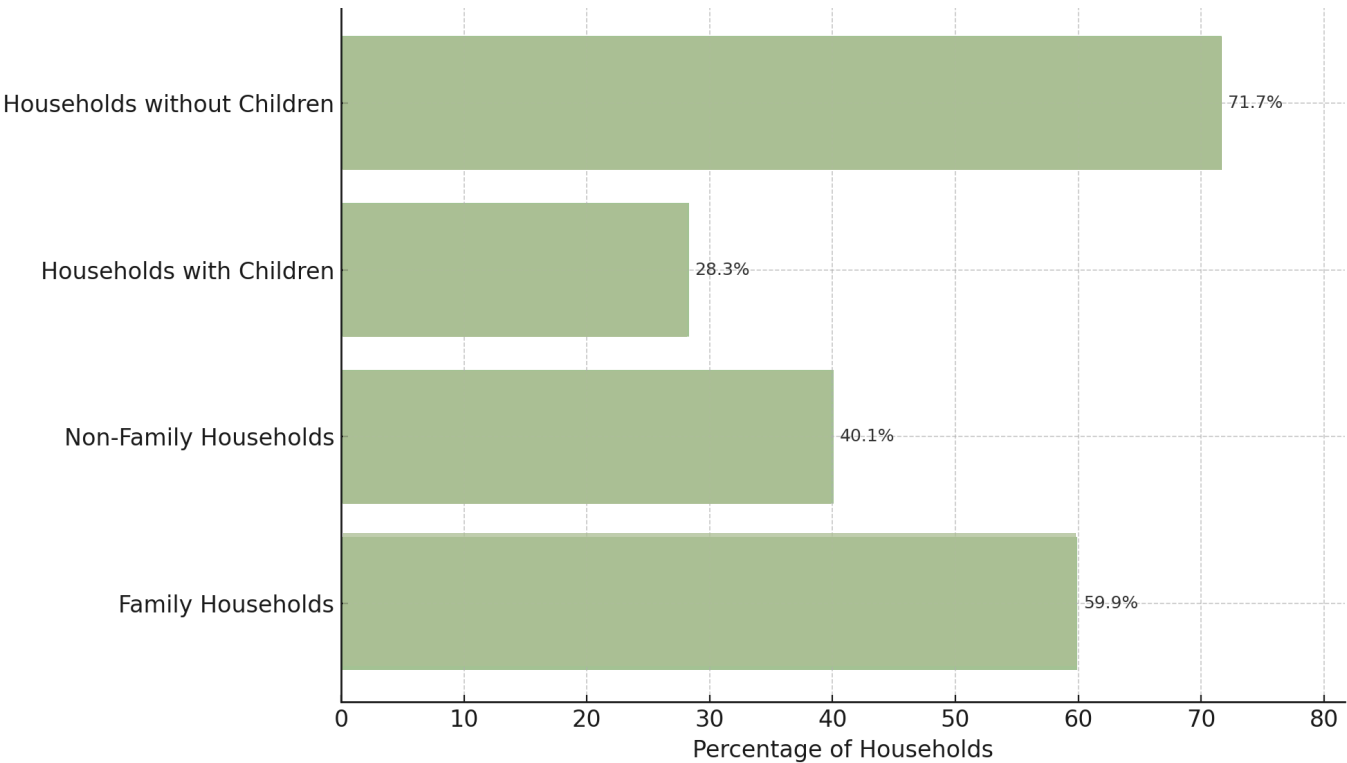


Figure 17. Infographic illustrating demographic data for the Cottonwood Falls site. Graphic made by author; data sourced from U.S. Census Bureau (2023) and Statistical Atlas (2023).

Figure 18. Y:Cube, 3D printed model, scale 1:200,
Photographer: Modelshop / RSHP
Copyright holder © RSHP used with permission.



Precedent Analysis

Precedents in this research are used to study how housing models respond to household size, affordability, and land use. Focus is placed on flexible unit design, shared space, and how well each project supports middle-income households. These examples inform strategies for modular housing in Kansas communities.

Methods

Y:Cube Housing, London, UK (2015)

Project Overview

- Architect: Rogers Stirk Harbour + Partners
- Client: YMCA London South West
- Completion: 2015
- Location: Mitcham, London
- Type: Modular, single-occupant housing
- Units: 36 prefabricated units (26 sqm / ~280 sq ft each)

Key Features

- Prefabricated modular units delivered to site fully constructed
- Designed for single-person occupancy with private bathroom, kitchen, and living space
- Energy-efficient design to reduce utility costs
- Stackable configuration allows high density on constrained urban sites
- Residents pay rent based on local housing benefit levels (Rogers Stirk Harbour + Partners 2015; Parolek 2020)

Relevance to This Project

Y-Cube demonstrates how modular systems can support nontraditional and single-person households, similar to those found in Strawberry Hill, Salina, and Cottonwood Falls. While compact, each unit is self-contained and offers dignity, privacy, and affordability. This model supports the idea that smaller, prefabricated housing can meet specific household types while maximizing land efficiency and minimizing construction time, key goals in this project’s proposed modular strategies.



Figure 19. Y:Cube Community play area, RSHP
Copyright holder © RSHP used with permission.



Figure 20. Y:Cube deck view, RSHP
Copyright holder © RSHP used with permission.

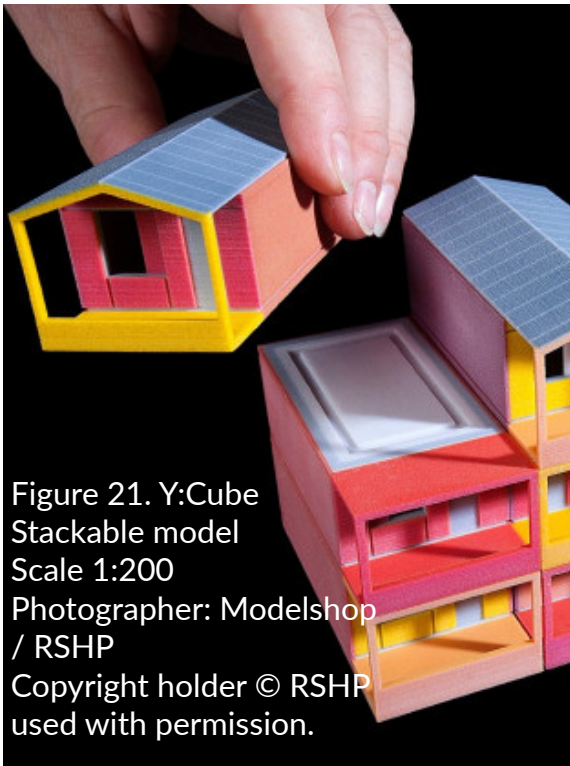


Figure 21. Y:Cube Stackable model
Scale 1:200
Photographer: Modelshop / RSHP
Copyright holder © RSHP used with permission.

20K House Project, Newbern, Alabama

Project Overview

- Designer: Auburn University's Rural Studio
- Location: Newbern, Alabama (ongoing since 2005)
- Type: Single-family, rural affordable housing
- Units: Prototypes for under \$20,000

Key Features

- Designed for low-income rural residents
 - Compact, energy-efficient homes using local materials
 - Modular layout with adaptable footprints
 - Built to reduce labor and construction costs
- (Rural Studio 2023)

Relevance to This Research

20K Houses show how rural housing can be modest, adaptable, and affordable without compromising quality. This aligns with goals for middle-income modular housing in Kansas towns where household sizes vary and cost efficiency is critical.

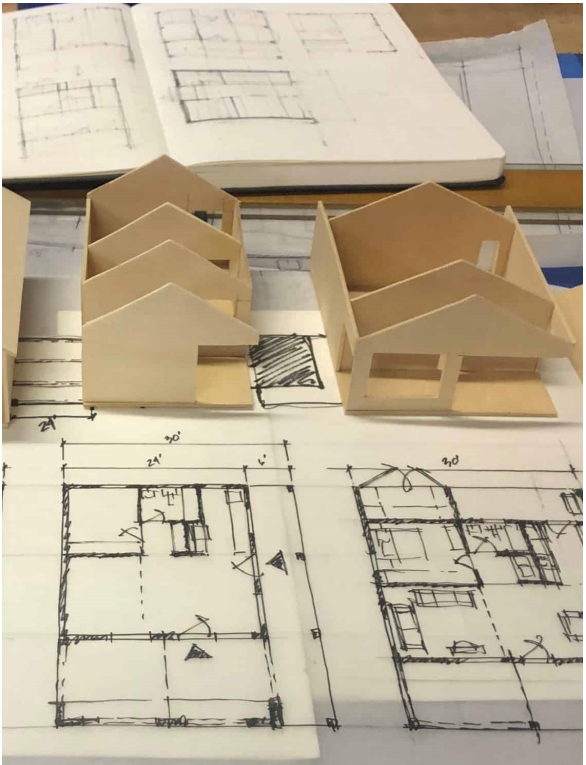
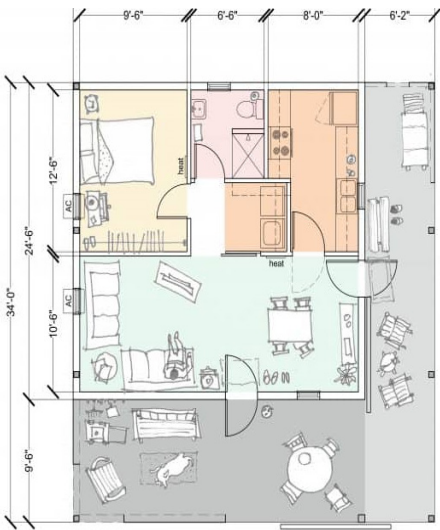


Figure 22. (Rural Studio 2023) used with permission.



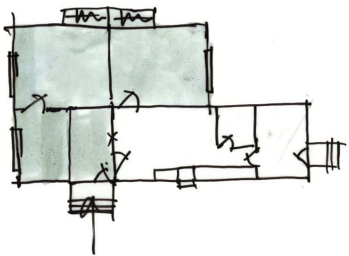
2020

NSF:	576 SF
INTERIOR GSF:	633 SF
SCREEN PORCH GSF:	245 SF
EXT. STORAGE GSF:	0 SF
PORCH GSF:	210 SF
TOTAL GSF:	1,088 SF

Figure 23. (Rural Studio 2023) used with permission.



DAVE'S HOME - 2009



New



Figure 23. (Rural Studio 2023) used with permission.

Nightingale Umarkoo Wayi, Melbourne, Australia (2023), Nightingale Housing

Project Overview

- Architect: Breathe Architecture
- Developer: Nightingale Housing
- Completion: 2023
- Location: Brunswick, Melbourne
- Type: Medium-density, community-driven affordable housing
- Units: 54 homes (1–3 bedrooms)

Key Features

- Mix of unit sizes to support singles, couples, families, and multigenerational households
 - Car-free design with strong emphasis on walkability, cycling, and transit
 - Shared rooftop gardens, communal laundry, and resident gathering spaces
 - Focus on social sustainability and long-term affordability
 - Delivered through a non-profit, triple-bottom-line model (financial, social, environmental).
- (Nightingale Housing 2023)

Relevance to This Research

Nightingale Umarkoo Wayi demonstrates how a modular, community centered approach can meet the needs of diverse household types through flexible unit layouts and shared amenities. The project’s car free design and integrated green space also align with this research's focus on livability and land use efficiency in middle-income housing models.



Figure 24. Emphasis on sustainable lifestyle with a central green space (Nightingale Housing 2025) used with permission.



Figure 25. Highlighting cooperative ownership and individual space within the structure (Nightingale Housing 2025) used with permission.



Figure 26. By providing outdoor rooms Nightingale supports residential wellbeing (Nightingale Housing 2025) used with permission.

Bungalow Court Housing, California, USA (1920s-Present)

Overview

Bungalow courts are a historic model of high density housing that supports affordability, walkability, and community interaction making them an early version of the “Missing Middle” (Parolek 2020).

Key Features

- Units: 5–12 small homes per site
 - Size: 600–1,200 sq ft per unit
 - Density: 20–40 du/acre depending on lot configuration
 - Layout: Oriented around shared pedestrian courtyards
 - Demographics: Singles, couples, small families, retirees
 - Originally built for working-class residents
- (Parolek 2020; Sim and Gehl 2019)

Relevance to Project

This precedent shows how compact, demographic scaled design can increase density without losing neighborhood character. It provides a model for modular strategies by proving that shared outdoor space, unit variation, and small footprint housing can meet the needs of modern middle-income families.



Figure 27. Example of a Bungalow Court in Alameda, CA (Wikicommons, 2014).



Figure 28. Example of a Bungalow Court from Los Angeles, CA (Wikicommons, 1940).

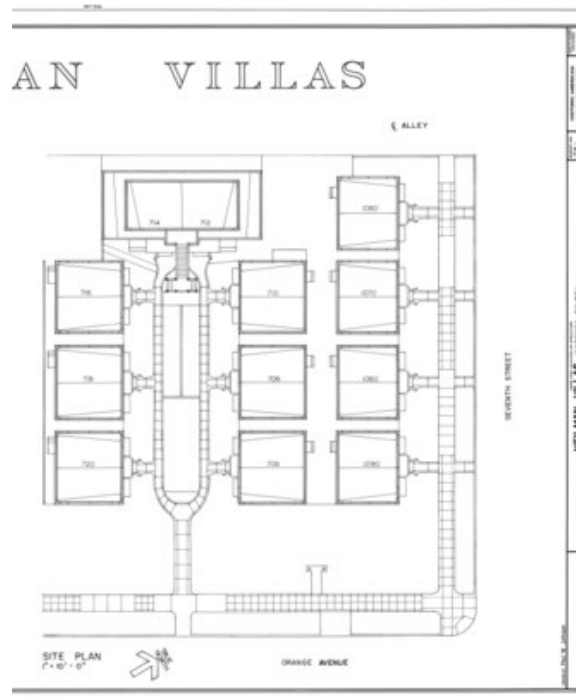


Figure 29. shows the plan view of Heilman Villas in San Diego, CA (WikkiCommons, 1933).

Strasser Apartments, Manhattan, Kansas

Project Overview

- Developer: Manhattan Housing Authority
- Location: Manhattan, KS
- Type: Affordable multifamily housing
- Units: 40+ units, primarily 1- and 2-bedroom apartments

Key Features

- Targeted toward working individuals, small families, and seniors
- Income-restricted units based on local Area Median Income (AMI)
- Walkable access to jobs, services, and K-State campus
- Simple, compact unit layouts designed for affordability and function (Manhattan Housing Authority 2023)

Relevance to This Research

Strasser Apartments reflect a practical approach to housing middle income and median income residents through modest unit sizing and efficient land use. The project supports a range of household types retirees, students, and small families, demonstrating how affordable design can meet real community needs in smaller cities.



Figure 30. Exterior of Stasser Landing (Manhattan Housing 2023) used with permission.

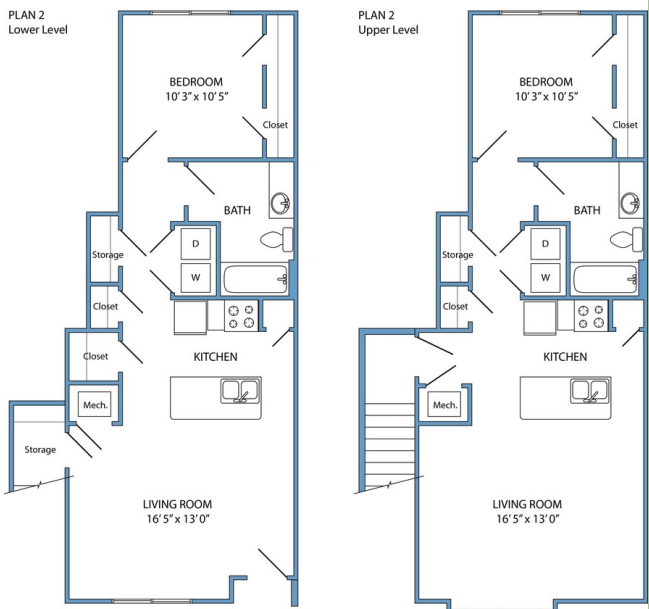


Figure 31. Floor Plan 2 one bed one bed showing density in a variation of flexible space (Manhattan Housing 2023) used with permission.

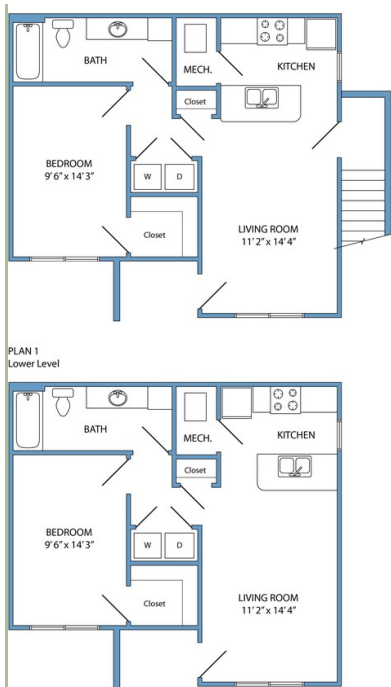


Figure 32. Floor Plan 1 bed 1 bath layout, showing density and affordability (Manhattan Housing 2023) used with permission.

Finch Cambridge, Cambridge, MA

Project Overview

- Architect: ICON Architecture
- Completed: 2020
- Type: Affordable multifamily housing
- Units: 98 units (studio to 3-bedroom)

Key Features

- Modular construction and compact unit plans
- Net-zero energy use with passive design
- Shared courtyards and community spaces
- Income-based rent structure (ICON Architecture 2020)

Relevance to This Research

Finch Cambridge supports various household sizes using stacked modular units and efficient site layout. Though urban, its strategies for density, unit variety, and affordability are directly transferable to rural infill and modular housing goals.



Figure 33. Inspired by form and materiality to relate back to the surrounding context (Crisafulli 2020). used with permission.



Figure 34. Secluded pathways adjacent to the dense affordable multifamily housing (Crisafulli 2020) used with permission.



Figure 35. Secluded pathways (Crisafulli 2020) used with permission.

Housing Profile Analysis

This section analyzes household type, size, income, and typical occupations to guide housing design that reflects who lives in these communities. Profiles include single adults, families with children, retirees, and remote workers. These patterns help match unit sizes and layouts to daily needs, supporting modular designs that respond to affordability, land use, and lifestyle (Galster et al. 2008).

Kansas City, KS
Strawberry Hill
Community Profiles

Illustrative snapshots of various household types in Strawberry Hill, emphasizing age, income, occupations, and housing preferences to inform context sensitive design solutions.

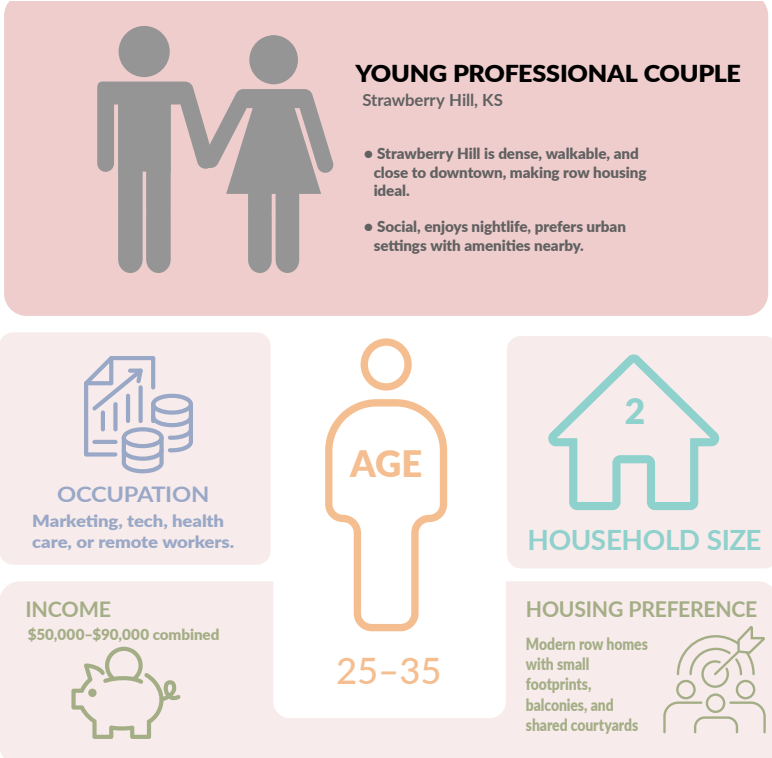


Figure 35.1 Strawberry Hill Profile 1 Profile made by author; data sourced from U.S. Census Bureau (2023).

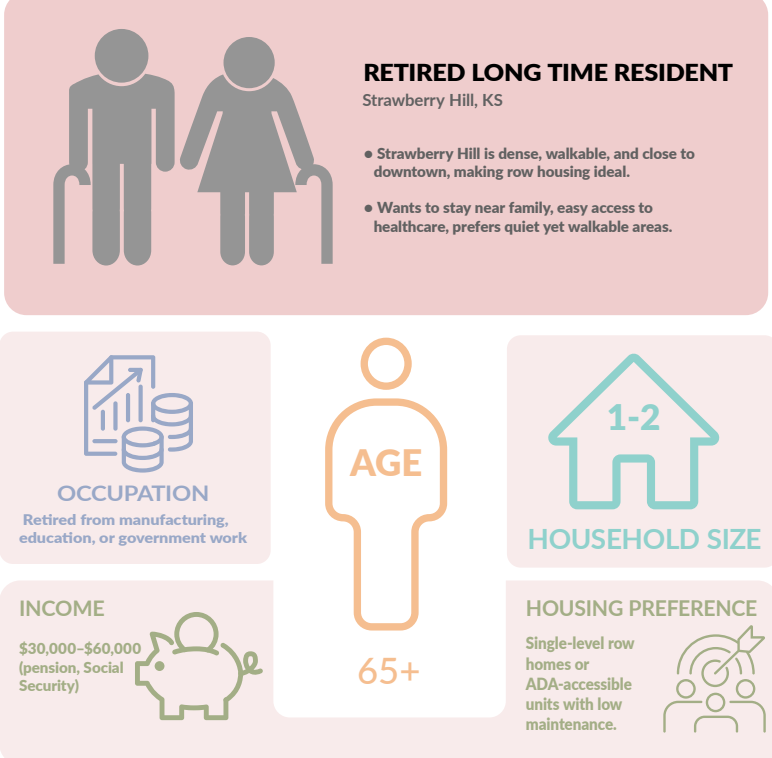


Figure 35.2 Strawberry Hill Profile 3 Profile made by author; data sourced from U.S. Census Bureau (2023).

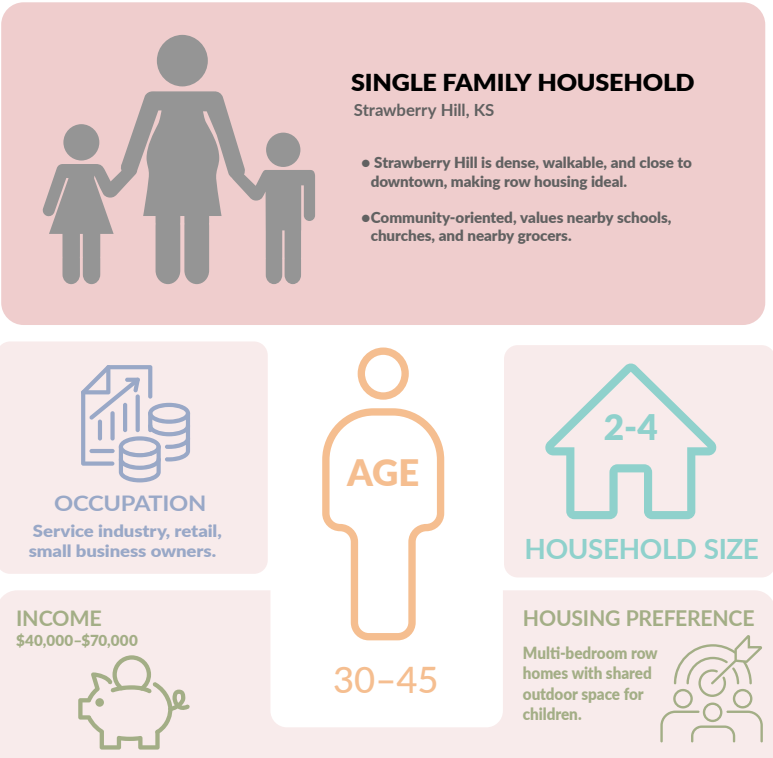


Figure 35.3 Strawberry Hill Profile 3 Profile made by author; data sourced from U.S. Census Bureau (2023).

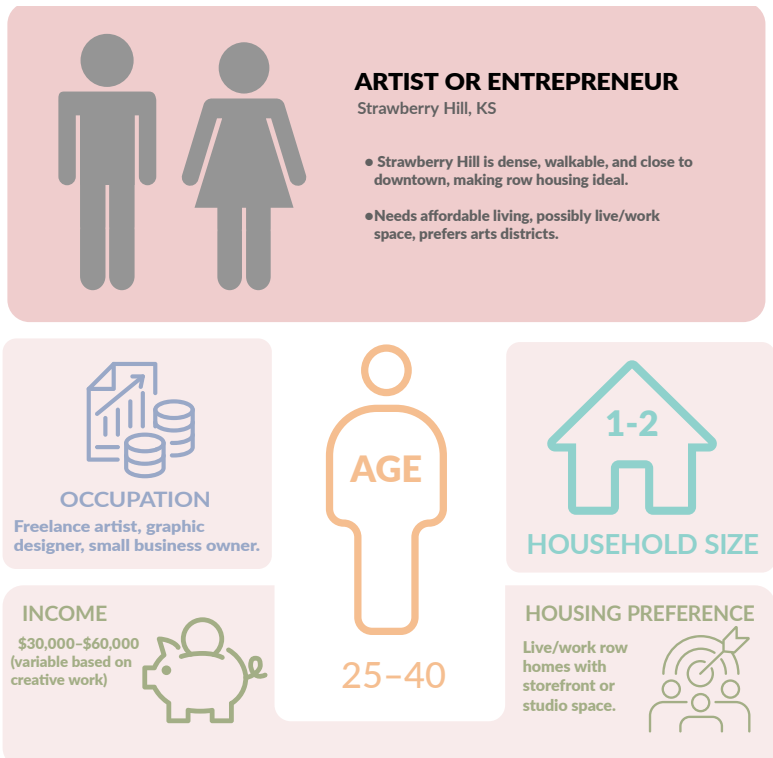


Figure 35.4 Strawberry Hill Profile 4 Profile made by author; data sourced from U.S. Census Bureau (2023).

Salina, KS
Community Profiles

Representative household types in Salina, Kansas, illustrate a suburban mix of ages, occupations, incomes, and housing preferences to inform inclusive and adaptable housing design.

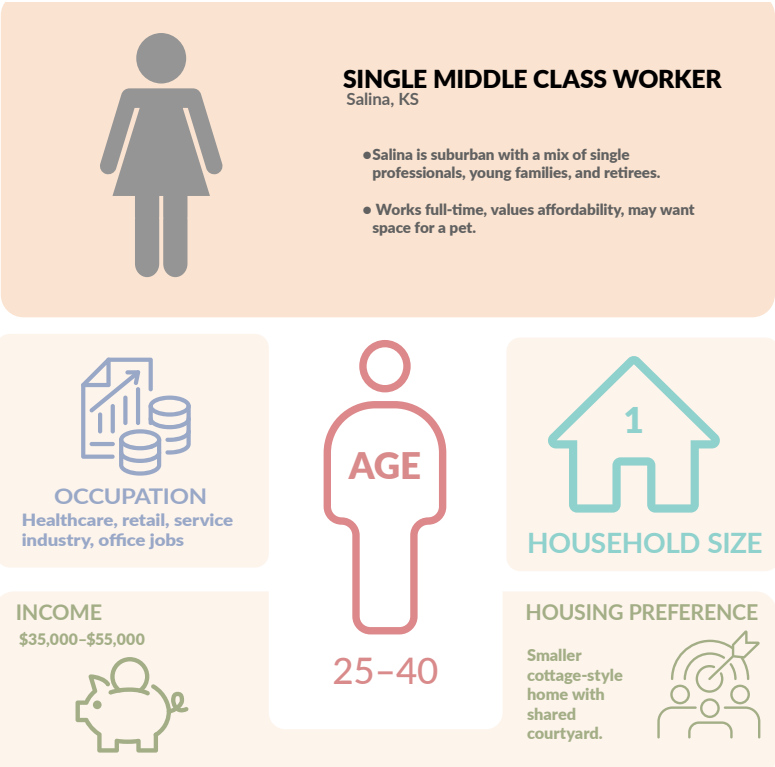


Figure 35.5 Salina Profile 1. Profile made by author; data sourced from U.S. Census Bureau (2023).

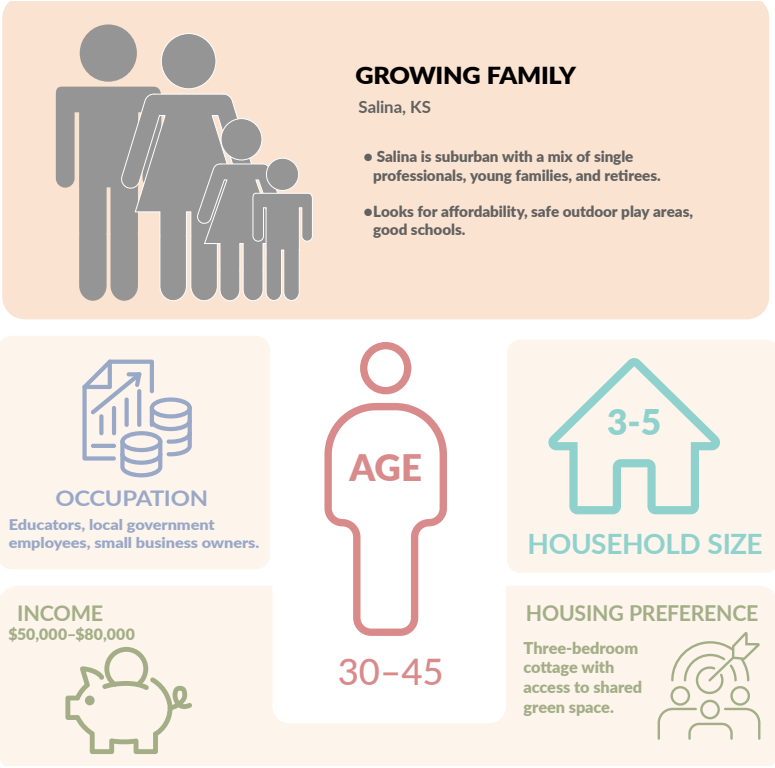


Figure 35.6 Salina Profile 2. Profile made by author; data sourced from U.S. Census Bureau (2023).

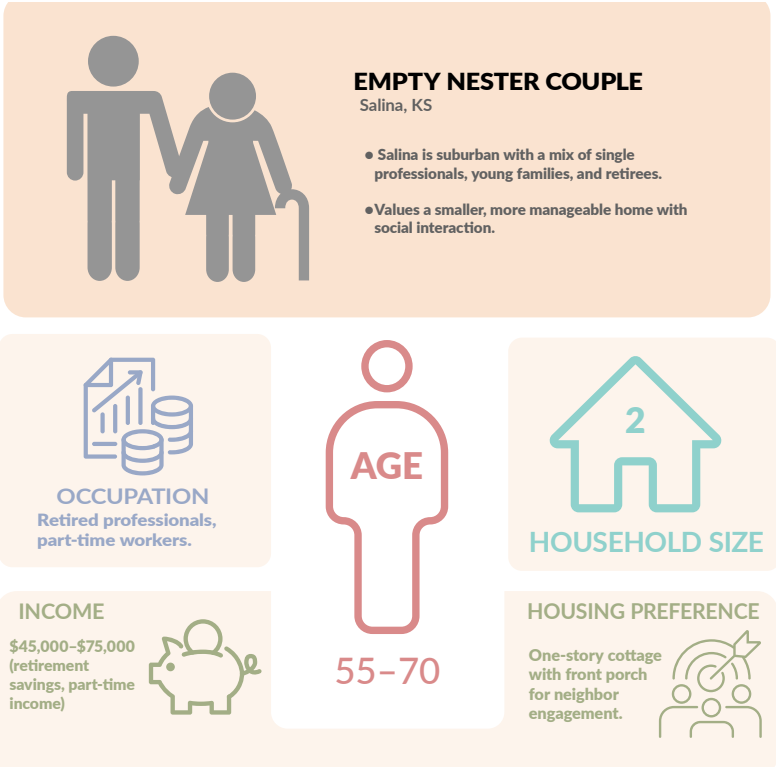


Figure 35.7 Salina Profile 3. Profile made by author; data sourced from U.S. Census Bureau (2023).

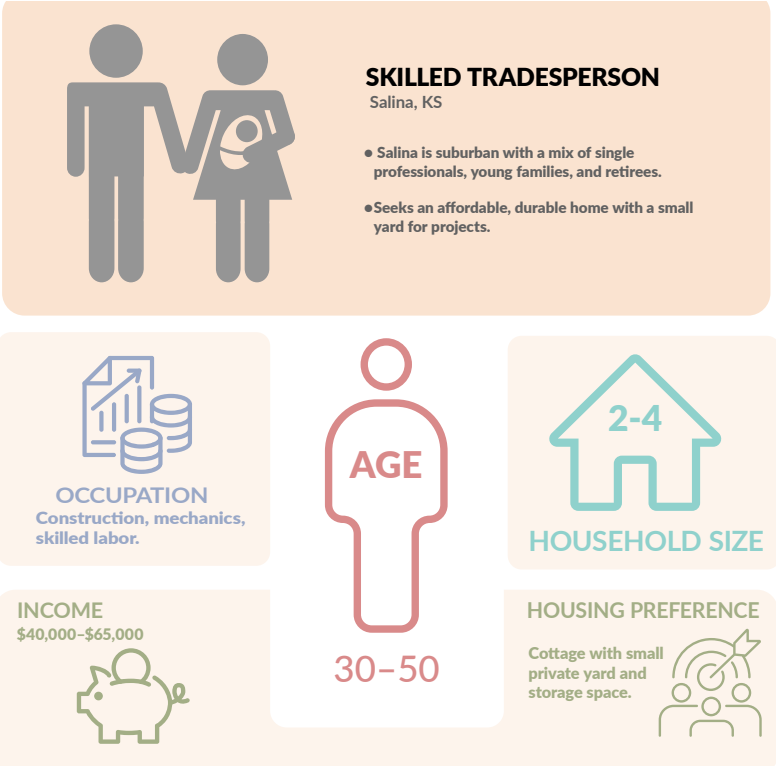


Figure 35.8 Salina Profile 4. Profile made by author; data sourced from U.S. Census Bureau (2023).

Cottonwood Falls, KS
Community Profiles

An overview of household types in Cottonwood Falls, focusing on rural lifestyles, local employment, and housing needs for retirees, small business owners, remote workers, and farmers.

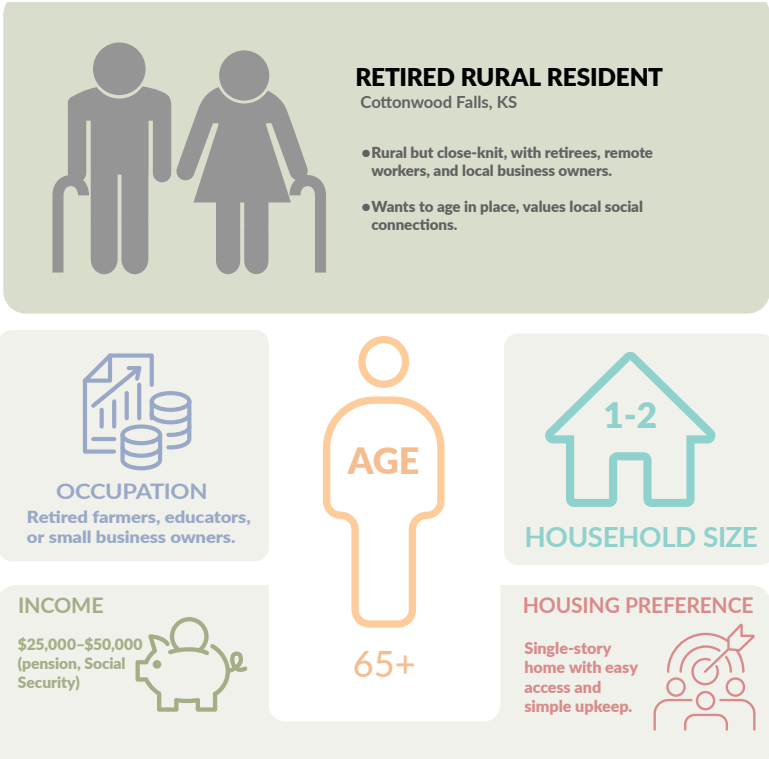


Figure 35.9 Cottonwood Falls Profile 1. Profile made by author; data sourced from U.S. Census Bureau (2023).

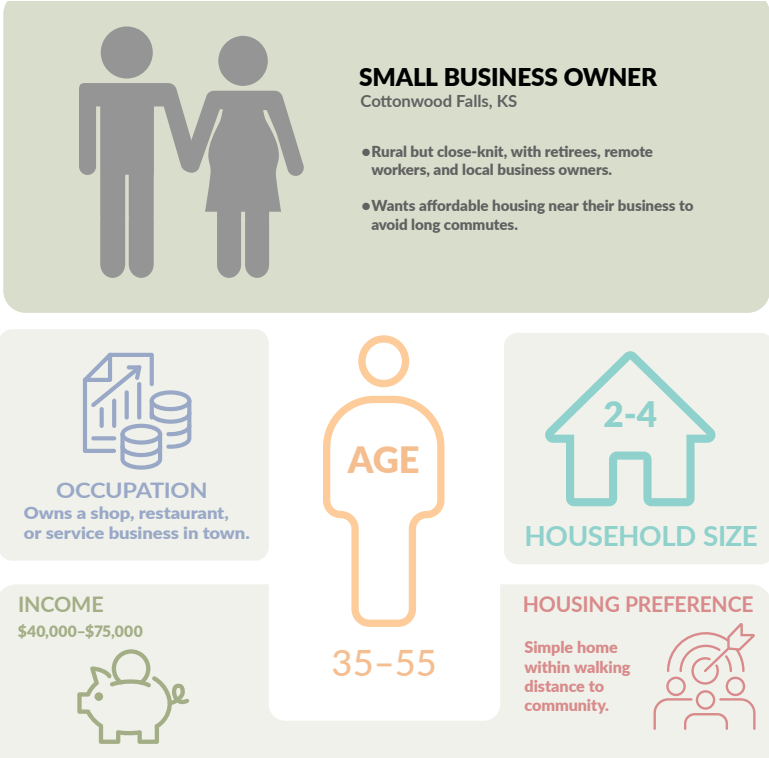


Figure 35.10 Cottonwood Falls Profile 2. Profile made by author; data sourced from U.S. Census Bureau (2023).

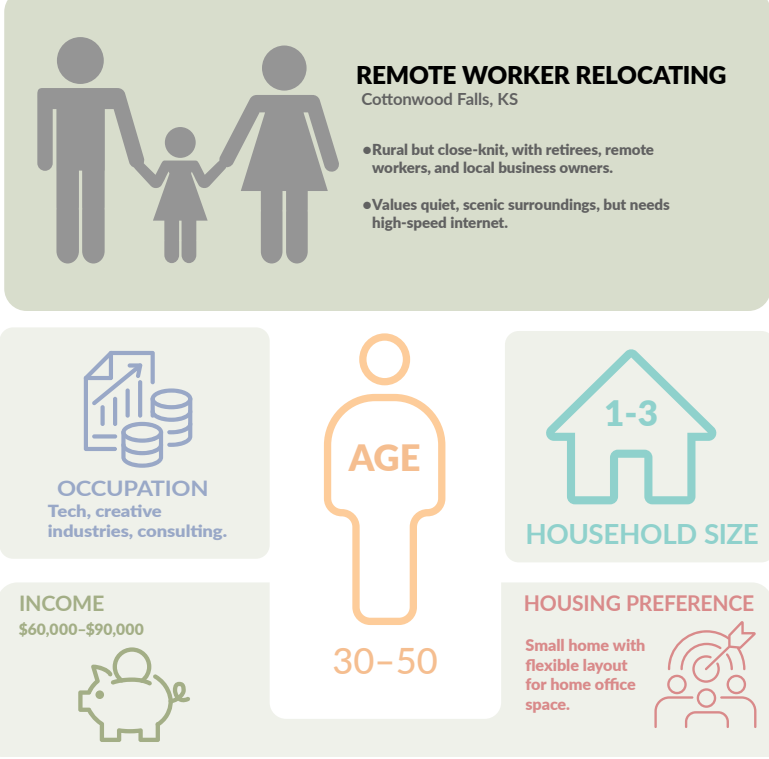


Figure 35.11 Cottonwood Falls Profile 3. Profile made by author; data sourced from U.S. Census Bureau (2023).

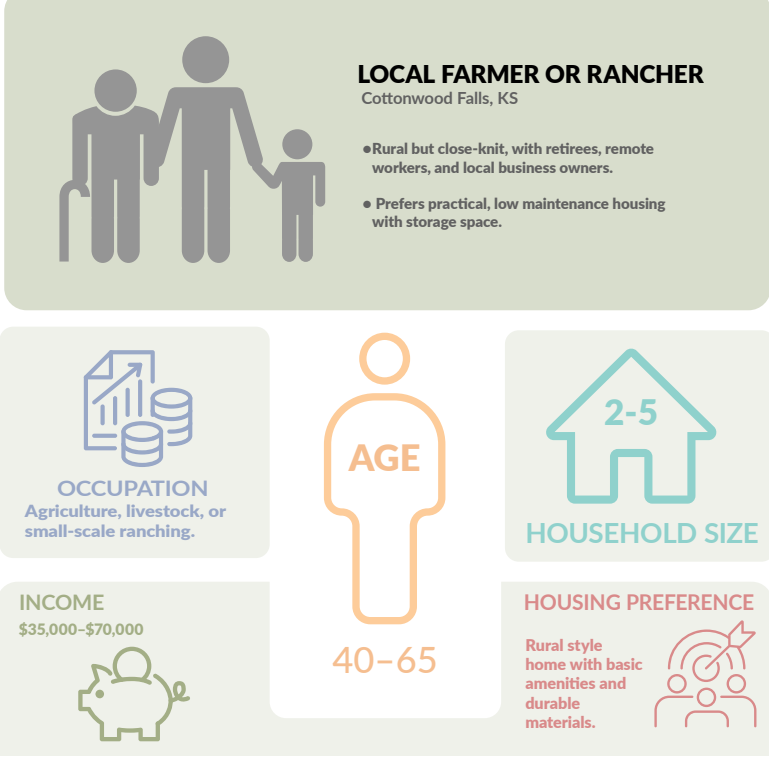


Figure 35.12 Cottonwood Falls Profile 4. Profile made by author; data sourced from U.S. Census Bureau (2023).

Site Features

Action Based Strategy

Site Selection

Select parcels based on household structure and AMI. Prioritize sites with utility access, potential for modular infill, and alignment with local policies (Galster et al. 2008).

Units per Lot

Balance unit count with open space needs. Use zoning overlays or variances to allow 2 to 6 modular units per lot, depending on site context (Parolek 2020).

Household Types Served

Design for 2 to 4 person households, with adaptable floor plans for multigenerational families, single parents, or shared households (Census 2023).

Density (units/acre)

Cluster housing around shared amenities. Use form based codes to increase density while preserving context sensitive design (Parolek 2020).

Resident Density (people/acre)

Estimate people per lot based on typical household sizes per site (urban: 2 to 4, suburban: 3 to 5, rural: 2 to 6). Adjust utilities and public space (U.S. Census 2023).

On-site Green Space

Use central green spaces and courtyards with optional fencing. Ensure semi private vs shared access is clear for residents (K-State Extension 2021).

Circulation Access

Design walkable, ADA compliant pathways. Use connected loops or alleys to support modular deliveries and safe access (KCMO Planning 2020).

CLT / Ownership

Use CLT (Community Land Trust) or co-op ownership to use resale prices and reduce land cost burden. Create guidelines for long term maintenance (Davis 2010).

Model Proximity to Amenities

Site near existing schools, transit, and health services. Reduce car use and support missing middle income integration (Parolek 2020).

04

Projective Design

This projective design uses planning strategies to offer alternatives to traditional housing models that no longer match the needs of middle income households in Kansas. It focuses on metrics such as unit size, units/per acre, circulation, household types, resident density, and proximity to amenities to guide design responses. Modular typologies are applied across three distinct contexts: urban (Strawberry Hill in Kansas City), suburban (Salina), and rural (Cottonwood Falls) to reflect site conditions and household structures. Each proposal aligns unit size and lot configuration with AMI and demographic trends, using strategies like shared green space, walkable access, and community ownership models to support more livable and context sensitive development.

Table 3. Site Features vs. Action Based Strategy (by author)

Figure 36. Street Art Kansas City, KS (Perdomo 2025).



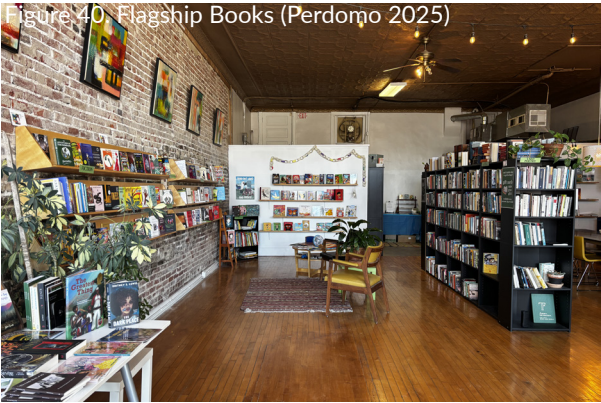
Methods

Strawberry Hill Site
Kansas City, Kansas

The proposed site is located at the corner of N 6th Street and Tauromee Avenue in the Strawberry Hill neighborhood. Positioned near a main street and adjacent to an established residential area, the site offers strong connectivity to the surrounding urban fabric. The proximity to existing density and amenities makes it ideal for testing modular infill housing that supports a variety of household types.

The site presents a design challenge due to its 6-foot grade change, requiring thoughtful grading and foundation solutions. However, this slope also provides an opportunity to explore adaptable modular configurations that respond to topography. Its central location and residential context make it a strong fit for this study’s focus on flexible and scalable housing in urban neighborhoods.

KANSAS CITY, KS- Strawberry Hill



Methods

**Site Design Strategies
for Strawberry Hill Site**

- Grading and site cut/fill.
- Drainage direction and flow.
- Building placement on flat zones.

A six foot slope across the site influenced how modular units were placed. Design 1 cuts directly through the slope, creating a stepped layout, while Design 2 curves around high points to form pockets and a central green space.

Considerations applied to Design 1 and Design 2 consisted of:

- Walkable circulation and access.
- Spatial relationships between units.
- Slope stabilization with planting.

For all alternatives, lots and housing units are individually owned. Community/amenity space is a Community Land Trust (CLT) and aesthetics and the landscape are maintained through a small Homeowners Association (HOA)

Figure 40.1. Site Plan of Design 1. This plan cuts through the sloped lot to create a stepped modular layout, addressing topographic change while organizing units along a linear path (Perdomo 2025).

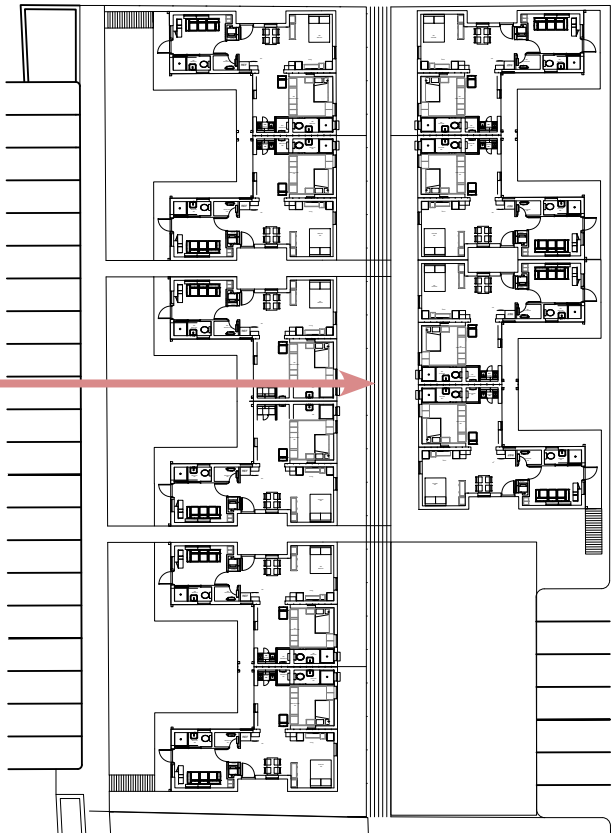


Figure 40.1 CAD Design 1 (created by author)

Figure 40.2. Site Plan of Design 2. This layout curves around slope contours to form spatial pockets and a central green space, responding to site drainage and circulation needs (Perdomo 2025).

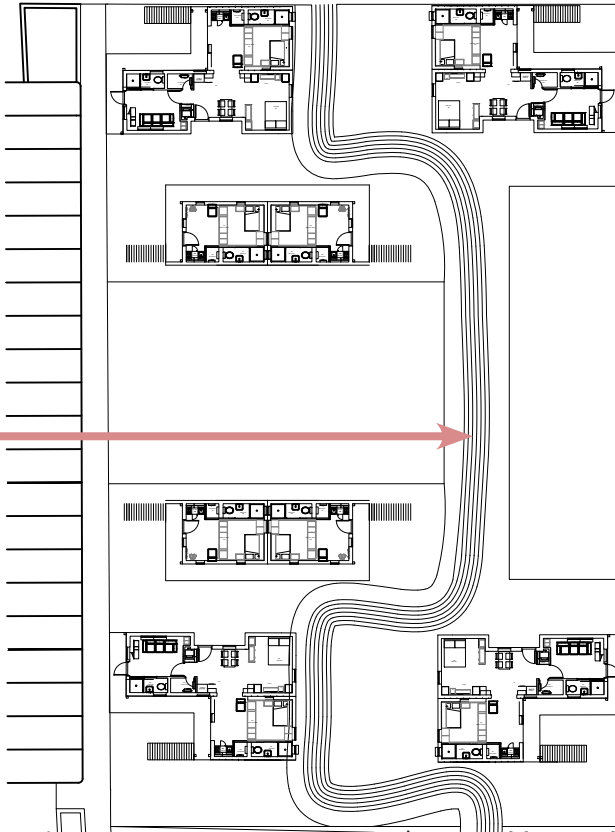


Figure 40.2 CAD Design 1 (created by author)

Strawberry Hill Site, Design 1

Adds 2–4 modular units per lot (800–1,100 sq ft) to increase density at a neighborhood scale. Lots are private and individually owned; shared green space and amenities are jointly owned through a CLT and managed through HOA.

Existing Housing



Figure 41.1 (Google Earth 2025)



Figure 41 (Perdomo 2025)

Comparative Metrics Existing Vs. Alternative Housing Site Layouts, Design 1

Metric	Existing Housing	Alternative Housing (proposed)
Average Unit Size (sq ft)	1,200–1,800	800–1,600 (varied)
Units on Lot / cluster	1	3–4
Household Types Served	Primarily nuclear families	Singles, couples, retirees, small families
Resident Density (people per site)	10–20	16–24
On-site Green Space	Private yards only	Shared public green space
Circulation Access	Driveways and sidewalks	Internal paths and shared entries
CLT / Ownership Model	Private ownership	CLT maintained amenities & private lot
Proximity to Amenities	Moderate walkability	High walkability and transit access

70

Table 4. Comparative Metrics for Existing and Alternate Housing Site Layouts, Design 1 (Strawberry Hill, KS). Compilation by author.

Alternative Housing



Figure 42 (created by author)

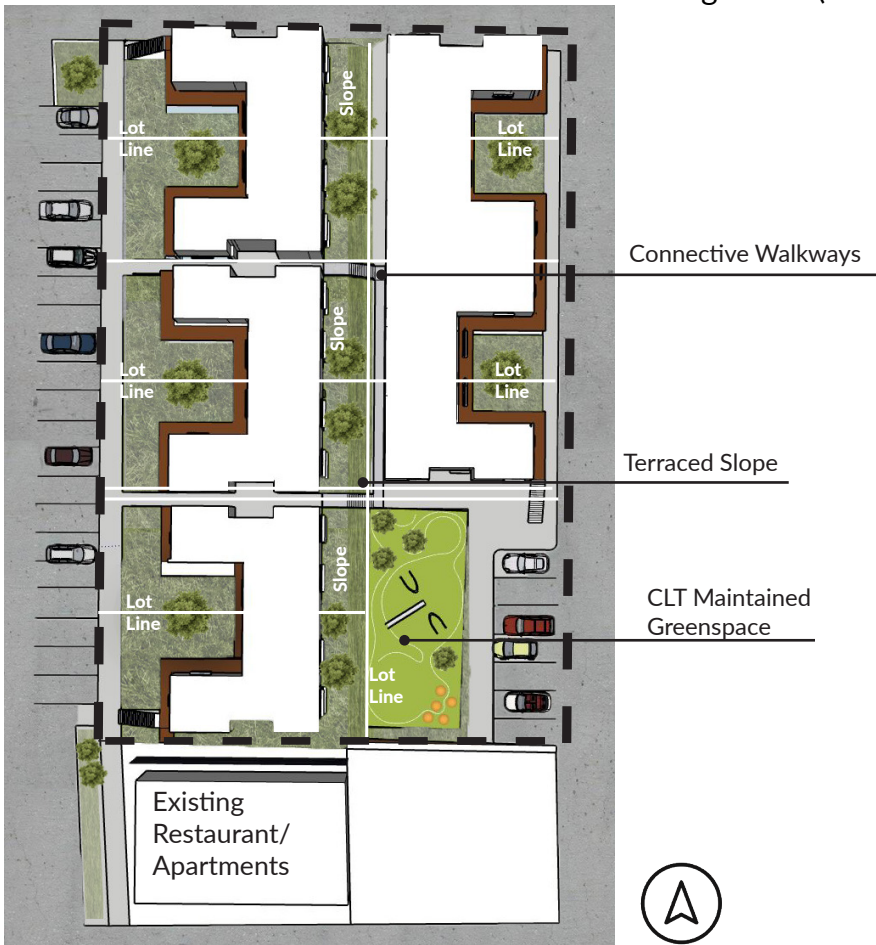
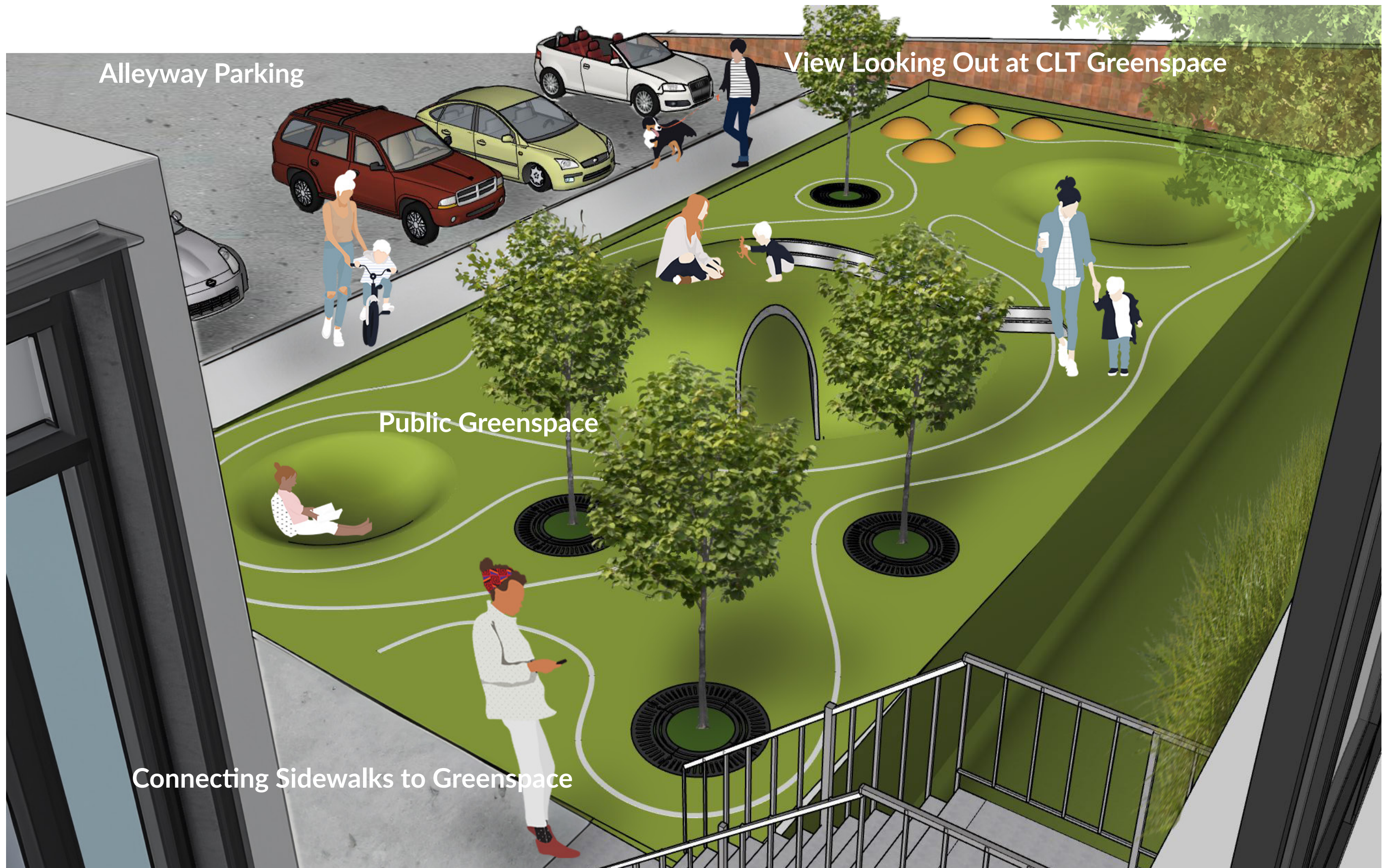


Figure 43 Site Plan of Design 1 urban setting (created by author)

71





Strawberry Hill Site, Design 2

A cottage court layout with 10–15 modular units (900–1,200 sq ft) around a shared courtyard. Units are privately owned; the CLT manages shared spaces to ensure long term affordability.

Existing Housing



Figure 41.1 (Google Earth 2025)



Figure 46. (Perdomo 2025)

Comparative Metrics Existing Vs. Alternative Housing Site Layouts, Design 2

Metric	Existing Housing	Alternative Housing (proposed)
Average Unit Size (sq ft)	1,200–1,800	600–1,200 (varied)
Units on Lot / cluster	1	6–8
Household Types Served	Primarily nuclear families	Singles, retirees, couples, small families
Resident Density (people per site)	10–20	35–45
On-site Green Space	Private yards only	Central shared green court
Circulation Access	Driveways and sidewalks	Pedestrian-first shared paths
CLT / Ownership Model	Private ownership	CLT maintained amenities & private lot
Proximity to Amenities	Car-dependent, limited walkability	Moderate to high walkability

Table 5. Comparative Metrics for Existing and Alternate Housing Site Layouts, Design 2 (Strawberry Hill, KS). Compilation by author.

Alternative Housing



Figure 47. (created by author)

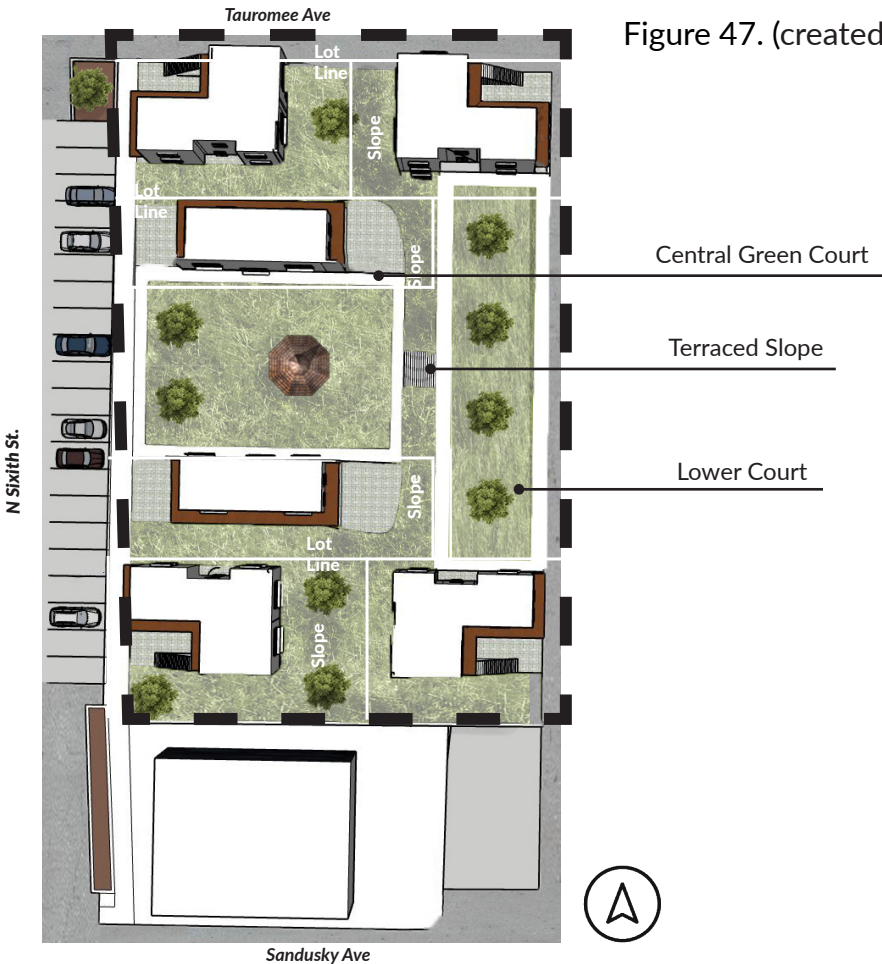


Figure 48. Site Plan of Design 2 urban setting (created by author)



Figure 49. Example of lower green court in Kansas City, KS (created by author)

Figure 50. Downtown Salina (Snawerdt 2025).



Methods

West Salina Site
Salina, Kansas

Salina was selected as the suburban study site for its large areas of open, underused land within and between residential neighborhoods. This spatial disconnect reflects broader suburban planning patterns that prioritize separation and lot size over housing variety or connectivity. These conditions present an opportunity to reintroduce missing middle housing through modular design. The availability of land, proximity to schools and services, and low existing density make Salina a strong test site for more efficient land use and flexible unit types that better match household size and income.

SALINA, KS



Figure 48. Downtown Salina (Snawerdt 2025).



Figure 49. Looking East of the Site (Snawerdt 2025).



Figure 50. Nearby Housing (Snawerdt 2025).



Figure 51. Looking South of the Site (Snawerdt 2025).



West Salina Site, Design 1

Modular infill (1,300–1,500 sq ft) on oversized lots preserves open space while diversifying housing. Privately owned homes share CLT-owned amenities to support affordability (Davis 2010; Parolek 2020).

Existing Housing

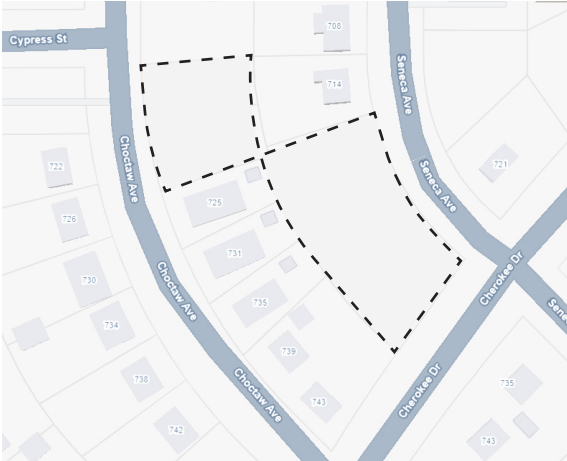


Figure 56.1 (Google Earth 2025)



Figure 52 (Snawerdt 2025)

Comparative Metrics Existing Vs. Alternative Housing Site Layouts, Design 1

Metric	Existing Housing	Alternative Housing (proposed)
Average Unit Size (sq ft)	1,200–1,800	1,000–1,400 (efficient footprint)
Units on Lot / cluster	1	5–6 (on 23,400 sf) / 7–9 (on 30,700 sf)
Household Types Served	Primarily nuclear families	Singles, retirees, couples, small families
Resident Density (people per site)	10–20	30–40 (on 23,400 sf) / 40–55 (on 30,700 sf)
On-site Green Space	Private yards only	Shared green court
Circulation Access	Driveways and sidewalks	Pedestrian-prioritized loop access
CLT / Ownership Model	Private ownership	CLT shared services & optional
Proximity to Amenities	Car-dependent, limited walkability	Moderate to high walkability

Table 6. Comparative Metrics for Existing and Alternate Housing Site Layouts, Design 1 (Salina, KS). Compilation by author.

Alternative Housing



Figure 53 (Snawerdt 2025)

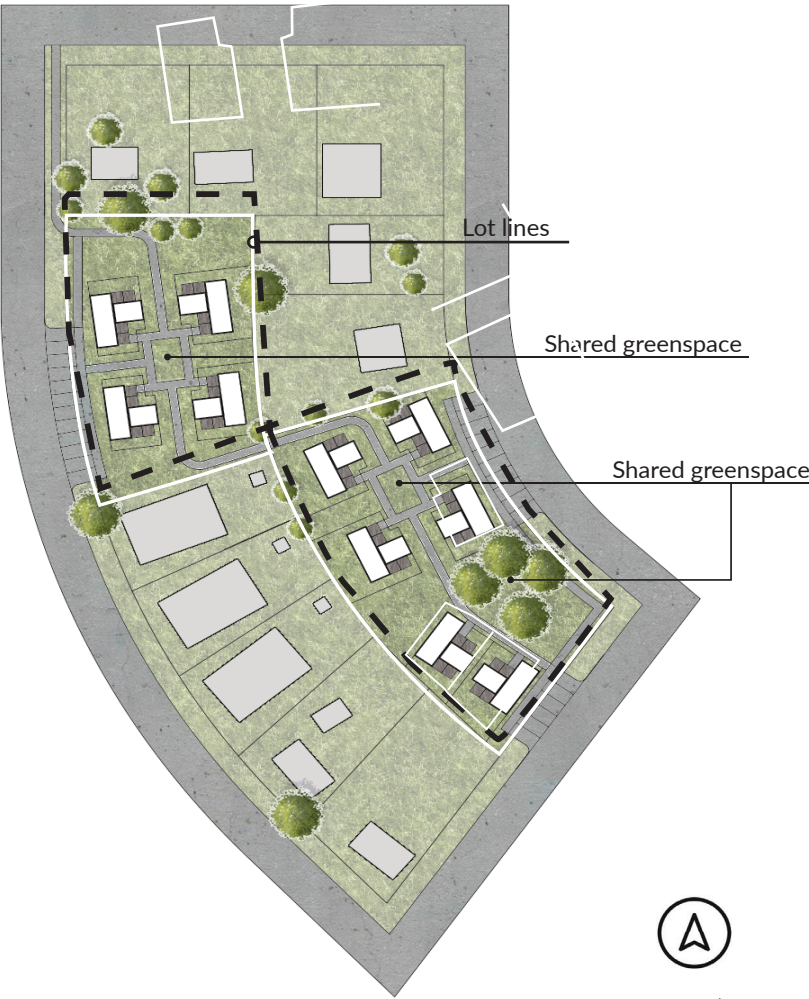


Figure 54. Site Plan of Design 1 Suburban setting (Snawerdt 2025)



Figure 55. Example of Salina, KS experience with adjacent housing to create a neighborhood feel around the cottage court/ greenspace (Snawerdt 2025)

West Salina Site, Design 2

Homes (1,400–1,600 sq ft) line a shared green path to improve density and reduce infrastructure. Lots are private; shared spaces are managed by the CLT (Sim and Gehl 2019; Davis 2010).

Existing Housing

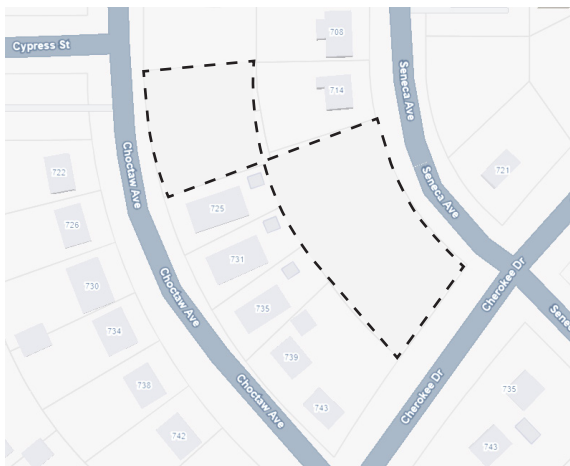


Figure 56.1 (Google Earth 2025)



Figure 56. (Snawerdt 2025)

Comparative Metrics Existing Vs. Alternative Housing Site Layouts, Design 2

Metric	Existing Housing	Alternative Housing (proposed)
Average Unit Size (sq ft)	1,400–2,000	1,000–1,400 (efficient layouts)
Units on Lot	1	4–5 (on 23,400 sf) / 6–8 (on 30,700 sf)
Household Types Served	Primarily nuclear families	Singles, small families, retirees
Resident Density (people per site)	8–18	25–35 (on 23,400 sf) / 35–50 (on 30,700 sf)
On-site Green Space	Private yards, often fenced	Shared landscape buffers and courtyard
Circulation Access	Driveways and cul-de-sacs	Pedestrian paths with shared access
CLT / Ownership Model	Private ownership	CLT maintained commons
Proximity to Amenities	Car-dependent, distant from services	Moderate to high proximity to schools

Table 7. Comparative Metrics for Existing and Alternate Housing Site Layouts, Design 2 (Salina, KS). Compilation by author.

Alternative Housing



Figure 57. (Snawerdt 2025)



Figure 58. Site Plan of Design 2 Suburban setting (Snawerdt 2025)



Connective Pathways

Pathways to Privacy

Native Plantings

Figure 60. Historic Downtown Cottonwood Falls (Shawerdt 2025)



Methods

Cottonwood Falls Site

Cottonwood Falls, Kansas

Cottonwood Falls was selected as the rural study site due to its small population, aging housing stock, and underutilized land within city limits. The low density and limited housing variety make it ideal for testing modular housing that fits smaller households and rural affordability needs. This site supports the argument that rural towns can use compact, flexible housing to fill gaps for retirees, single adults, and low- to middle-income families.

COTTONWOOD FALLS, KS

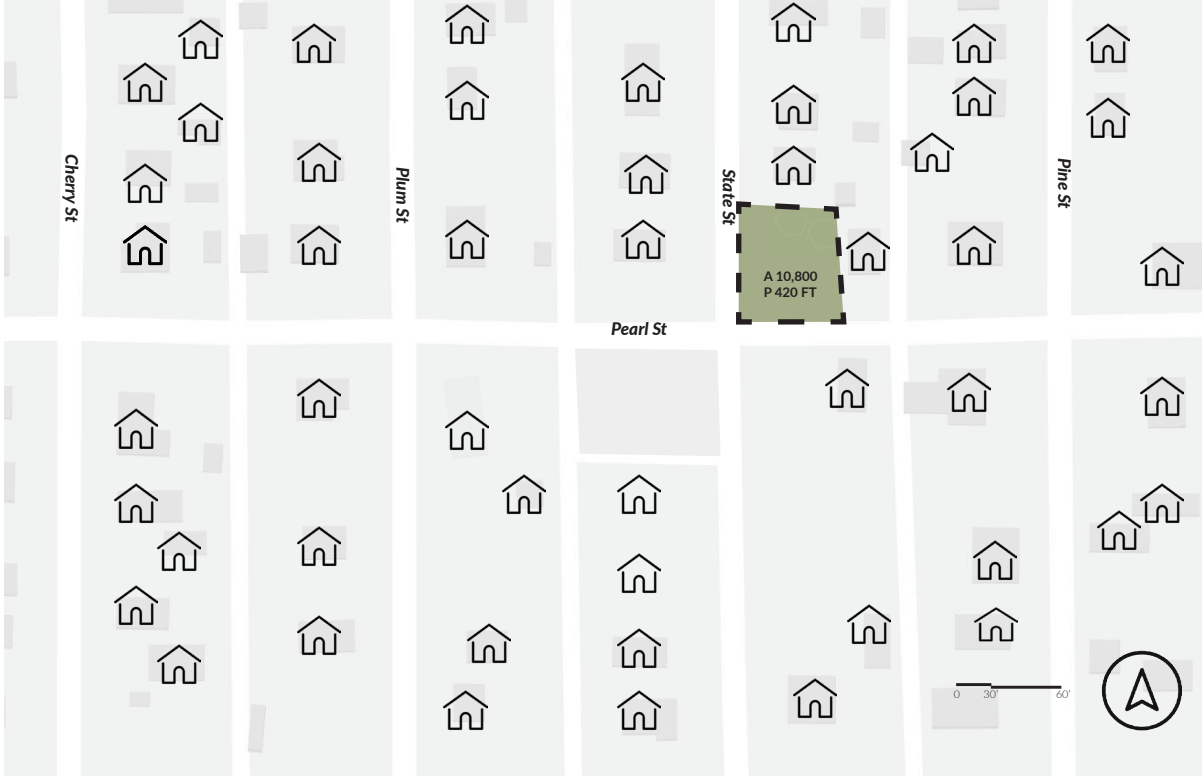


Figure 61. Historic Downtown Cottonwood Falls (Snawerdt 2025).



Figure 62. Looking South of the Site (Snawerdt 2025).



Figure 63. Looking Northwest of the Site (Snawerdt 2025).

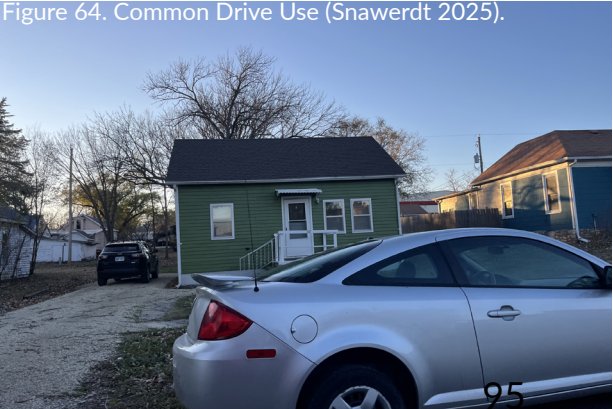


Figure 64. Common Drive Use (Snawerdt 2025).

Cottonwood Falls Site, Design 1

Small modular homes (900–1,100 sq ft) on large privately owned lots include decks and carports, and private spaces. Zero lot line layouts can maximize usable lot space.

Existing Housing

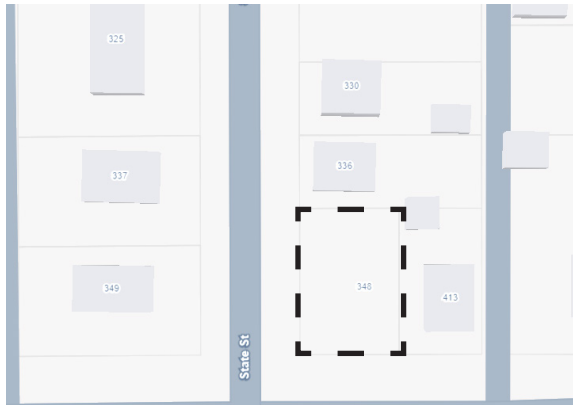


Figure 65.1 (Google Earth 2025)



Figure 65. (Google Earth 2025)

Comparative Metrics Existing Vs. Alternative Housing Site Layouts, Design 1

Metric	Existing Housing	Alternative Housing
Household Types Served	Primarily older adults or families	Retirees, small families, single/couple adults
Resident Density (people per unit)	1-4	2-8
Average Unit Size (sq ft)	1,400–1,800 sq ft	1,100–1,300 sq ft
Units on Lot/Cluster	1	2-4
Development Code Setbacks	Standard setbacks	Opportunity for zero lot line setbacks
Building orientations	Long axis parallel to street	Orientation allowed to vary
Parking Provision	On street or detached garage	Streetside parking bay
Landscape Areas	Manicured lawn all around	Reduced lawns & native areas (front & back)
Private Areas/Amenities	Patios and fenced backyards	Patios, privacy screening, possible fences

Table 8. Comparative Metrics for Existing and Alternate Housing Site Layouts, Design 1 (Cottonwood Falls, KS). Compilation by author.

Alternative Housing



Figure 66. (Snawerdt 2025)

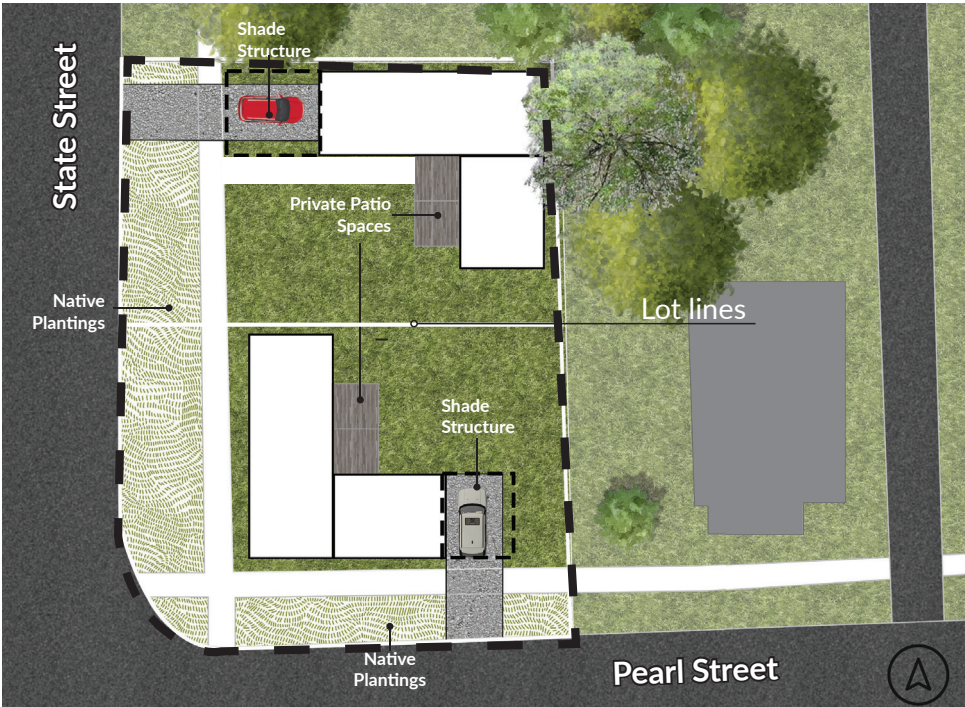


Figure 67. Site Plan of Design 1 rural setting (Snawerdt 2025)



Cottonwood Falls Site, Design 2

Clusters of 2–4 modular homes (1,100–1,300 sq ft) share native open space and parking.

Existing Housing

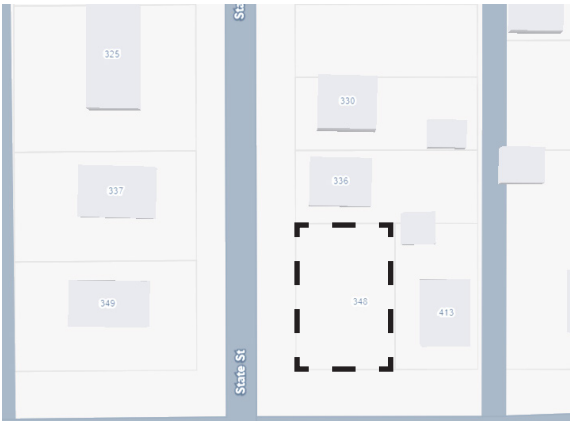


Figure 69. (Google Earth 2025)

Figure 65.1 (Google Earth 2025)

Comparative Metrics Existing Vs. Alternative Housing Site Layouts, Design 2

Metric	Existing Housing	Alternative Housing (proposed)
Household Types Served	Primarily older adults or families	Retirees, small families, single/couple adults
Resident Density (people per unit)	1-4	2-8
Average Unit Size (sq ft)	1,400–1,800 sq ft	1,100–1,300 sq ft
Units on Lot/Cluster	1	2-4
Development Code Setbacks	Standard setbacks	Opportunity for zero lot line setbacks
Building orientations	Long axis parallel to street	Orientation allowed to vary
Parking Provision	On street or detached garage	Streetside parking bay
Landscape Areas	Manicured lawn all around	Reduced lawns & native areas (front & back)
Private Areas/Amenities	Patios and fenced backyards	Patios, privacy screening, possible fences

Table 9. Comparative Metrics for Existing and Alternate Housing Site Layouts, Design 2 (Cottonwood Falls, KS). Compilation by author.

Alternative Housing



Figure 70. (Snawerdt 2025)

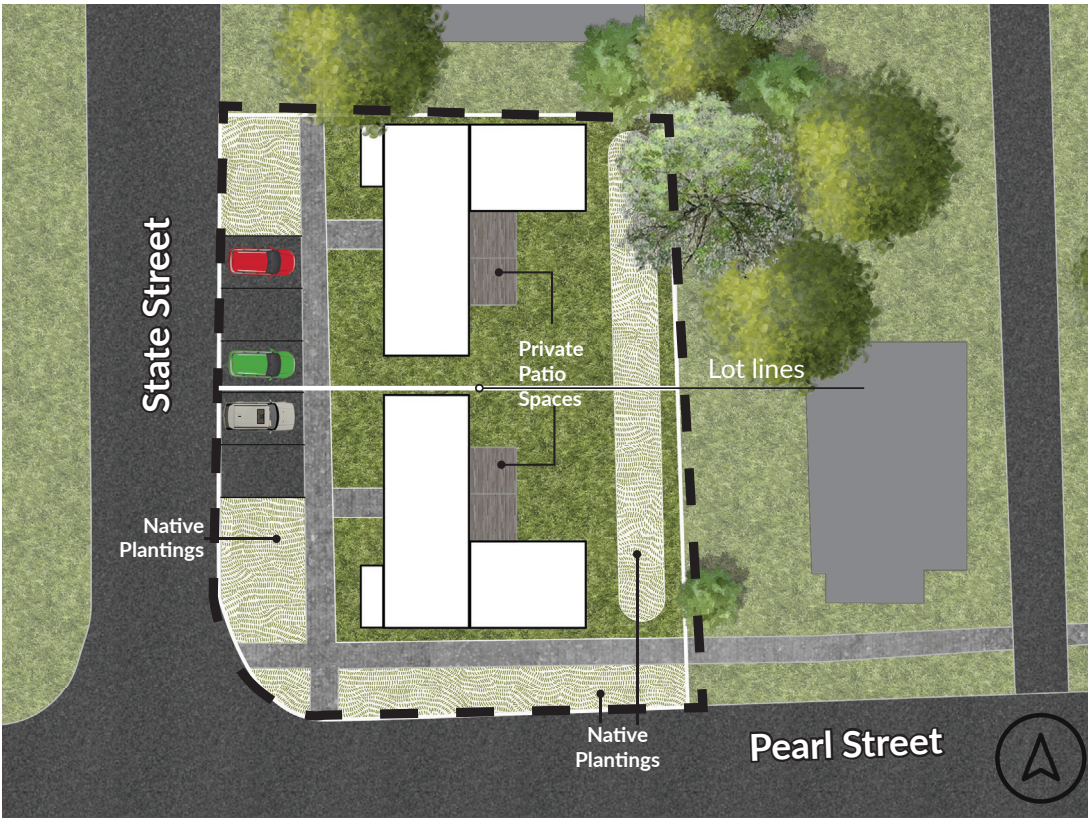


Figure. 71 Site Plan of Design 2 rural setting (Snawerdt 2025).



Reduced Manicured Yard Space

Privacy Fencing

Planting Beds

Native Species Bioswale Areas

Private Patio

Conclusion

Today's housing challenges come from outdated development patterns, limited housing types, and policies that no longer reflect how a large portion of middle income households live (Karim 2006; La Gory, Ward, and Mucatel 1981). In many Kansas communities, the continued reliance on large single family homes fails to serve these households both economically and spatially.

This research demonstrates that modular housing, when paired with planning strategies such as scaled unit sizes, and efficient site circulation, offers a realistic and adaptable alternative (Davis 2010; Carney et al. 2023). The projective designs in Kansas City, Salina, and Cottonwood Falls show how modular infill can respond to local demographics and site conditions across urban, suburban, and rural settings.

The overarching goal is to provide better alternatives that align with the actual needs of middle income families. Scaled unit sizes play a key role in this approach by supporting the daily lives and spatial needs of the missing middle. These design strategies not only improve livability and land use efficiency but also serve as tools for shaping future policy. By showcasing missing middle options that better match contemporary household sizes, this approach redefines housing as a responsive, design led solution (Parolek 2020; Sim and Gehl 2019).

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Reurbanism

Balancing Character and Change in Housing Development

Strawberry Hill in Kansas City, Kansas, is a historic neighborhood with walkable streets, mixed housing types, and strong community identity. It shows how older areas can adapt to modern housing needs while preserving their character. Planning strategies such as accessory units, rowhouses, or modular infill can increase affordability without large scale redevelopment (Shibley 1998). Reusing underused lots or restoring existing buildings supports gradual growth for the community.

While Strawberry Hill offers an urban example, this approach applies in suburban places like Salina and rural towns like Cottonwood Falls. In all three contexts, balancing new housing with existing form helps meet today’s household needs more efficiently. This supports the central goal of this research: to develop affordable, adaptable housing strategies that respond to household size, structure, and context.

Age and Life Stage Demographics

Age Separation , Integration, and Housing Patterns

Housing patterns often reflect past planning decisions that either separated or connected communities. Gentrification, or the reinvestment in older neighborhoods, can improve infrastructure but often leads to rising housing costs that push out long term residents (Spain and Laska 1980). When new development only targets higher income households, it overlooks the actual needs of the people already living there. Addressing this requires housing strategies that support affordability and flexibility so that neighborhood change includes, rather than replaces, existing residents.

Demographics

Cultural Hubs and Community Belonging

Cultural hubs are shared public spaces such as markets, art venues, or event centers that bring people together across age, background, and income. These spaces help maintain community identity and strengthen social ties (Gotham 2001). When paired with inclusive housing and walkable planning, they support both stability and livability, especially in neighborhoods experiencing demographic change. Rather than being separate from housing, they can be part of what makes a neighborhood feel complete.

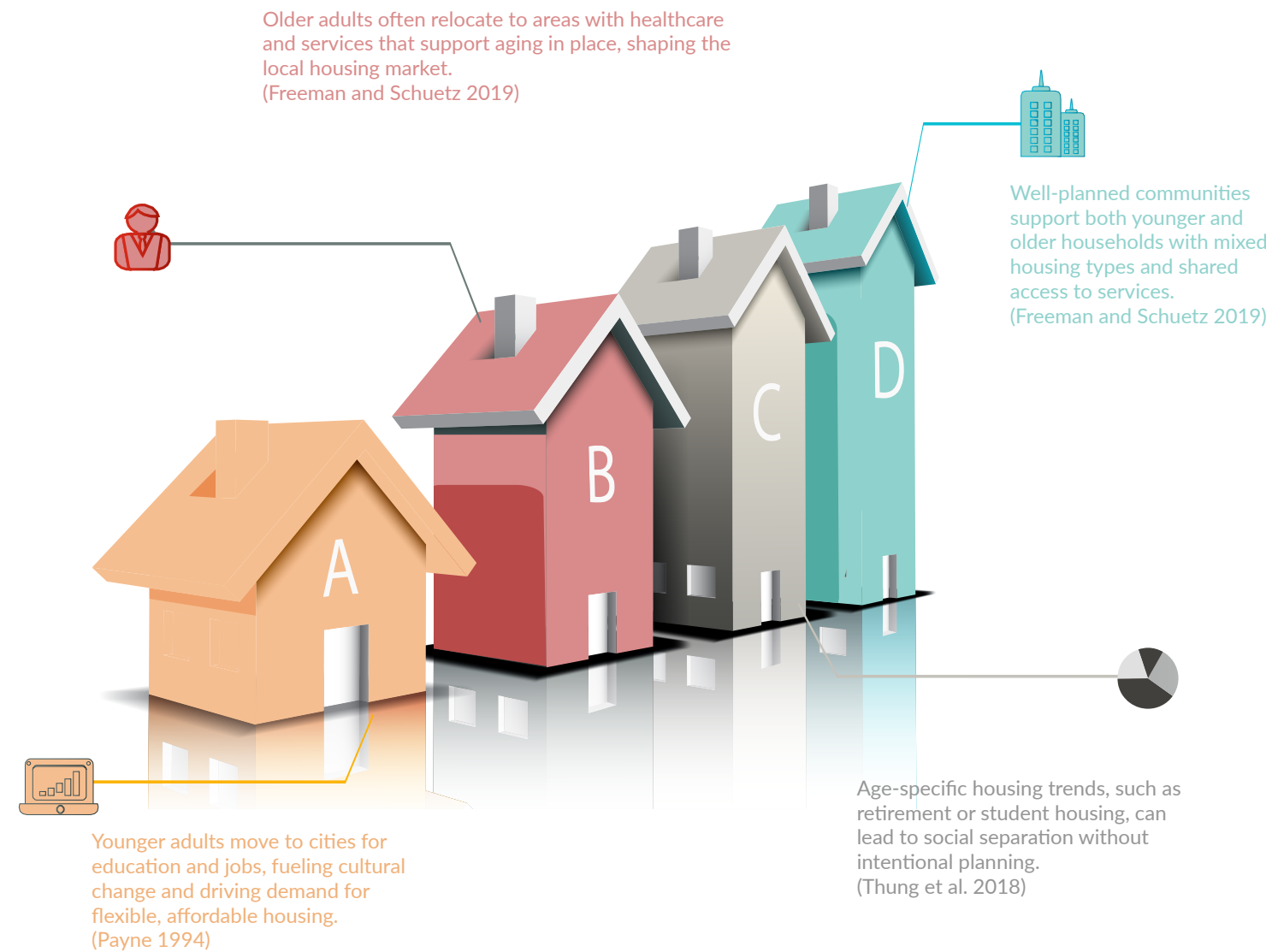
A. Age and Life Stage Demographics

Changing Demographics & Housing Needs

Changing demographics across age groups continues to shape how neighborhoods evolve and who they serve. Younger adults often move to cities for jobs and education, while older adults relocate to areas that support retirement or caregiving needs (Payne 1994; Freeman and Schuetz 2019). These movements impact not just population, but also the kinds of housing that are built, maintained, or neglected.

When age separation patterns are not considered in planning, the result can be age segregated communities that fail to reflect actual household needs. Responding to these shifts requires more intentional design and housing strategies that support long term social inclusion and community stability.

Demographic Trends and Their Influence on Age Separation in Urban Areas



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