

HOUSING THE NEXT 2500

Assessing Missing Middle Housing Strategies to Increase the Housing Supply in West Chester Borough

PLN405/605 Planning Design Studio B — Spring 2025

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I. Introduction & Problem Statement

The lack of affordable and attainable housing has been a consistent and worsening issue for West Chester Borough. With an almost entirely developed environment, the Borough will struggle to accommodate population growth in the coming decades if nothing changes. When contemplating strategies to accommodate this growth and increase the housing supply in the Borough, incorporating additional middle-density housing rose to the top as the studio's primary strategy for further investigation.

Purpose of the Project

The studio project was organized around three central purposes:

- Explore the potential of Missing Middle Housing and Accessory Dwelling Units (ADUs) to increase the housing supply in West Chester Borough.
- Examine impediments to the use of missing middle strategies, including zoning constraints and community resistance.
- Explore how advanced GIS 3D modeling technologies can be used to visualize and assess the changes that would come with new housing types.

Affordable vs. Attainable Housing

A central distinction that framed the studio's work is the difference between affordable and attainable (workforce) housing. Affordable housing serves households at or below 60% of the area median income (AMI). The AMI for West Chester is approximately \$81,500. Examples of household needing affordable housing would include a recently homeless family using a housing voucher, or a retail worker earning close to minimum wage. Attainable, or workforce, housing serves households earning between 60% and 120% of AMI. Such households include recent college graduates, Emergency Medical Technicians (EMTs), teachers, and healthcare workers. Roughly 40% of the Borough's workforce is employed in retail, healthcare, hospitality, food service, and education, sectors with median salaries below \$61,000. This means that a significant share of the local labor force is being priced out of the community it serves. Seniors who wish to age in place but downsize into smaller units face a related version of the same shortage. Because the Borough's economic vitality is tied to the availability of affordable and attainable housing, addressing the shortfall is both a social and an economic imperative.

Background Research

Background research for the project consisted of three components: a review of key planning documents, research into national best practices for missing middle housing and ADUs, and field visits to the blocks ultimately selected for analysis. The planning documents reviewed included the West Chester Comprehensive Plan, the West Chester Zoning Ordinance, Chester County's Landscapes III (2019), and Daniel Parolek's Missing Middle Housing. The neighborhood selected for field analysis was located in the NC-1 Zoning District; its east–west boundaries were Brandywine Street and New Street, and its north–south boundaries were Cherry Alley and Mulberry Alley, with particular attention to Price Street and Dean Street.

Barriers to Housing Construction & Ownership

The studio identified two categories of barriers that constrain the delivery of missing middle housing in the Borough: barriers to construction and barriers to ownership.

Barriers to Construction

- Current zoning regulations, including limits on building coverage and building height
- Minimum lot size requirements
- Permeable surface (impervious) coverage limits
- Front, side, and back yard setback requirements
- Required off-street parking spaces

Barriers to Ownership

- Concerns about changes to neighborhood dynamics
- Lack of available parking spaces
- Housing market instability
- Strain on local government services, which can increase the overall cost of living

These construction- and ownership-side barriers recur throughout the studio's later scenario analysis and shaped the guiding principles adopted in Section IV.

II. Population & Housing Trends

Understanding West Chester Borough's demographic and housing trajectory was essential to establishing the case for missing middle housing. The studio compiled a profile of the Borough's population and housing stock, examined projected growth through 2050, and compared the Borough's socio-economic conditions to Chester County and Pennsylvania as a whole.

Borough Profile: Population

West Chester Borough's total population stands at 18,671. The Borough is home to a substantial student population: 3,745 students live on West Chester University's North Campus, and another 1,442 students live in town, making up a meaningful share of the Borough's renter population. The Borough's racial composition is predominantly White (74%), followed by Black or African American (13.9%) and Hispanic or Latino (10.9%) residents. The median age in the Borough is 24.8 years, reflecting the strong presence of West Chester University.

Table 1. Key Population Characteristics

Key Indicator	Value
Total Population	18,671
Number of Students on North Campus	3,745
Number of Students Living in Town	1,442

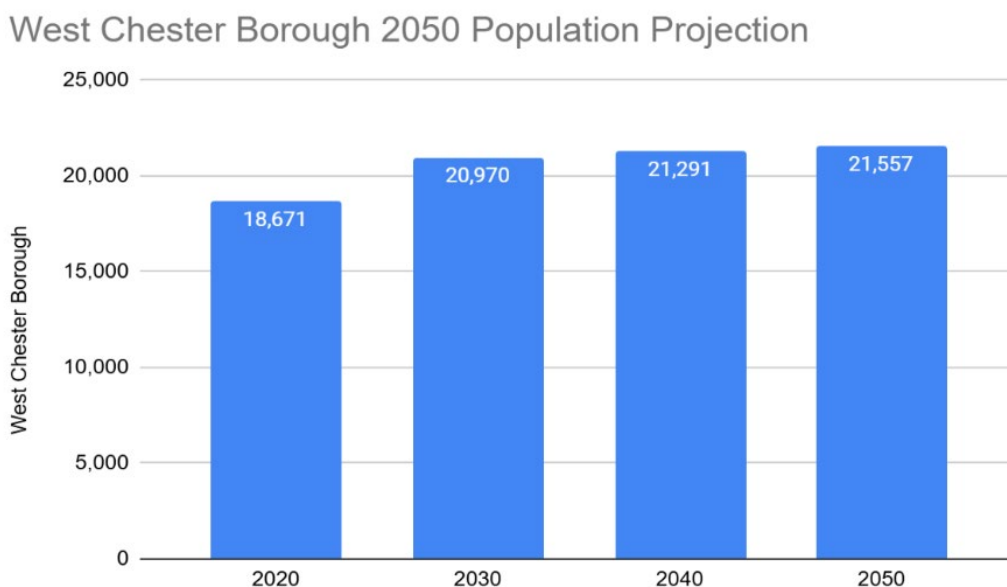
Key Indicator	Value
Racial Composition	White (74%), Black or African American (13.9%), Hispanic or Latino (10.9%)

Sources: U.S. Census 2020 and West Chester University

Population Trends & Projections

The Borough has experienced modest but steady population growth over the past five years. Projecting this trend forward using a 2020–2050 growth model, the Borough is expected to grow from approximately 18,671 residents to a projected 21,557 residents by 2050 — an increase of roughly 15%.

Figure 1. Population Projection

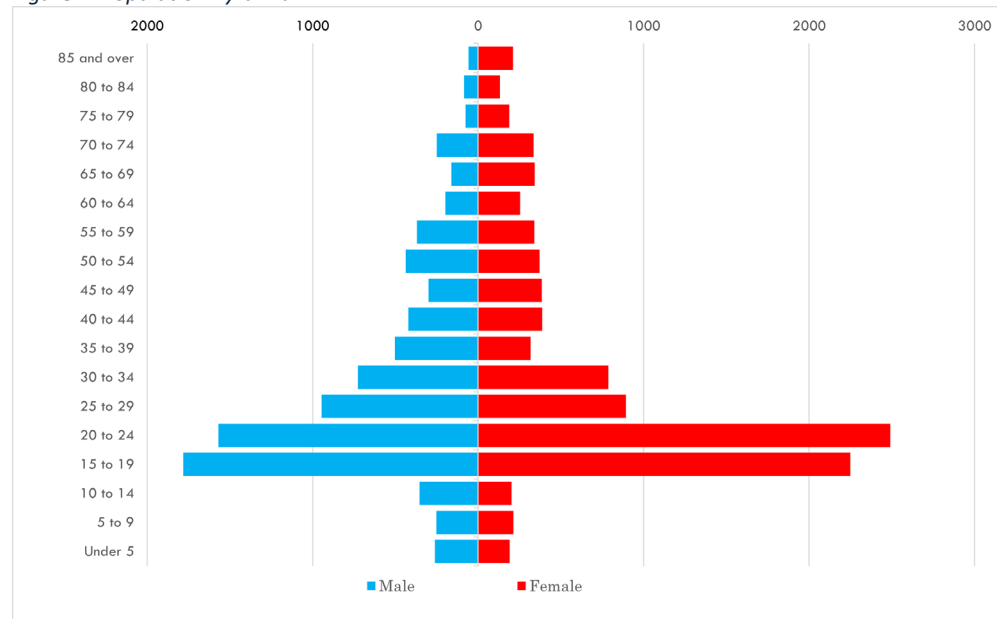


West Chester Borough 2050 population projection, showing growth from 2020 to 2050 (Source: DVRPC).

Population Pyramid

The Borough's population pyramid reveals a distinctive age structure driven by the university: a large majority of residents fall in the 15–30 year-old range, while the 0–14 age cohort is comparatively small. This age distribution has direct implications for housing demand, since young adults and students disproportionately favor smaller, more flexible housing types — precisely the kind of unit missing middle housing and ADUs are best suited to provide.

Figure 2. Population Pyramid



Population pyramid for West Chester Borough, showing a concentration of residents aged 15–30 (Source: U.S. Census 2020).

Borough Profile: Housing

The Borough's housing stock is dense relative to its land area of approximately 1.85 square miles, yielding a population density of 10,114.3 persons per square mile. As of 2023, the Borough contained 7,676 total housing units and 7,001 households, reflecting an increase of 319 units and 268 households since the 2020 count of 7,357 units and 6,733 households. Of the total housing stock, 4,740 units — well over half — are renter-occupied.

Table 2. Key Housing Characteristics

Key Indicator	Value
Population Density	10,114.3 persons/sq. mi.
Total Housing Units (2023)	7,250
Total Households (2023)	6,665
Total Rental Units	4,740

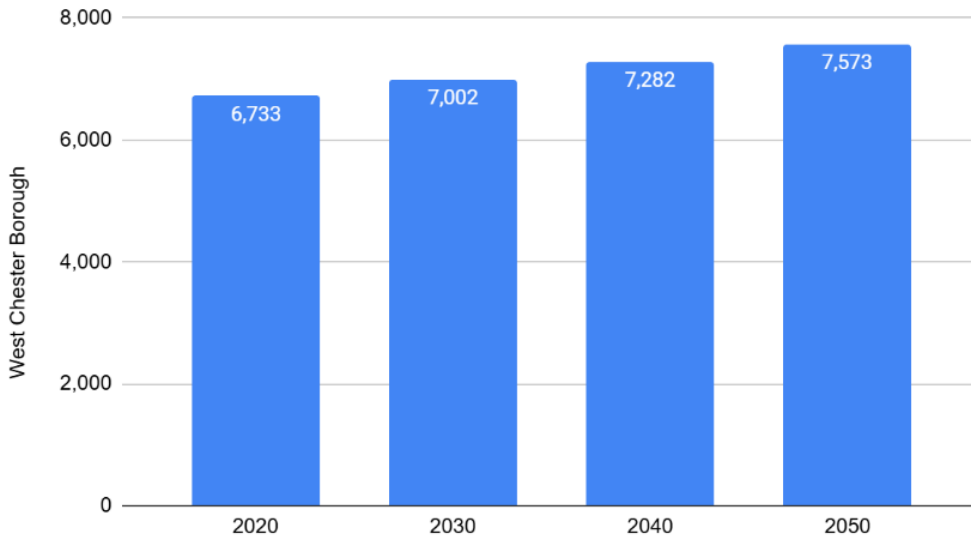
Sources: Chester County Planning Department

Housing Trends & Projections

Projecting current trends forward, the Borough can expect to reach approximately 7,600 households by 2050.

Figure 3. Household Trends

West Chester Borough 2050 Household Projection

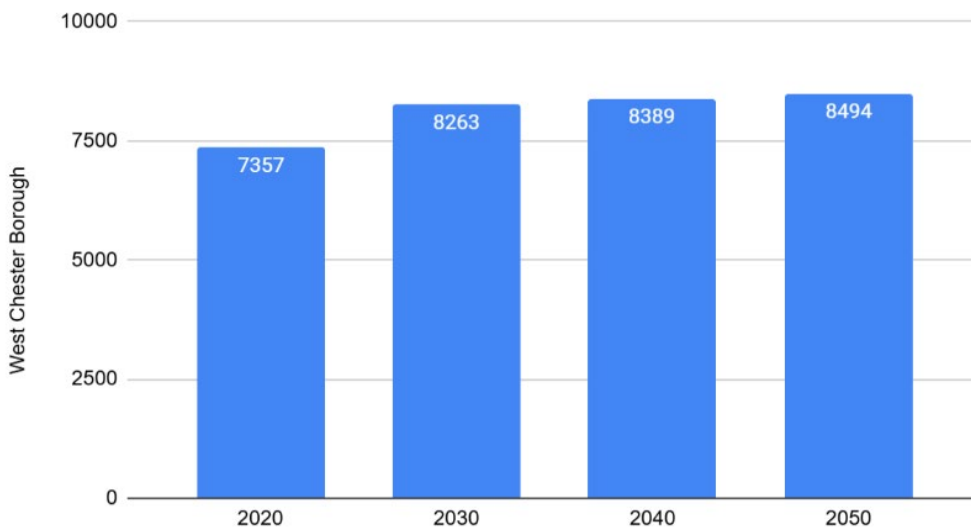


West Chester Borough 2050 household projection.

On the unit side, maintaining current trends implies the Borough would need to add approximately 32.72 housing units per year, reaching a total of roughly 8,494 units by 2050 — an increase of about 1,137 units over the 2020 baseline.

Figure 4. Housing Units Trends

West Chester Borough 2050 Housing Unit Projection



West Chester Borough 2050 housing unit projection.

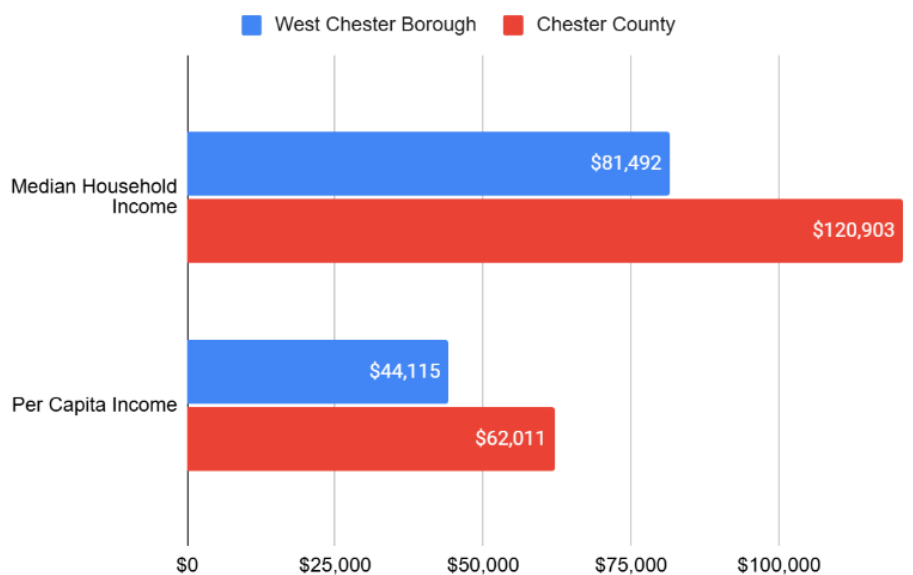
Socio-Economic Profile

The studio compared West Chester Borough's socio-economic indicators against Chester County and Pennsylvania to contextualize the affordability challenge. West Chester Borough's median household income is \$81,492 — slightly above Pennsylvania's statewide median of \$76,081, but well below Chester County's median of \$120,903, which is the wealthiest county in the state. Despite this relatively high income figure, the Borough's poverty rate stands at 18.3%, significantly higher than both the county and state figures; this disparity is likely influenced by the large student population and the high cost of living in the Borough. Notably, roughly 1,442 students live out in town, accounting for about 17% (roughly 1 in 6) of the total renter population — many of whom may have rent supplemented by parents not captured in Borough income data.

Table 3. Key Household and Housing Indicators

Indicator	West Chester Borough	Comparison Geography
Median household income	\$81,492	PA: \$76,081 Chester County: \$120,903
Persons in poverty	18.3%	Higher than county and state
Renter-occupied units	65.1%	Chester County: majority owner-occupied
Median home value	\$528,571	Chester County: comparable PA: \$291,899
Median gross rent	\$2,210 / month	Higher than county and state
Income needed to afford median home	~\$160,000	—
Income needed to afford median rent	~\$106,000	—

Figure 5. Income Comparables



Median household income and per capita income, WC Borough vs. Chester County.

Figure 6. Poverty Comparables

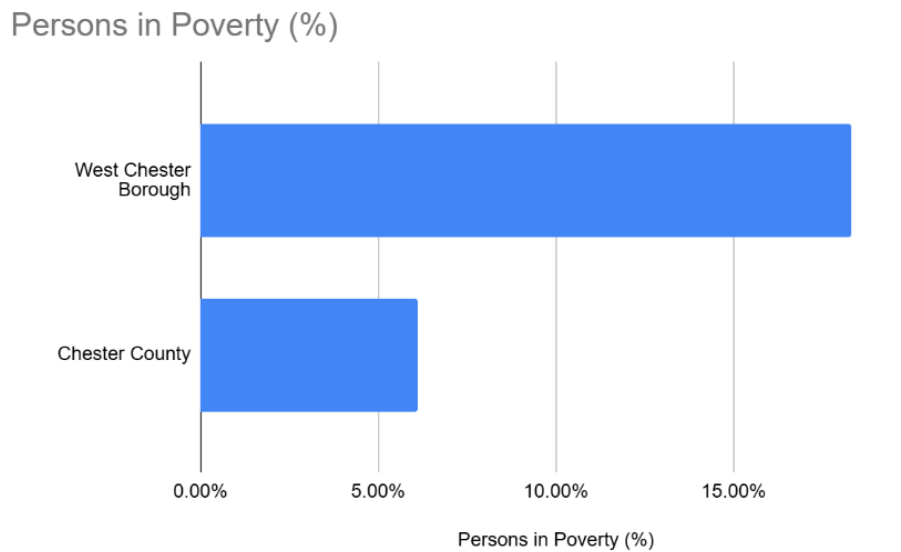


Figure 7. Persons in Poverty (%), WC Borough vs. Chester County

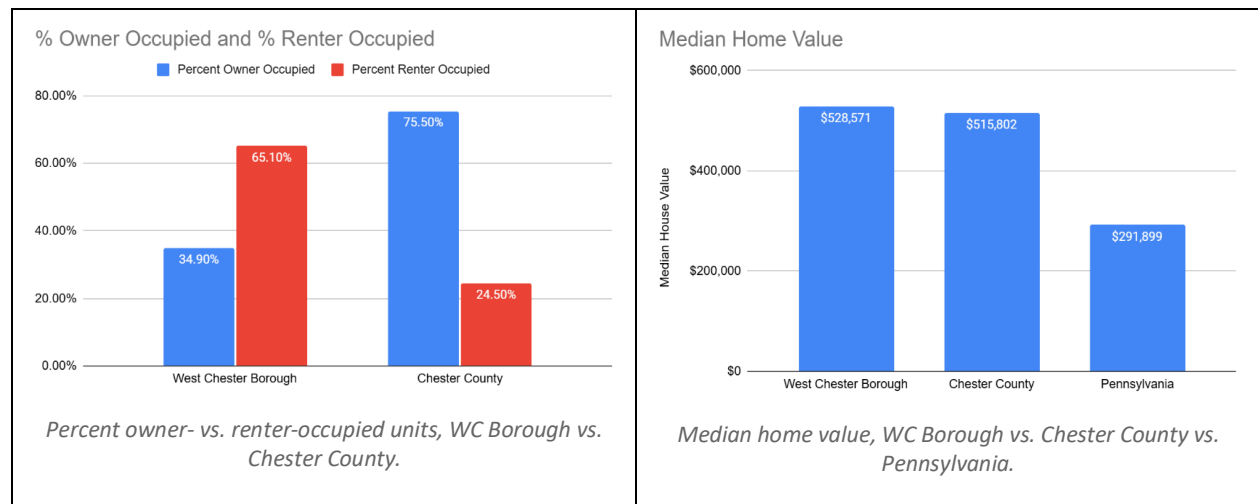
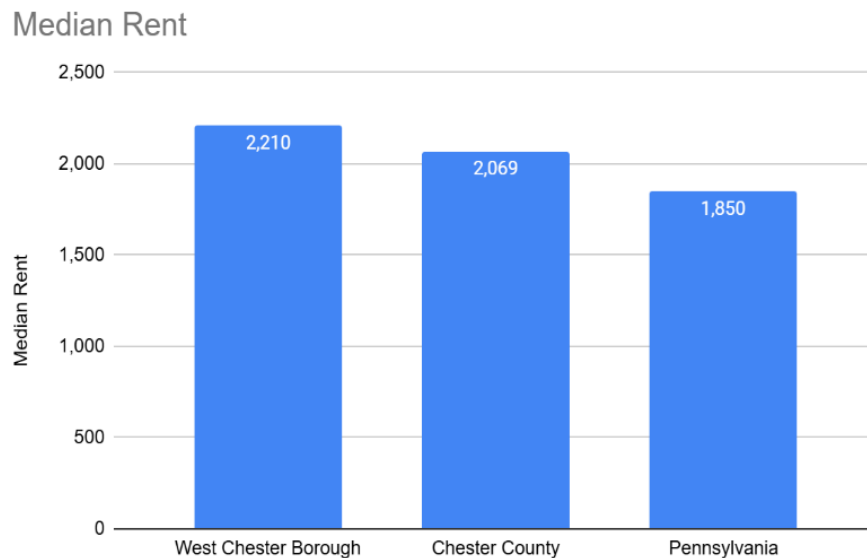


Figure 8. Median Rent Benchmarks



Median rent, WC Borough vs. Chester County vs. Pennsylvania.

A household needs an income of approximately \$160,000 to afford a median-value home in West Chester, and approximately \$106,000 to afford the median rent — both figures well above the Borough's actual median household income of \$81,492.

What This Means

Taken together, these trends describe a Borough facing high cost of living, a high poverty rate, and slow but steady population growth, a combination that adds up to a clear and growing need for affordable and attainable housing. Because the Borough's built environment is already largely developed, meeting this need will require increasing the efficiency of land use within existing neighborhoods rather than expanding outward, which is precisely the role missing middle housing and ADUs are positioned to play.

III. Tools for Affordable Housing

Missing Middle Housing

Missing Middle Housing (MMH) refers to a range of house-scale buildings — duplexes, triplexes, courtyard buildings, townhomes, rowhomes, and similar forms — that provide a variety of housing types at a density compatible with single-family neighborhoods. As Daniel Parolek observes, highly desirable, walkable neighborhoods across the country combine single-family homes with missing middle housing types. Much of West Chester Borough's existing housing stock in and around the town center already meets the definition of missing middle, meaning that returning to the Borough's historic development pattern offers a realistic path for addressing current and future housing shortages.

Missing Middle Housing and Affordability

Missing middle housing types tend to be affordable relative to conventional single-family construction for three related reasons. They are affordable by design, achieving lower rental and for-sale prices without public subsidy. Land trusts and shared-lot strategies can further limit the cost of land underlying each unit, increasing affordability. Finally, smaller-scale housing development is more financially feasible for individual developers and can be more attractive to lending institutions than large, capital-intensive projects, broadening the pool of potential builders.

Best Design Practices for Missing Middle Housing

- Context-sensitive infill that responds to the scale and materials of the surrounding block
- Frontage and street interaction — porches, stoops, and windows oriented toward the public realm
- Human-scale architecture that avoids overwhelming bulk relative to neighboring buildings

Best Policy Practices for Missing Middle Housing

- Zoning reform that legalizes missing middle building types by right in appropriate districts
- Parking flexibility, including reduced or eliminated minimum parking requirements
- Form-based codes that regulate building form and street relationship rather than only use and density

Case Study: Minneapolis, Minnesota

In the 2000s and 2010s, Minneapolis experienced a rapid increase in population and housing prices. To address these pressures, the city revised its zoning regulations, legalized multifamily homes (including duplexes and triplexes) in residential districts, and set minimum building height standards in higher-density areas. Following implementation, the city saw a 45% increase in permit applications for 2–4 unit development, meaningfully expanding its housing supply.

Case Study: Portland, Oregon

Portland is projected to add approximately 123,000 households by 2035. To meet this demand, the city created the Residential Infill Project, which rezoned areas of the city to allow more duplexes, triplexes, and fourplexes. As a result, 86% of new medium-density housing was developed in designated centers and corridors, and 80% of those units were located within a quarter mile of mass transit, pairing new density with existing transportation infrastructure.

Accessory Dwelling Units (ADUs)

An ADU is a smaller, independent residential dwelling unit located on the same lot as a primary home. ADUs are also known as accessory apartments, secondary suites, or "granny flats." According to the American Planning Association, ADUs can increase housing affordability for both homeowners, through supplemental rental income, and tenants, through lower rents than typical market-rate units, while creating a wider range of housing options and facilitating denser use of the existing housing stock in

already-established neighborhoods. West Chester Borough passed an ADU ordinance in 2023, which permitted ADU's in several zoning districts.

IV. Studio Project Overview & Methodology

Project Motivation

The studio's motivation was to increase the housing supply for three overlapping populations: young professionals and adults of all varieties working in and around the Borough; empty-nesters and households that want to age in place; and, potentially, new off-campus student housing. The overarching aim was to define and identify a path toward attainable housing for current and future residents while maintaining the existing character of the neighborhoods being studied.

Guiding Principles

The studio adopted five guiding principles to ensure that any missing middle strategy would increase the housing supply without undermining the qualities that make existing West Chester neighborhoods desirable:

- Maintain the existing neighborhood character — building height, setbacks, coverage limits, and architectural compatibility
- Maintain the character of the streetscape — build-to lines, front porches, alley-loaded development, protected street trees, and enhanced lighting
- Maintain pedestrian orientation and features — improved sidewalks, crosswalks, and biking infrastructure
- Protect green and open spaces to the greatest extent possible — preserving trees, vegetation, yards, and existing open space
- Minimize regulatory impacts on property owners and the permitting process

A recurring theme across these principles is the need to build community and stakeholder buy-in: residents and neighbors must understand and embrace the need for housing development that increases supply and broadens the range of housing options available to accommodate population growth and changing household needs. The studio identified several open questions a Borough-led process would need to resolve, including whether and how student housing should be permitted, how missing middle housing should be regulated (for example, as a conditional use tied to sidewalk, streetscape, lighting, or stormwater improvements), and how best to promote missing middle housing in ways that reduce neighborhood opposition (NIMBYism).

Additional Objectives of the Project

- Developing a greater understanding of how missing middle housing impacts housing supply
- Identifying barriers to implementation of missing middle housing in West Chester Borough
- Identifying a "pilot project" neighborhood for future application
- Getting to know West Chester Borough's current Zoning Ordinance — what is allowed, what was once allowed, and what could be allowed in the future

- Modeling potential scenarios for future development

What Is ArcGIS Urban?

ArcGIS Urban is a 3D modeling and planning platform that enables cities and planners to visualize, simulate, and analyze the impact of policy and zoning changes on housing development. The platform creates a digital twin of the city, providing a 3D representation of the built environment that planners can use to identify areas dominated by restrictive single-family zoning and to communicate the impact of current regulations to stakeholders and the public.

How Urban Can Be Used in Planning

- Visualizing zoning and land use constraints
- Testing and simulating policy changes, such as allowing duplexes or triplexes in single-family neighborhoods, or adjusting height and floor-area-ratio limits
- Supporting infill and redevelopment strategies by identifying underutilized parcels suitable for new housing
- Engaging stakeholders and building consensus through interactive before-and-after visualizations
- Aligning housing with transportation and amenities by overlaying housing plans with transit networks, schools, and services

As one applied example, the city of Rocky Mount, North Carolina, used ArcGIS Urban to test changes to density bonuses and floor-area ratios, demonstrating how such changes could increase the supply of affordable and missing middle housing units.

Limitations of ArcGIS Urban

The studio found that ArcGIS Urban is more suited to larger areas of study, where metrics that overcount or undercount population, households, emissions, and parking requirements tend to even out across a broad sample. Applied at the scale of a single block or a handful of parcels — as this studio project required — those same errors become far more visible and consequential, a limitation discussed further in Section VI.

Methodology

The studio selected a four-block neighborhood as its site for detailed analysis based on three criteria: proximity to the West Chester University campus, location within the NC-1 zoning district, and adjacency to the NC-2 zoning district, which permits somewhat higher-intensity development. The studio then compared metrics across four ArcGIS Urban plan scenarios to determine the housing supply and related impacts of different regulatory approaches. Missing middle housing strategies are most effective in neighborhoods that are predominantly single-family detached, which the selected site exemplifies.

Figure 9. ArcGIS Urban Scenario



Neighborhood selection map showing proximity to campus.

Within ArcGIS Urban, each of the four studio teams created a development "Plan" for one block using a consistent set of tools: the Edit Parcels and Develop tabs to modify the type of development on a lot, the Split tool to separate one parcel into two, the Add ADU tool to place accessory units, and the Metrics panel to extract parcel-level data on population, households, and parking for each scenario.

Figure 10. ArcGIS Urban Sample Plan



ArcGIS Urban parcel editing and development tools used in the studio's methodology.

Four-Block Study Area

The selected study area comprises four contiguous blocks in West Chester Borough, positioned in a transition zone between the denser downtown core and the Borough's lowest-density NC-1 districts. Each of the four studio teams was assigned one block within this area to model in detail.

Aerial view of the four-block study area.

Cherry Aly

Cherry Aly

Cherry Aly

Price St

Price St

Price St

Price St

Juniper Aly

Juniper Aly

Juniper Aly

Juniper Aly

Juniper Aly

Sharpless St

Sharpless St

Sharpless St

Sharpless St

Mulberry Aly

Mulberry Aly

Brandywine St

S New St

S New St

S New St

S New St

S New St

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Project boundaries overlaid on an aerial image of the study neighborhood.

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V. Block Analysis with ArcGIS Urban

Existing Character of the Study Area

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Figure 14. Site Conditions 1



Existing rear-yard garage conditions along the study block.

Figure 15. Site Conditions 2



Existing single-family homes and streetscape.

Figure 16. Site Conditions 3



Existing streetscape with mature trees and on-street parking.

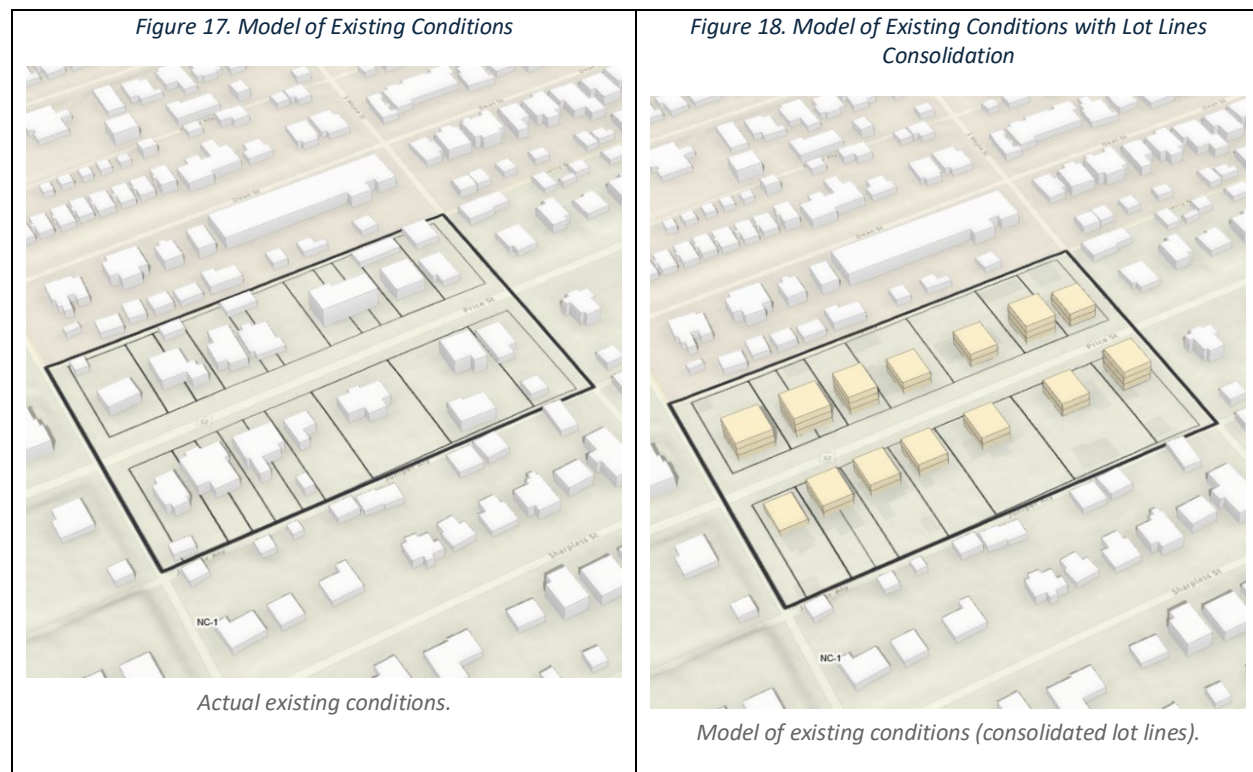
Scenario 1: Model of Existing Conditions

Scenario 1 provides an approximation of existing conditions based on observable structures. The model assumes all structures are single-family detached to comply with NC-1 zoning, and that no existing ADUs are present. Livable area and building size were estimated accordingly, and structures were placed on lots to comply with required setbacks and building coverage requirements under NC-1 zoning.

Table 4. NC-1 District Requirements

Standard	NC-1 Requirement
Build-To Line	Matching adjacent setbacks
Side Yard Minimum	15 ft
Rear Yard	35 ft
Height	35 ft
Building Coverage	30%

Because this block contains nonconforming duplexes and structures that straddle lot lines, the raw parcel geometry did not work directly within the ArcGIS Urban model. To create a workable model with usable metrics, the studio consolidated lot lines and placed one single-family detached house on each parcel, shown at right below alongside the actual existing conditions.



The Scenario 1 analysis concluded that there is meaningful room to build or retrofit ADUs and missing middle development on these lots, and that not all parcels currently have a garage or other accessory structure in place — indicating latent capacity for additional density before any zoning changes are considered.

Scenario 2: NC-1 By-Right Development with 75% ADUs

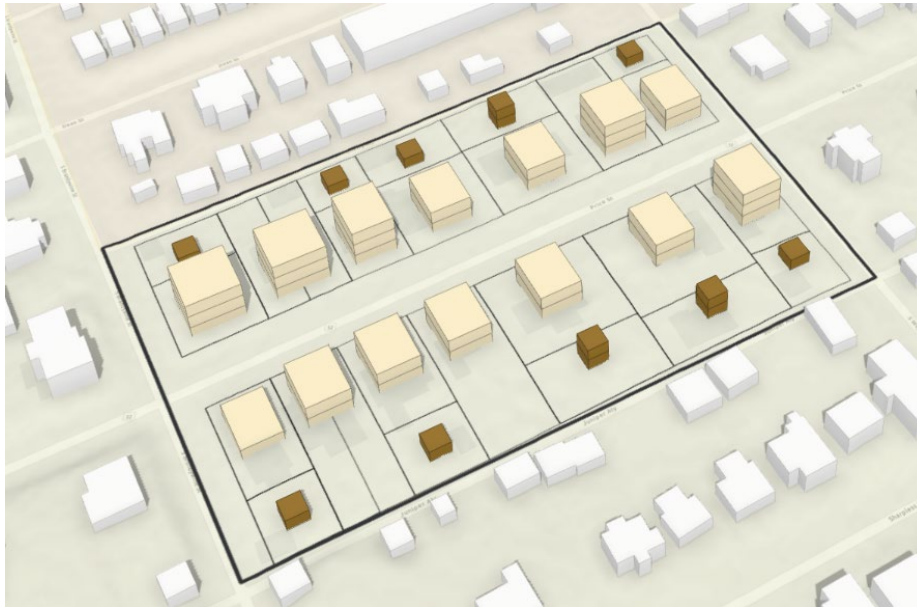
The NC-1 zoning district is designed to encompass the Borough's lower-density neighborhoods, comprising primarily single-family detached residences. The intention behind Scenario 2 is to test additional density that can be built out within the existing NC-1 district while maintaining the neighborhood's existing quality and streetscape, specifically, by adding ADUs to 75% of the block's lots.

Table 5. NC-1 Zoning Requirements

Standard	NC-1 Requirement
Build-To Line	Matching adjacent setbacks
Side Yard Minimum	15 ft
Rear Yard	35 ft
Accessory Structures	5 ft
Height	35 ft
Permitted Use	Single-family detached

For this scenario, the studio was tasked with developing the block of West Price Street (bounded by S. Brandywine St, Juniper Alley, and S. Wayne St) so that 75% of the lots utilize ADUs. Using ArcGIS Urban, the team identified 10 lots with sufficient setback to accommodate ADUs; 10 new dwellings were added, 3 of which are two-story units. This scenario increased the block's total housing units by 10, with a roughly proportional increase in population. Because ADUs front the rear alleyways rather than the street, little additional off-street parking is required, and existing street parking is more than capable of absorbing the additional residents. Scenario 2 represents an ideal option for a modest increase in housing density and population with very little visible effect on the block's streetscape or overall character.

Figure 19. Scenario Two Model



By-right development model of the NC-1 zoning district with 75% ADUs. ADUs (shown in brown) are permitted in both NC-1 and NC-2 districts.

Scenario 3: NC-2 By-Right Development with 75% ADUs

Scenario 3 tests the effect of upzoning the block from NC-1 to NC-2, which allows for additional flexibility in development by expanding the allowable building footprint, loosening restrictions on yard width, and allowing semi-detached and attached houses. In practice, this mostly means duplexes and townhomes.

Table 6. NC-2 Zoning Provisions

Standard	NC-2 Requirement
Build-To Line	Matching adjacent setbacks
Side Yard Minimum	10 ft
Rear Yard	20 ft
Accessory Structures	5 ft
Height	35 ft
Additional Permitted Use	Semi-detached and attached residential

Starting from a baseline of 28 units and a population of 60 (population density of 8,186.14 persons per square mile), the team explored by-right development under NC-2 zoning with 75% ADU coverage. The properties on the corner of New and Sharpless, and the south corner of Wayne and Sharpless, were split, and a new one-story single-family detached home along with two two-story single-family attached homes (duplex/townhome style) were added.

Table 7. Scenario Comparison

Metric	Existing (Scenario 1)	Scenario 3
Dwelling units	28	45 (+60.71%)
Population	60	90 (+50%)
Population density	8,186.14 / sq. mi.	12,194.29 / sq. mi.

Figure 20. Scenario 3 Model



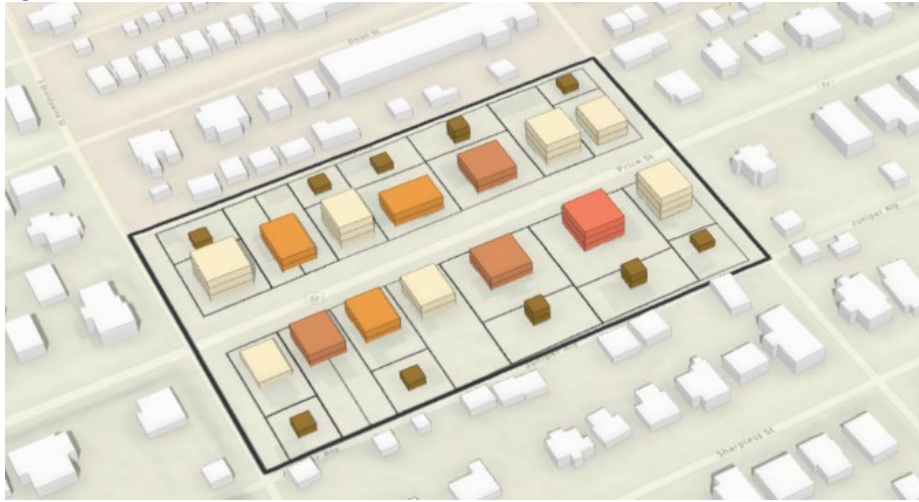
By-right development model of the NC-2 zoning district with 75% ADUs, illustrating the added density from upzoning.

For this particular block, Scenario 3's attached units — five additional housing units — actually better reflect existing on-the-ground conditions, since many of the block's buildings shown here are duplexes in real life; it is the ADUs that represent the more speculative addition. Overall, Scenario 3 provides a gentle but meaningful increase in density relative to Scenario 2.

Scenario 4: Missing Middle Development

Scenario 4 takes the most ambitious approach among the four scenarios: rather than working within existing NC-1 or NC-2 standards, it amends the NC-1 Zoning Ordinance directly to offer multiple housing density options, including duplexes and triplexes, while also expanding the use of ADUs. This scenario is designed to meet the demand for increased housing supply by allowing greater flexibility in housing type, and it produces the greatest number of new units of any scenario tested.

Figure 21. Scenario Four Model



Missing middle development scenario showing duplexes (orange) and triplexes (red) integrated into the existing block, alongside expanded ADU use.

Comparing All Four Scenarios

Viewed together, the four scenarios illustrate a gradual and cumulative increase in density from existing conditions (Scenario 1) through modest ADU infill (Scenario 2), upzoning-enabled attached housing (Scenario 3), and full missing middle flexibility (Scenario 4). This progression was modeled for one representative block; in total, the four studio teams analyzed the medium-density housing potential of four separate blocks within the broader study neighborhood using this same four-scenario framework.

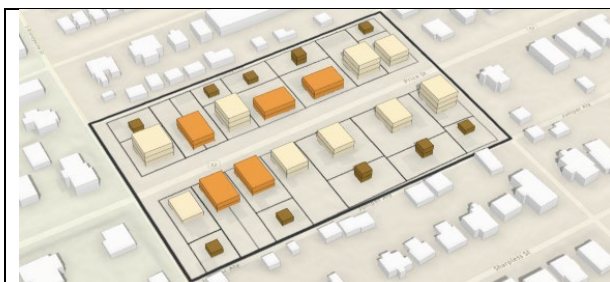
Scenario Comparison



Scenario 1 — Existing conditions.



Scenario 2 — NC-1 by-right with ADUs.



Scenario 3 — NC-2 by-right with ADUs.



Scenario 4 — Missing middle development.

VI. Findings: Comparing Scenario Metrics

Analyzing Scenario Metrics

For the sake of transparency, the metrics automatically calculated by ArcGIS Urban are not the metrics analyzed in this report. Instead, the studio manually calculated the potential for growth in each site area based on the models constructed in Urban, and cross-checked those statistics against both existing conditions and one another. Manual calculations were determined through analysis of 2020 Census blocks and applicable zoning code requirements. The average household size across all four blocks was 2.6 persons, and most buildings analyzed were two stories.

Table 8. Building Type Metrics

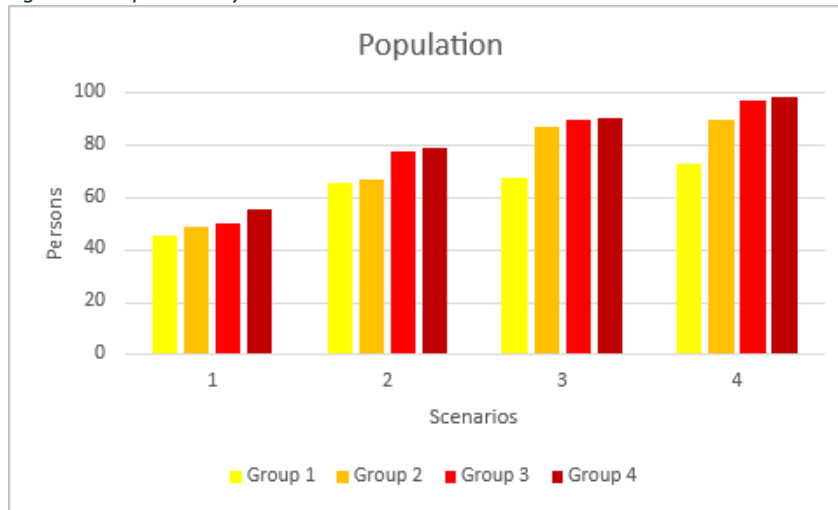
Building Type	Dwelling Units	Parking Spots Required	People (avg.)
Detached 1-story single family	1	2	1.75
Detached 2-story single family	1	2	2.6
Detached 3-story single family	1	2	4.5
Accessory Dwelling Unit (all types)	1	1	2
Duplex	2	4	3.5
Triplex	3	6	7
Attached 2-story single family	2	4	3.5

These building-type assumptions, which are based on the zoning code for dwelling units and required parking, and on Census data for average household size within the district, were used to establish a minimum and maximum estimate of population and parking demand for every scenario across all four blocks.

Comparing Population

Each scenario led to greater growth in population across all four blocks, with the greatest potential for growth found in the groups with denser characteristics — that is, the blocks with smaller lots and more compact existing development.

Figure 22. Population by Scenario

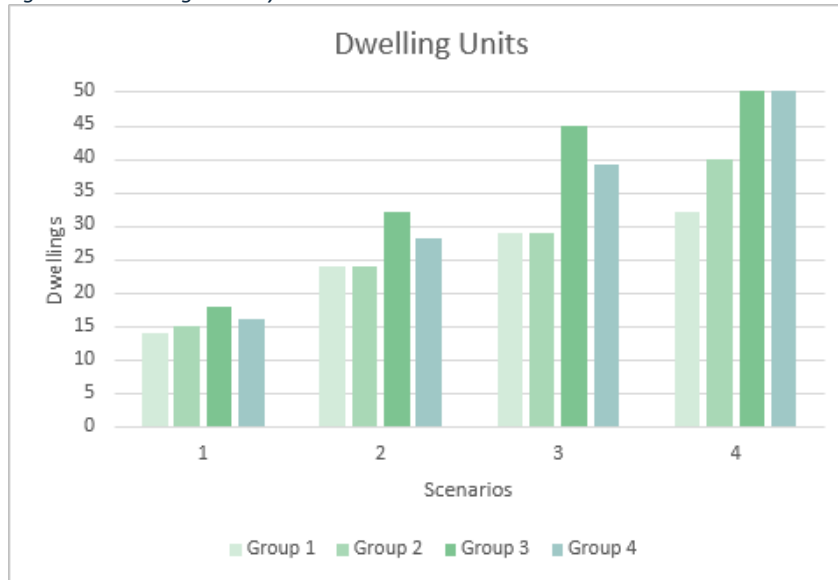


Comparing projected population across Scenarios 1–4 for all four study blocks.

Comparing Dwelling Units

Some blocks are better positioned for ADU addition than others; the same pattern holds for single-family home conversion into attached or semi-detached units. Blocks with larger, uniform lots saw more limited unit growth, while blocks with irregular or already-subdivided parcels showed greater flexibility for adding units.

Figure 23. Dwelling Units by Scenario



Comparing dwelling-unit growth across Scenarios 1–4 for all four study blocks.

Comparing Parking

By adding more housing types, such as triplexes and duplexes, the projected population for each scenario increases substantially. However, the Borough's zoning code requires two parking spaces per dwelling unit — a requirement that, applied literally, could offset much of the practical benefit of increased density unless paired with parking flexibility or reduced minimums.

Figure 24. Parking by Scenario

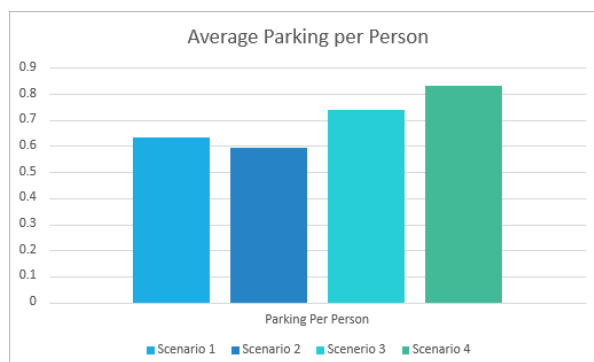


Comparing required parking spaces across Scenarios 1–4 for all four study blocks.

Analysis Across All Blocks

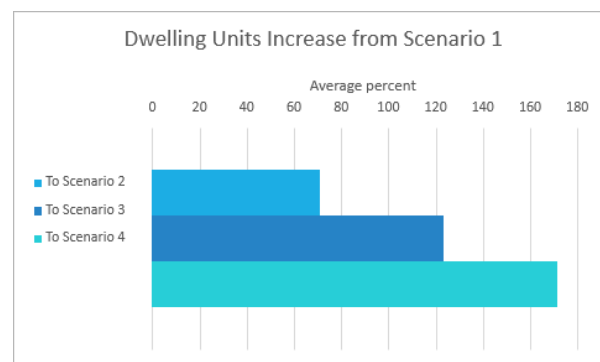
Aggregating results across all four blocks confirms two patterns: average parking demand per person rises only modestly across scenarios relative to the increase in overall dwelling units, and the increase in dwelling units from Scenario 1 is progressively larger moving from Scenario 2 through Scenario 4, with Scenario 4 (missing middle) producing the largest gains block-wide.

Figure 25. Parking Analysis



Average parking demand per person across scenarios.

Figure 26. Dwelling Unit Analysis



Dwelling-unit increase from Scenario 1 across scenarios and blocks.

Which Scenario Do We Think Is Best?

Weighing housing gains against community-character impacts, the studio identified two scenarios as the most promising paths forward, each with different trade-offs. Scenario 3 (upzoning from NC-1 to NC-2) moderately increases housing density through the construction of ADUs, with duplexes, single-family-attached, and two-family housing permitted by right. The change is meaningful but incremental. Scenario 4 (ordinance amendment to allow the full range of missing middle housing types) significantly increases density and delivers the largest housing gains of any scenario tested, but potentially at the cost of community character if not carefully managed through design guidelines.

Block Overview & Performance Across Scenarios

The four-block study area explored how missing middle housing strategies could increase housing supply while preserving neighborhood character. The table below summarizes each team's block characteristics and scenario outcomes.

Table 9. Summary of Scenario Outcomes

Team	Key Block Traits	Scenario 3 (NC-2 By-Right)	Scenario 4 (Missing Middle)	Overall Growth Trend
Team 1	Larger lots, traditional single-family homes (Cherry Alley to Juniper)	Moderate increase with ADUs added (no major infill)	Slightly higher with Scenario 4, but limited by lot sizes	Moderate growth overall
Team 2	Smaller lots, closer to S. New St (Cherry Alley to Juniper)	Stronger increase with by-right duplexes and ADUs	Highest growth among outer blocks with new multi-unit types	High growth potential
Team 3	Moderate lots, walkable, near WCU (Brandywine–Mulberry–Wayne)	Good increase in units with NC-2 by-right zoning	Larger increase with triplexes and ADUs	Balanced, strong growth
Team 4	Smallest lots, highest starting density (Wayne–New–Mulberry–Juniper)	Already dense; Scenario 3 modestly added units	Massive growth when triplexes and duplexes allowed	Highest growth overall

Limitations of ArcGIS Urban

The studio identified three specific limitations in using ArcGIS Urban for this type of fine-grained, parcel-level analysis:

- Overcounting and undercounting: Urban sometimes double-counted or missed population and parking totals when lots were split, merged, or when multiple units were added to a single parcel.

- Simplified assumptions: Urban applies standardized assumptions for household size, parking demand, and CO₂ emissions that do not always reflect West Chester's actual conditions.
- Parcel nonconformities: Because West Chester's lot fabric is older and more irregular than the platted subdivisions the software is optimized for, existing lot shapes did not always fit neatly into Urban's calculations, in some cases producing unrealistic density estimates.

These limitations reinforce why the studio chose to manually calculate and cross-check growth potential rather than rely solely on Urban's automated outputs, and they should be kept in mind by Borough staff or officials using similar tools for future planning work.

VII. Reflections & Recommendations

How Does Medium-Density Development Help the Borough?

"Missing middle" housing, including duplexes, triplexes, townhomes, rowhomes, accessory dwelling units, and other creative infill density solutions, offers additional housing supply in a built-out municipality without requiring outward expansion. Much of West Chester Borough's existing housing stock in and around the town center already meets the definition of missing middle, meaning that returning to the Borough's roots presents a realistic way to address current and anticipated future housing crunches. Beyond housing supply itself, the added property tax, local income tax, and local spending associated with more residents can meaningfully boost the local economy.

How Does Medium-Density Development Help the People?

Medium-density development offers improvements to walkability, accessibility, and sense of community by supporting more foot traffic, more eyes on the street, and shorter distances to daily needs. With more residents, and the additional property tax, income tax, and local spending they bring, West Chester gains a greater municipal budget with which to improve conditions for the entire Borough, not only the neighborhoods that see new housing directly.

Involving ArcGIS Urban in This Process

The studio's experience with ArcGIS Urban surfaced both clear strengths and clear limitations for this kind of neighborhood-scale planning exercise.

Positives

- Simultaneously modeling multiple potential development scenarios for direct comparison
- Assessing how these scenarios impact demographic, land use, and consumption metrics in an interactive, visual format

Where ArcGIS Urban Falts

- The platform is finicky when applied to an older municipality with existing lot and building nonconformities
- Calculations behind several of the platform's built-in metrics were initially wrong or misleading, requiring the studio's manual recalculation described in Section VI

Final Recommendation

Based on the block-by-block analysis and the broader review of missing middle housing practice, the studio's final recommendation is that the Borough consider upzoning the four-block study neighborhood from NC-1 to NC-2. Upzoning this neighborhood would allow for greater flexibility in future housing development without disrupting the visual harmony and close-knit, small-town feel that makes West Chester special. This recommendation is explicitly conditioned on pairing any upzoning with the guiding principles outlined in Section IV, including preserving building height, setbacks, coverage limits, streetscape character, and green space, so that added density is achieved through compatible infill rather than a departure from the neighborhood's existing form.

Successful implementation will also depend on issues beyond zoning text alone: how the Borough addresses parking requirements given the finding that current minimums may constrain achievable density; how it regulates or conditions missing middle housing, for example by tying approval to sidewalk, streetscape, lighting, or stormwater improvements; how it handles the sensitive question of student housing; and how it builds community support to reduce opposition to increased density. Genuine stakeholder engagement by identifying who the relevant stakeholders are and bringing them into the process early, was repeatedly identified as a prerequisite for any missing middle strategy to succeed politically, not just technically.

VIII. Conclusion

West Chester Borough's housing challenge is structural: a nearly built-out community facing continued demand for affordable and attainable housing cannot rely on greenfield development to meet that demand. Population and housing projections through 2050, alongside a socio-economic profile showing a poverty rate and rent burden well above county and state norms, together establish an urgent and growing need for additional housing supply that today's zoning does not adequately accommodate.

This studio's four-block analysis near West Chester University, conducted using ArcGIS Urban and cross-checked through manual calculation, suggests that missing middle housing, much of which already exists in the Borough's older neighborhoods, offers a credible, character-compatible path to expanding the housing supply. Across all four blocks studied, allowing missing middle building types produced the largest gains in potential dwelling units and population relative to existing conditions, though the magnitude of that gain varied predictably with each block's existing lot pattern and starting density. Realizing that potential Borough-wide will require pairing a modest zoning change, such as the recommended upzoning from NC-1 to NC-2, with clear design guidelines, updated parking standards, and a deliberate community engagement process that helps residents understand the connection between housing supply, affordability, and the long-term economic health of the Borough.

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