# THE WAKE COUNTY AFFORDABLE HOUSING PROJECT

THOMAS BARRIE, AIA

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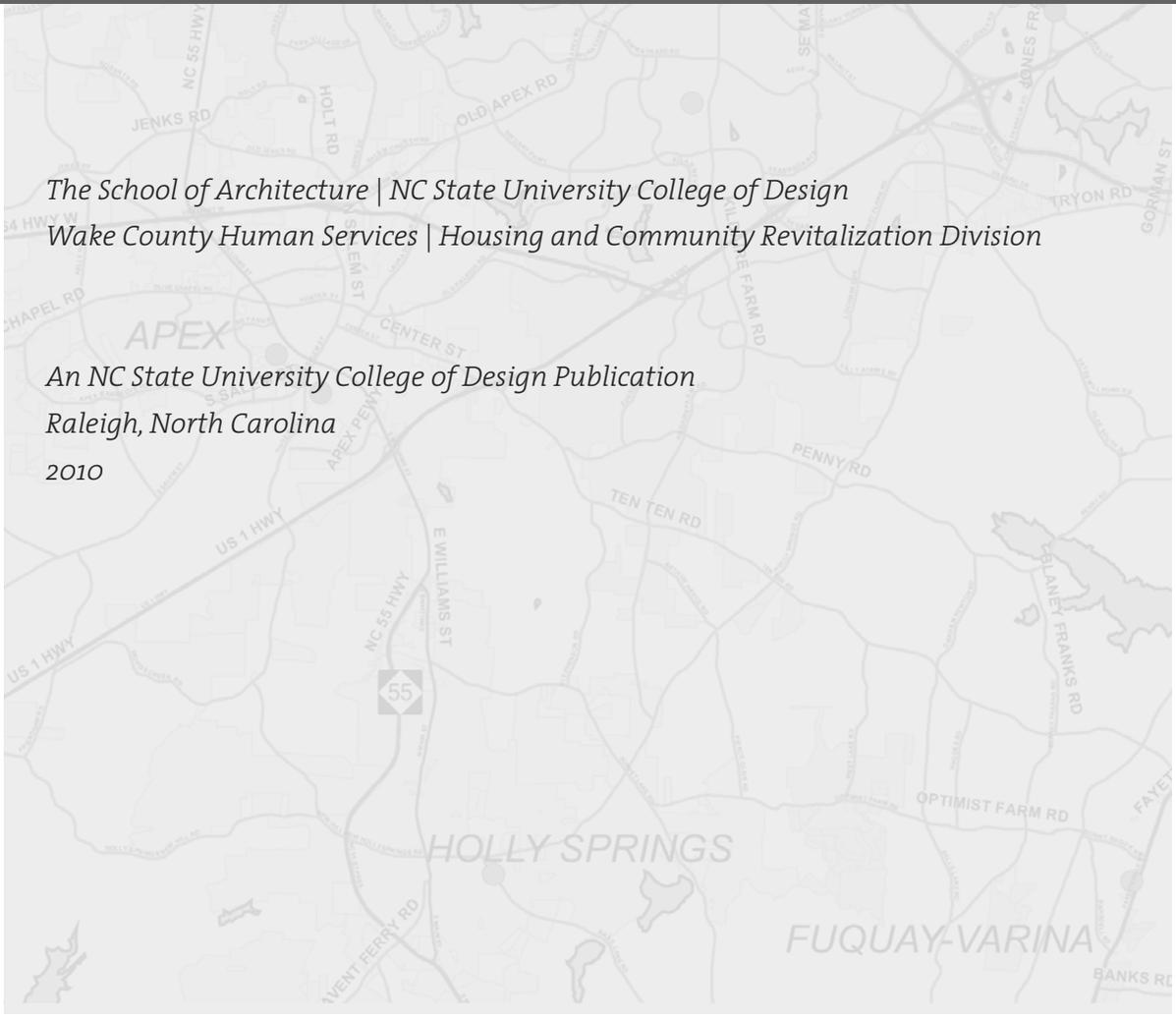
THOMAS BARRIE, AIA

NC State University College of Design
Campus Box 7701, Raleigh, North Carolina, 27695-7701
design.ncsu.edu

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Twelve students participated in the semester-long design project. Left to right: Maria Papiez, Jeffrey Pleshek, Jessica Cochran, Erich Brunk, Thomas Barrie, AIA, Professor of Architecture, Keith Wales, Hariwan Zebari, Trey McBride, Geoffrey Diamond, Tyler Morrison and Patrick Madrigan. Not shown, Stephanie Greene and Lindsay Ottaway.

ACKNOWLEDGEMENTS

INTRODUCTION

PEAK CITY
GRILLE & BAR

WATER TOWER
POLICE STATION
APEX MUSEUM
COMMUNITY CENTER
FIRE STATION

S. SALEM ST.

CENTER ST.

E CHATHAM ST.

JUNKYARD WAREHOUSE

CHURCH

MIDDLE SCHOOL

Wake County is too-often characterized by placeless sprawl and a lack of transportation and housing choices.

There is a significant amount of substandard housing in Wake County, including overcrowded households and units without plumbing and/or heating. Pictured: Manufactured house in Holly Springs.

Open country and farmland are part of what makes Wake County a beautiful and unique place. Unfortunately, the very qualities that make Wake County special risk becoming placeless sprawl. Pictured: Wendell farm for sale.

Project Description and Background

The Wake County Affordable Housing Project was a research and design project conducted by faculty and students from the School of Architecture at NC State University College of Design. The project included research on housing needs in Wake County and national programs and best practices in affordable housing, and the design of a range of affordable housing models. It focused on affordable housing strategies, with a particular interest in transit-oriented development. It also incorporated considerations of sustainable communities, which are defined as places that over time are ecologically responsible, economically viable and socially equitable.[1] The project included a number of design workshops conducted at designated Pilot Towns. Lastly it is hoped that the project outcomes will assist the Housing and Community Revitalization Division of Wake County Human Services to provide affordable housing in Wake County.

Project Goals

The overall goals of the project included the following:

- To provide **the students** with the enriched educational experience of a real-world project, as part of their education as future leaders in the profession.

- To provide **The Wake County Human Services Housing and Community Revitalization Division** with national best practices and leading-edge strategies and models for affordable housing in Wake County, as a foundation for further research and the professional design of future projects.

Project Process

The Wake County Affordable Housing Project was a year-long research and design project that included directed research by research assistants and a semester-long graduate design studio. The design studio was conducted during the 2009 Fall Semester and included graduate and undergraduate students in architecture and landscape architecture. The studio began with physical research on Wake County ex-urban towns and unincorporated areas (excluding Raleigh), including Cary, Morrisville, Apex, Holly Springs, Fuquay-Varina, Garner, Zebulon, Wendell, Wake Forest and Rolesville. For each locale, student teams provided documentation and analysis of their essential histories, physical characteristics, and housing types. There was particular attention paid to transit hubs, downtown area(s), walkable residential neighborhoods, and housing types. Overall, the students aimed to incisively and evocatively qualify and communicate the essential characteristics of their study area.

Traditional downtowns distinguish parts of Wake County. Picture: Downtown Apex.
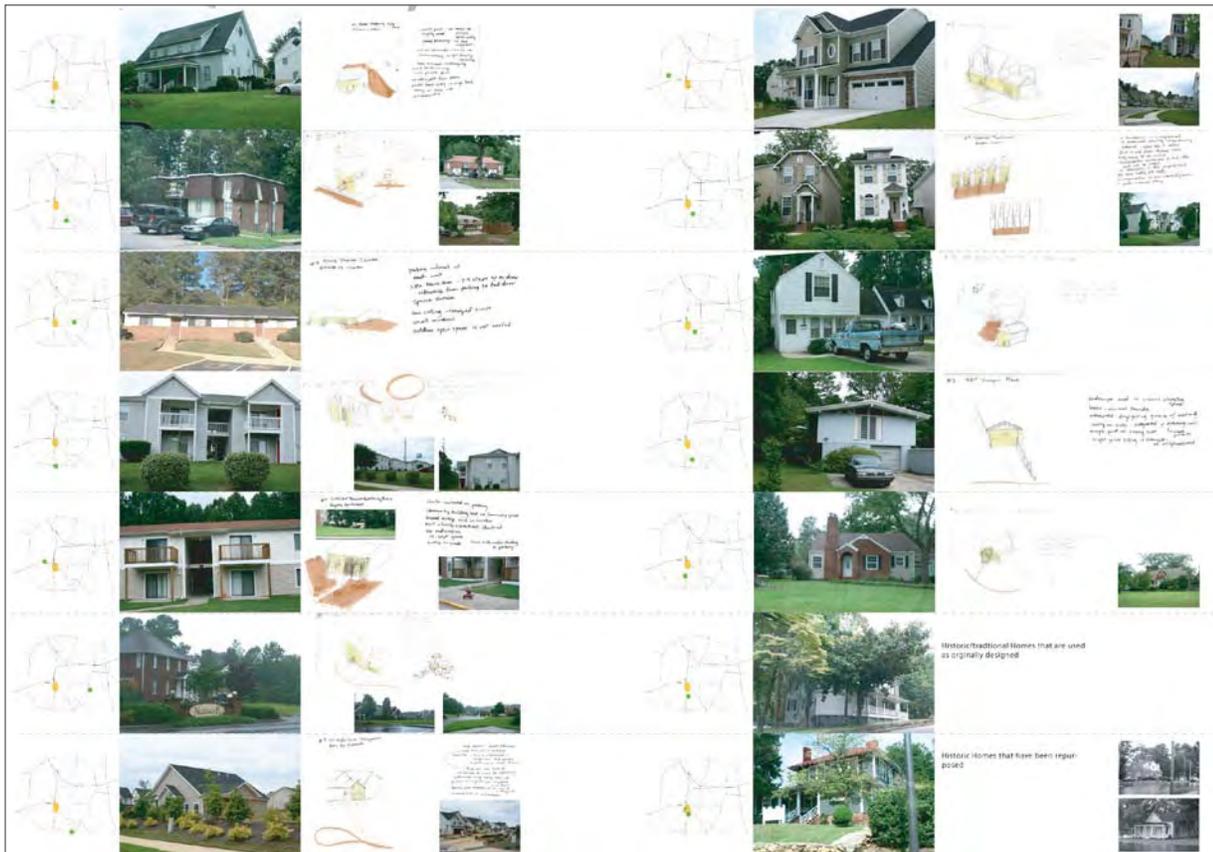
The research had a particular focus on housing types in Wake County. (Jessica Cochran and Lindsay Ottoway)

TOWN OF APEX

The peak of good living..

01 | HISTORY

INCEPTION

RURAL

RAPID DECLINE

LOW DENSITY

DORMANCY

SUBURB

SUSTAINED GROWTH

INCREASED DENSITY

RAPID GROWTH
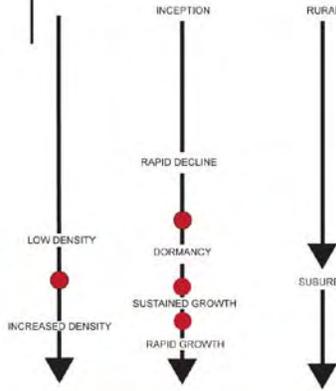
1860s	A small number of people begin settling what will become Apex.
1869	Railstation connects Apex to trade routes, growth becomes possible and a town center emerges.
1873	Apex is officially incorporated.
1873 - 1905	Existing pine forests are cleared for agriculture to support the new population.
1905 - 1920	Tobacco farming replaces traditional crops when a disease in nearby Person and Granville counties wiped out the tobacco crop and forced farmers to relocate.
1905, 1911	Fires wipe out many commercial buildings in the central business district which were replaced by 1914 with the brick buildings that are there today.
1920s	Tobacco sales suffer and causes the population of the town to decline from 1000 to around 800.
1930s - 1950s	The Great Depression hits an already suffering Apex. Town becomes dormant.
1960s	Apex grew throughout the 50s along with the rest of the nation. Research Triangle Park was established in the 60s and the new influx of population caused more growth in Apex and surrounding towns.
1990s	The migration out of large cities turns Apex into a suburb of Raleigh and surges the population to 5,000.
2008	Population has grown to nearly 35,000.

02 | HOUSING

BUNGALOW

COLONIAL

RANCH

GEORGIAN

NEO-CLASSICAL

MULTI-FAMILY QUAD-PLEX

QUEEN ANNE

MULTI-FAMILY DUPLEX

GROCERY

OLD SALEM STREET

DOWNTOWN APEX

MAIN ROAD

APEX UNION DEPOT BUILT IN 1912

BEFORE

AFTER

DEMOGRAPHICS

POPULATION GROWTH
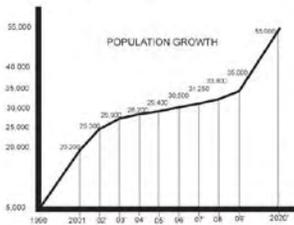
POPULATION DATA

TOTAL POPULATION:	35,000
TOTAL AREA:	10.6 SQ. MILE
DENSITY:	1,925 /SQ. MILE
MEDIAN INCOME FOR HOUSEHOLD:	$81,500
MEDIAN INCOME FOR FAMILY:	$91,300
THE PER CAPITA INCOME OF TOWN	$26,300
POPULATION BELOW POVERTY LINE:	2.0%
AVERAGE HOUSEHOLD SIZE (IN 2000):	2.73
AVERAGE FAMILY SIZE (IN 2000):	3.18

AFRICAN AMERICAN
ASIAN
OTHER
85% WHITE

HALF MILE DIAMETER

SINGLE FAMILY AND LAND USE

COMMERCIAL AND RETAIL

MULTI-FAMILY DUPLEX

PARKS AND MISCELLANEOUS

NORTH

WATER TOWER
POLICE STATION
APEX MUSEUM
COMMUNITY CENTER
FIRE STATION

PEAK CITY
GRILLE & BAR

PEAK CITY GRILLE & BAR · BARDEN & TAYLOR CPA · OUT OF THE KILN · ANTIQUES ON SALEM · MARTY ALLEN PHOTOGRAPHY · LAUREN AND NATIVA + OFFICE SPACE · HEATHER REAL ESTATE · PIGGYBACK MARKET, APEX YOGIC LIVING + FUNKY MONKEY PAPERIE · ANNA'S PIZZERIA

CENTER ST.

E CHATHAM ST.

JUNKYARD WAREHOUSE
CHURCH
MIDDLE SCHOOL

03 | CONTEXT

SITE CONTEXT

- MULTI-FAMILY
- SINGLE FAMILY 2-3 UNITS PER ACRE
- SINGLE FAMILY 4-6 UNITS PER ACRE
- RETAIL

CHURCH AND CIVIC BUILDINGS

SCHOOLS

HISTORIC DISTRICT

MAJOR ROADS

COMBINED

The field research focused on downtown areas, existing and future public transportation, walkable residential neighborhoods, and housing. (Analysis of Apex by Trey McBride and Harawan Zebari)

Cary's downtown is centered on the intersection of Academy and Chatham streets.

The small-town character of Wake Forest is accentuated by its traditional downtown.

Residents of Wendell are justifiably proud of its historic downtown.

Following these initial surveys and analyses, three Pilot Towns were designated for focused study. The towns — Cary, Wake Forest and Wendell — were chosen because of their unique qualities, the diversity each brought to the study as a whole, and their willingness to participate. For each Pilot Town, student teams engaged in further research on the physical characteristics of the built environment, housing, existing or proposed transportation links and other issues germane to the project. Concurrently, the studio's research assistant compiled demographic information on Wake County and best practices regarding the legislating, funding, and the provision of affordable housing nation-wide, with a particular focus on leading edge counties — all of which was shared in review and de-briefing sessions. Furthermore, student teams produced precedent research on affordable housing best practices, including mixed-use and mixed income examples (see pages 50–54).
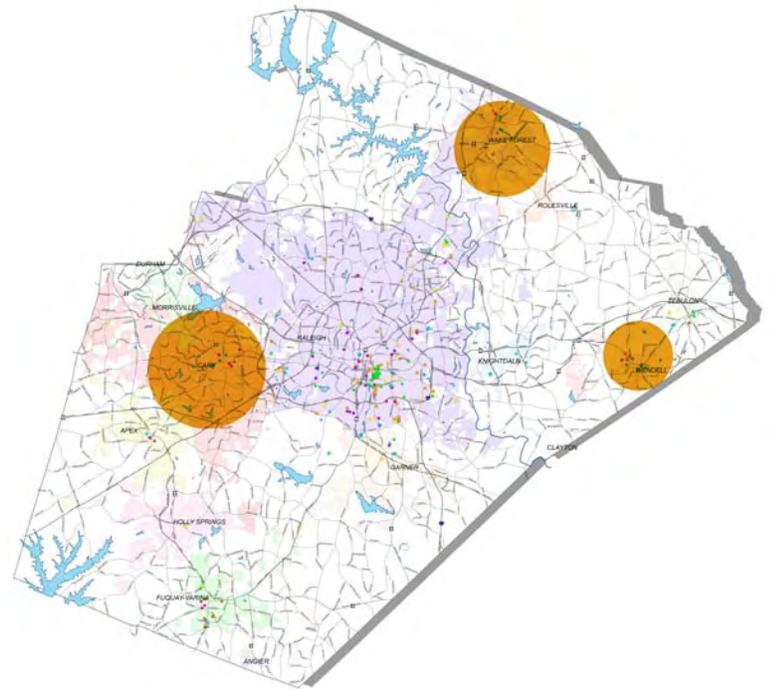
The Wake County Affordable Housing Project addressed affordable housing contexts, issues and needs countywide, but with a particular focus on three designed Pilot Towns: Cary, Wake Forest and Wendell.

Following the research and analysis phase, students identified potential sites, based on the following criteria:

- Proximity to existing or proposed public transportation link(s).

- Walkable to centers of businesses and services.

- Available land of sufficient size and configuration to accommodate multiple housing units and, if appropriate, mixed-uses.

- The potential for new development to create more cohesion and identity within the existing urban fabric.

- Correspondence with sites identified for future development in current city studies or plans.

- Orientation and environmental conditions to facilitate sustainable development and architecture.

Based, in part, on responses to the research on local and national contexts, the students next developed preliminary site and building strategies for their chosen sites. These were brought, along with the research, to the Pilot Town Workshops. Additionally, throughout the semester, interim reviews of student design proposals were conducted during which staff from Wake County Human Services, local housing providers and advocates, and faculty provided input based on their areas of expertise.
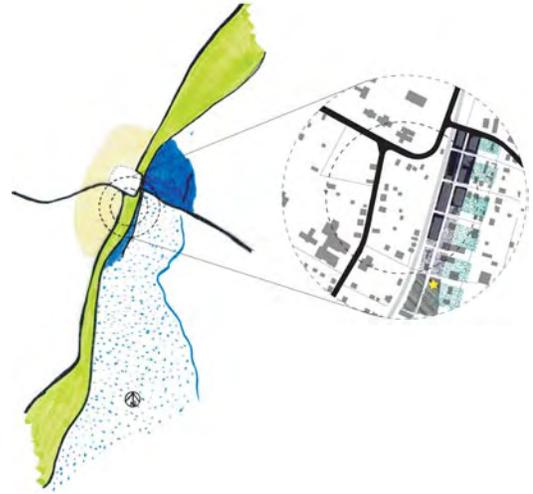
Proximity to existing or proposed major transportation link(s) within walking distance of businesses and services were central to site selection. (Analysis of Wake Forest by Jessica Cochran)

Throughout the semester, interim reviews of student design proposals were conducted, during which staff from Wake County Human Services, local housing providers and advocates, and faculty provided input based on their areas of expertise. Pictured: Graduate student Maria Papiez receives input from (from left to right) Randy Lanou, Georgia Bizios and Emily Fischbein.

The Cary Workshop was conducted at the historic Page Walker House and included presentations, input, discussion, and a walking tour of the downtown area.

Mayor Vivian Jones leads the tour of Wake Forest.

Mayor Harold Broadwell speaks at the Wendell Workshop.

Pilot Town Workshops

The Pilot Town workshops were opportunities to present initial research findings and preliminary design proposals, and receive input from municipal leaders, housing providers and residents — all as a means to identify predominant issues. Students and faculty benefitted from the perspectives of those who know their communities best, and the subsequent design development aimed to incorporate as much of the information and advice as possible. Overall, students and faculty aimed to substantially incorporate local character and urban conditions while utilizing research on established strategies or emerging national trends in affordable housing.

Service Learning Projects and North Carolina State University

North Carolina State University is North Carolina's largest comprehensive university. Founded in 1887 as a land-grant institution under the Morrill Act of 1862, NC State has a three-part mission: instruction, research, and extension. The latter describes the unique model of land-grant universities that were founded following the Civil War. Congress deeded land to establish new universities that would not only educate students but would serve their citizenry. This unique American model has the goal of accessible education paired with an extensive outreach and service mission.

Like other land grants, NC State began by serving the agricultural needs of the mostly-agrarian state through its schools of agriculture and veterinary medicine. Today all 100 counties continue to be served through the County Extension program. As the state's demographics and industrial profile have changed, however, so have the services provided by NC State. Its broader service mission now includes economic development, re-tooling industry, technology transfer, urban affairs, community services, housing and urban design. Where in the past a farmer might contact a County Extension Officer to seek answers to a problem, now it is municipal and business leaders who come for the expertise that only a Research I institution can provide.

Increasingly NC State is serving more and more cities, small towns and communities in areas of housing and urban design — most of which is performed in the College of Design's Office of Research, Extension and Engagement. Through a diverse group of initiatives and faculty, issues such as environmental health, universal design, landscape urbanism, community art programs and the design of home environments are addressed.

The *Affordable Housing and Sustainable Communities Initiative* founded by Thomas Barrie focuses on research, community-based demonstration and service-learning projects, and the development and dissemination of a knowledge base in its subject area.

Its *mission* is primarily educational — to provide educational resources for government, non-profit and community leaders, students and the general public, and innovative and applicable solutions to the housing and urban challenges that North Carolina communities face. Traditional research and applied research through funded projects and service-learning studios are potent means to produce substantive, applicable and measurable outcomes. The education of qualified practitioners and future leaders in the profession remains central to our mission, and therefore the integration of professional education and research is essential.
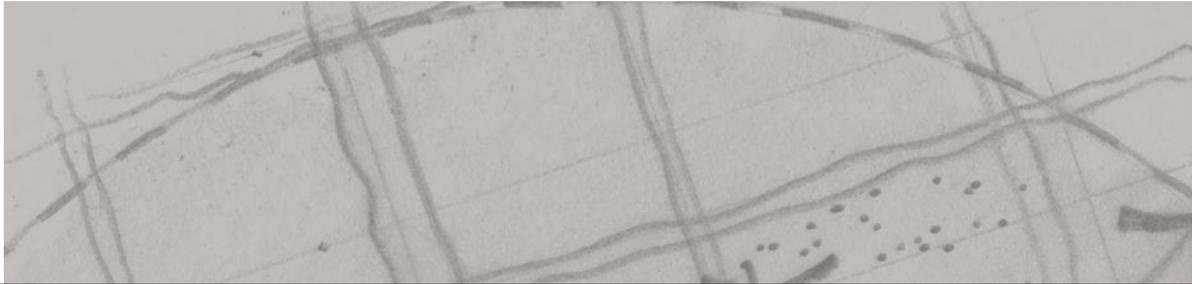
ESTABLISHING THE CONTEXTS
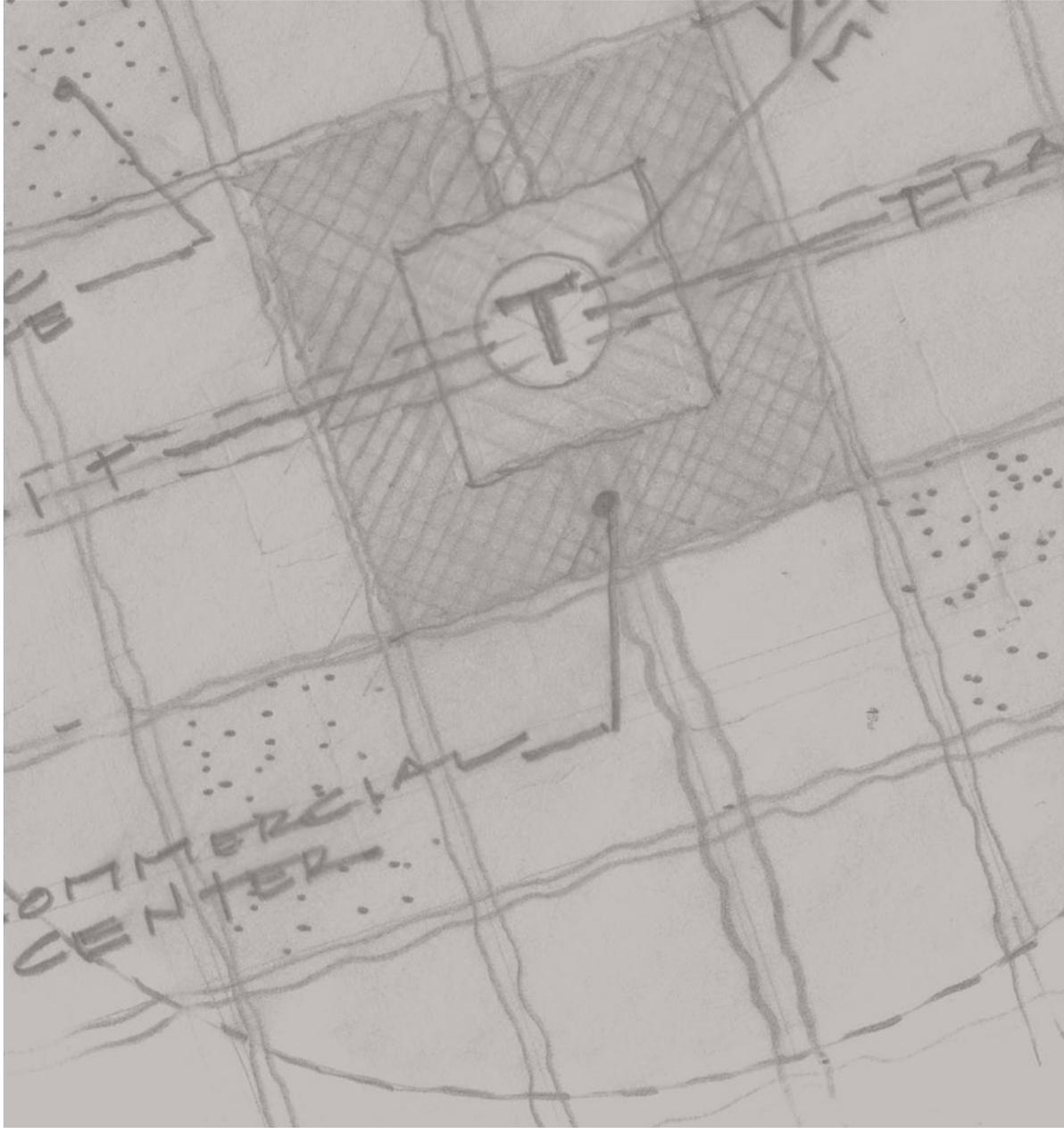
Affordable Housing is Fair Housing

It is a well-known fact that, for too-many Americans, the availability of safe, decent housing is out of reach, a national condition that has only worsened during the recent economic downturn. Often it is the most vulnerable of our fellow citizens who are disproportionally affected — low-wage workers and families with children. The term "fair housing" has its origins in Title VII of the Civil Rights Act of 1968, which prohibited discrimination in housing according to inclusive criteria. Today, though many states have adopted fair housing regulations (including North Carolina), it refers more generally to the social equity issues germane to accessible and affordable housing.

Affordable housing is generally defined as homes for individuals and families who cannot afford market rate in their communities and, specifically, as housing that costs less than 30 percent of a household's gross income. Affordable housing is often referred to as "work force housing" or "essential worker housing," reflecting the fact that low-wage workers include those upon whom we depend for basic community services — nurses, day-care providers, teachers, firemen and policemen. Others who need our help are also in the most precarious situations regarding housing: those with chronic illnesses or homelessness. Any measure of a culture depends on how well it supports the full spectrum of its members. In this context, the provision of affordable housing is an ethical issue. It is simply the right thing to do.

However, making sure that our community's housing needs are addressed (and eventually met) not only supports our fellow citizens, but strengthens local economies and communities. For example, affordable housing is often misunderstood as providing minimum shelter or taking the form of large projects, which often provokes worries about its effect on property values. However, current

Well-planned and designed housing can aid in creating the character and sense of identity upon which the value of our communities are inextricably paired. (David Baker + Partners, Architects, Armstrong Place, San Francisco)

research indicates that community-based affordable housing does not adversely affect property values. In fact, proactive housing programs can address issues such as sub-standard housing that can have substantial impacts on property values. Moreover, well-planned and designed housing can aid in creating the character and sense of identity upon which the value of our communities are inextricably paired. Providing housing where it is often needed the most, close to commercial centers and transportation, is an effective antidote to the ubiquitous sprawl that too-often characterizes our ex-urban municipalities. A range of affordable housing types allows family members to trade up without moving out, and for the elderly to age in place. Also, it is well known that "non-traditional" families comprise 75 percent of national demographics — households of unmarried individuals or couples without children, of whom many prefer smaller units. It is this population that often gravitates towards civic and commercial centers and who are an essential component regarding the health of local economies. In the end it makes economic sense — decent, accessible, and affordable housing costs less in the long run and adds much to our communities.

A House is Not a Home — The Symbolism of Home

While we typically refer to dwelling units as "housing," what we all desire is a "home." Home is the center of our lives, the place that we may depart from, but to which we always return. As the hub of our personal world; its safety and stability are essential to our sense of well-being. If our homes become precarious, whether through threats of foreclosure or eviction, unsafe neighborhoods or deteriorating conditions, our lives are similarly viewed or experienced as unstable and threatened.

As in the Burt Bacharach and Diane Warwick song, "A house is not a home, when there is no one there to hold you tight," we may rent or buy a house or housing unit, but it is through our occupation and personalization that the house becomes our home. It is a place that we appropriate and where we express ourselves. As Dolores Hayden states, "A home fulfills many needs: a place of self expression, a vessel of memories, a refuge from the outside world, a cocoon where we can feel nurtured and let down our guard."[2] The term "home" is often used to describe where we were born or raised, our "home town," indicating its profound and enduring ontological significance. To speak of one's "homeland" is to describe a unique place to which we are inextricably bound. As in J.H. Payne's *The Maid of Milan* (1832), "Be it ever so humble, there is no place like home."

The feeling of "being at home," describes a condition of ease and comfort, and so it is not unusual that we often tell our guests to make themselves "at home." Dorothy, who in the Wizard of Oz so plaintively cried, "There's no place like home!" echoed Homer who wrote in *The Odyssey*, "There's nothing better in this world" than a "happy peaceful home." Odysseus is homeless for many years following the Trojan Wars, unable through a range of circumstances to find his way home, poetically describing the disorientation and terror of being "homeless." Robert Frost in his evocative poem "The Death of the Hired Hand" writes that "home is the place where, when you have to go there,

they have to take you in." How many times in our lives when, feeling buffeted by events or challenges, have thought or cried, "I just want to go home!" Home is our refuge from the vicissitudes of the world and thus its enduring symbolism as a place of stability and safety. These perspectives and contexts are essential to the integration of all of the issues germane to housing in general and affordable housing specifically.

The feeling of "being at home," describes a condition of ease and comfort. (Home images by Jessica Cochran)
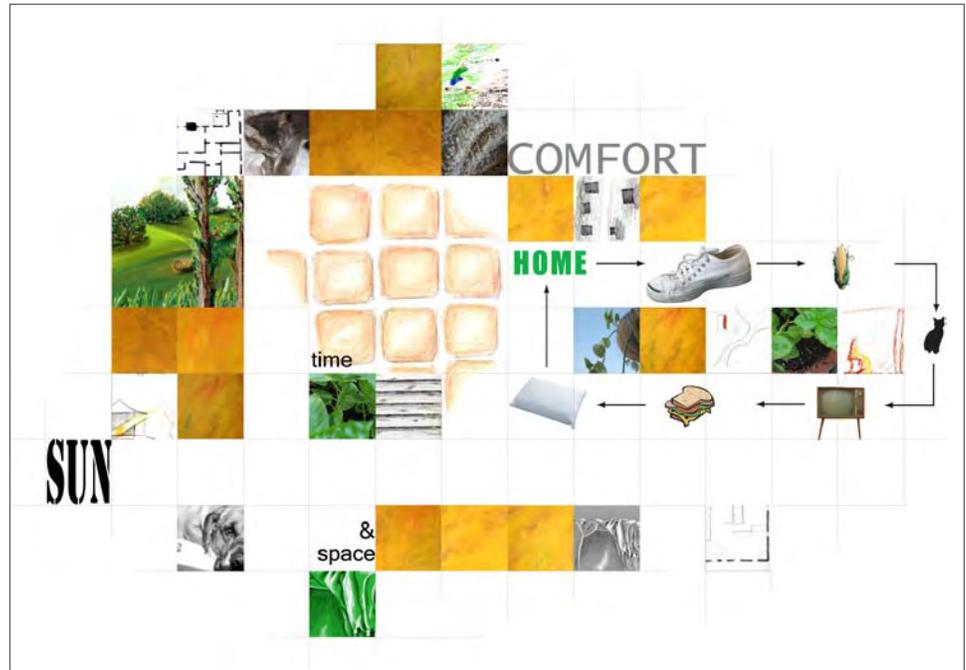
Cultural Presumptions and Consumer Preferences — The Roots of the Suburban Single-Family House

A significant challenge to advocating for and providing housing that serves a broad spectrum of income levels and needs in our communities is the cultural presumptions regarding the best form of housing. Over time North American culture came to prejudice the single-family house at the expense of other, more affordable models. Those who own single-family houses tend to hold the view that any other model will adversely affect the character and value of their community — and those who don't tend to aspire to own one. And, even though multifamily housing is common in suburbia, it is often both physically (by its location in peripheral areas) and culturally "invisible." It is essential to recognize the cultural foundations of these prevalent attitudes — as a means to uncover the power they hold in both national and local debates regarding affordable housing. In particular, opposition to affordable housing, so-called NIMBYism (Not In My Back Yard) often depends on unexamined attitudes that are predominantly cultural and emotional.

It is important to recognize the privileged position the single-family house has assumed in American culture. For individuals and families, the purchase of a single-family house is often the most significant investment they will make in their lifetimes. It comprises most of their equity, serves as the means to secure other loans, and is viewed as a life insurance policy or retirement account. For municipalities, property taxes comprise a significant portion of their tax base, (revenues that pay for public safety, schools and other essential services). For this reason speculative developers often receive incentives from municipalities because of the capacity of new subdivisions to increase the tax base. And, logically, the more expensive the houses, the more tax they generate, a further incentive to attract higher price point developments. Lastly, in a national context, support of the single-family house comprises the largest public housing program in the country through the federal income tax deduction for mortgage interest.[3] (There is no comparable deduction for rent.) Indeed, homeownership is often presented as an ideal, implicitly relegating renters to the status of second-class citizens. In these contexts, the dominance of the single family house is clear, and it is understandable why affordable housing in general, and subsidized rental housing specifically, can appear to be so threatening and opposition to it often so visceral.

It is obvious that there are other ways to own one's domicile beyond the single-family house, and that renting can give one the flexibility home ownership doesn't. According to Paul Krugman, "there are some real disadvantages to homeownership," and he points out the following risks and limitations: in today's market homes can precipitously lose value; homeownership limits our ability to move (to new jobs etc.); and single-family houses in the suburbs accrue significant transportation costs.[4] Why then, the almost myopic preference for the single-family house? And, why the ubiquitous home styles and imagery of most of our subdivisions? To answer these questions, we need to turn to 18th century England and the rise of the world's first true middle class and the establishment of the first suburbs.

Even though suburbs dominated by single-family houses may be the ultimate American cultural artifact, its genesis was in the industrial English cities of London and Manchester.[5] Until the 18th century, ex-urban areas surrounding major cities were seen as inferior, and to call someone a 'suburbanite" was to insult them.[6] The aristocracy traditionally lived in cities, but maintained country estates or hunting lodges for their entertainment. However, with the rise of a new mercantile middle class, attitudes about the city and its ex-urban areas changed. For the first time in British society there was a class of wealthy people who had achieved positions of power through their own entrepreneurship and hard work. No longer was the ability to buy property and build one's own house limited to the "landed gentry," but increasingly was open to the emerging middle class. During a time when John Locke's theories regarding the virtues of the politically free individual — able to own land and live where he pleased — enjoyed renewed popularity, the new middle class exercised their ability to build homes that responded to their needs and reflected their new status. The notion of the self-made man resulted a building type to serve it — the suburban single family house.[7]

Arguably the first suburbs were built by the new middle class outside of London, where 18th century notions regarding healthy, pastoral living, the primacy of the family,[8] and the house as symbolizing one's social and economic status coalesced. What may have begun as weekend villas soon transitioned into primary residences to satisfy

new social and religious ideals. Women were now positioned as leading the domestic and spiritual aspects of the family, in a setting no longer compromised by the corrupting influences of the city. The men, making use of improved roads and carriages, commuted to the city, returning to their ideal "compact bourgeois villas"[9] when their work was done.

The new suburban house of 18th century England not only satisfied the changed social and family needs of the new middle class, but through its setting and style appropriated images of power of the county estates of the aristocracy. In other words, the houses they built symbolized the political and monetary gains that this new class had achieved. Early subdivisions even adopted aristocratic names, such as Victoria Park in Manchester.[10] And, essential to the validation of their new social status was separation from the "lower classes." This was a gradual but significant change, as previously maintaining one's social position depended only on title or peerage (as the classes freely intermingled in cities such as London and Manchester). Now it demanded the physical separation only the new suburbs could provide. Thus, an early model develops of residential enclaves, set in ex-urban settings where land was cheap, connected to work and commerce by new transportation technologies, all of which served to satisfy and symbolize cultural and social imperatives.

The residential suburb may be distinctly American, but early settlements (such as in New England), did not correspond to this model. However, suburbs composed primarily of single-family houses have proven to be a ubiquitous development pattern and potent social symbol. The ideal of the "self made man," (adopted from England), who is able to "hold and transmit property" as a basic right, are enduring American ideals. Home ownership of a single-family house typically serves

to represent one's social and economic class, symbolized by imagery that bears a remarkable affinity with its English predecessors. The layouts of planned unit developments assiduously adopt images of pastoral settings, with curvilinear roads that recall county lanes, and gated entrances reminiscent of country estates. House models and subdivisions often use English names that not only suggest upper class pedigree, but also directly refer to country estates.

A cursory survey of Wake County subdivisions reveals this national pattern. Subdivision names such Prestwyke and Cheswick conjure images of country farms (*wick* is an old English word for farm). Names such as Lochmere and Birkleigh make oblique pastoral references. (*Loch* is a Scottish word for lake and *mere* is its English equivalent — *birk* is an old English word for birch.) Others such as Baybridge Park, Carlton Park, Windsor Park, and Highgate Park are directly associated with hunting estates. ("Parks" were the hunting lands associated with hunting lodges.) Names such as Drayton Reserve, Falls Preserve, Bishop's Grant and Brighton Forest make similar associations to hunting lands reserved for aristocratic landowners.[11] Others such as Deacon's Ridge, Stonegate at St. Andrews, Mews at Legacy Greene, Jubilee Village, Royall Mill Townes, Avalon Springs, Churchill Estates, Stratford at Abbington and the Townes at Bedford Square, consistently (though often inaccurately) adopt English town, county or country nomenclature.

House models and subdivisions often use English names that not only suggest upper class pedigree, but also directly refer to country estates. Pictured: Bishop's Grant, Wake Forest.

Suburban house styles (and names) mimic their English predecessors and convey similar messages of class and status.

In part, the ubiquitous model of the single-family house and economically stratified subdivisions, have perpetuated economic segregation and prevented the inclusion of more diverse housing models, including a range of affordability. The suburban single-family house serves the needs of many very well. However, in the context of national and local demographics and their trends, homeownership of an individual dwelling unit disconnected from public transportation and dependant on the private automobile, does not work for all. Disclosing predominant cultural attitudes, revealing true costs, and examining economic contexts, can help all of us to see housing more dispassionately, and provide the foundation for substantive and sustainable alternatives.

Transit Oriented Development and Affordable Housing

There is no one definition for Transit Oriented Development, but it is commonly defined as compact mixed-use development planned around transit hubs and accessible to walkable neighborhoods. For example, the metropolitan transit authority of Portland (OR), defines TOD's as "Multiple-unit housing and mixed use projects that support the public investment in light rail and fixed route transit (bus) service because they preserve, enhance, or contribute to creating active pedestrian districts within walking distance of transit. A TOD may be a single building, a group of buildings, or a multiple block district." They are also referred to as Pedestrian Pockets, which have been described as "a simple cluster of housing, retail space and offices within a quarter-mile walking radius of a transit system."[12] Even though these models may be most applicable to urban environments, they have also been applied in ex-urban and suburban settings.[13] However, true TOD's need to have sufficient density and diversity of uses, anchored by a mass transit station, and predominantly accessible by pedestrians or cyclists. Otherwise, the equally broad term of TAD, or Transit-Adjacent Development, may be more appropriate.[14] (That said, for clarity this report will use the term TOD.)

TOD's are often promoted as a means to revitalize urban and suburban centers, and as an alternative to the economically and environmentally unsustainable model of predominant ex-urban North American land-use planning and development. They are positioned as an antidote to sprawl, which often leads to the loss of farmland, open space, and most-importantly, local character. TOD's can also be effective models for incorporating affordable housing. According to the Center for Transit Oriented Development, "Development of housing adjacent to transit presents opportunities to meaningfully address the nation's continued need for affordable housing."[15] The American Public Transportation Association states that households that use transit instead of driving can save almost $9,500 per year, an amount equivalent to groceries, childcare or community college tuition for two students for the same time period.[16]

Peter Calthorpe, one of the founders of Transit Oriented Development, states: "Affordable housing must start with affordable neighborhoods."[17] Nationally, transportation is second only to housing as a household cost, with the average family spending approximately 32 percent of their income on housing and 19 percent on transportation. More important, extremely low income households can spend over 50 percent of their family income on transportation and often

depend on unreliable automobiles. Many move to suburban locations because of lower housing costs, but any gains they make are quickly erased or exceeded by transportation costs. However, for those who live in transit-rich locations, 32 percent remains the cost of housing, but transportation can be as low as 9 percent.[18] Simply stated, the more one can use public transportation, the less one's transportation cost will be, increasing the overall affordability of a place of residence. TOD's can be an essential component of a comprehensive affordable housing strategy because living adjacent to public transportation can significantly reduce a household's transportation costs.

Beyond issues of affordability, TOD's have the ability to create neighborhoods, often walkable, and enhance the character of the built environment. And these environments are becoming desirable to more people. As national demographics and living costs continue to change so will the market for housing near transit. According to the Center for Transit Oriented Development, the demand for transit adjacent housing will nearly triple in the next twenty years, an estimate that could easily change with increasing gas prices and commute times. Moreover, the largest growing populations — singles, couples without children, the elderly and low-income households — are the most likely to seek TOD's.[19]

Several cities across the United States have adopted TOD regulations and guidelines for existing or future transit. With the passing of the Intermodal Transit Fund in the North Carolina Assembly, Wake County would be wise to plan for a more transit-based future. One of the requirements of the bill is the provision that to receive funding there needs to be an "identification of potential resources and a strategy to provide replacement housing for low-income residents displaced by transit development and to create incentives for

the purpose of increasing the stock of affordable housing to at least fifteen percent (15 percent) within a one-half mile radius of each transit station and bus hub to be affordable to families with income less than sixty percent (60 percent) of area median income."[20] Selection of an appropriate strategy to accomplish these housing goals will be vital to the success of future TOD's, as well as an essential component of a proactive and sustainable affordable housing strategy.[21]
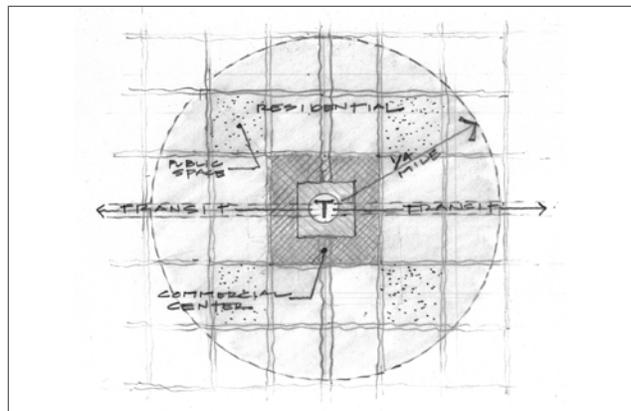
Transit Oriented Development is commonly defined as compact mixed-use development planned around transit hubs and accessible to walkable neighborhoods.
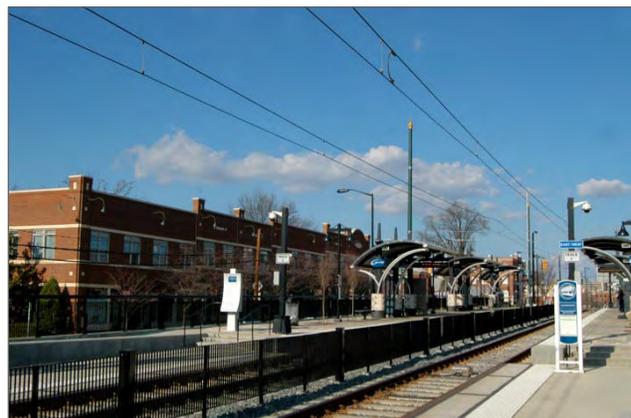
Charlotte NC has planned its new light rail system around Transit Oriented Development.

Sustainable Design and Affordability

Sustainable design practices need to be intrinsic to all architecture, but can make special contributions to affordable design. It is a well-known fact that the construction and environmental control of buildings contribute 48 percent of greenhouse gases. An equally important figure is that transportation accounts for 28 percent. (The rest is attributed to industry.) Housing providers can no longer justify creating buildings that do not minimize their carbon footprint. Moreover, it is clear that sustainable practices can often significantly contribute to long-term affordability.

David Brown states in the introduction to *The Home House Project* that, "Affordable Housing is a noble cause with a bad history."[22] Many have pointed out the mistakes of the past, in which affordability was viewed as predominantly achieved by utilizing economies of scale and minimizing up-front land, design, labor and material costs. Too often this meant that affordable housing developments were located on remote sites, disconnected from context, commerce and transportation, were designed according to bottom-line instrumental metrics at the expense of the creation of context-responsive, energy-efficient, healthy and convivial environments, were inefficient in their use of energy, water and materials, and often created unhealthy interior environments due to material use and degradation.

From an urban design position, sustainable urbanism can reduce overall environmental impacts and create healthier environments. These approaches align with the integral model for sustainable urbanism proposed by Mark Roseland, which outlines three principal areas essential to sustainable urbanism — *Community Conviviality,*

Environmental Viability and *Economic Adequacy. Community Conviviality* focuses on the quality of life issues of walkable communities, connected by multi-modal transit choices, with close proximity to shopping, services, recreation and community events. *Environmental Viability* includes sustainable building practices that aim for a minimal carbon footprint, substantial transit choices, and regeneration of the environment through parks, greenways, native plantings, recycled building materials and community gardens. *Economic Adequacy* addresses social equity issues through the incorporation of workforce and affordable housing, adjacent retail and community services, and a range of transit choices.[23]

Sustainable development and architecture can lower annual operating costs for housing developers, which may enable them to build more or better affordable units. It can also lower these costs for homeowners, thus freeing up funds for other living expenses or savings. It can be achieved through a broad range of means which can be summarized as follows.

Efficient land-use

- Locating housing within established city or town centers to incorporate existing infrastructures.
- Choosing sites near public transportation, shopping, schools and other daily needs to minimize the need for automobiles.

Energy, water and material efficiencies

- Orientation and configuration of units, outdoor spaces and parking to achieve passive strategies.
- Achieving low-energy building performance by incorporating Leadership in Energy and Environmental Design (LEED™) and Energy Star checklists, including: High R-value thermal insulation, high E windows, efficient heating, ventilating and air conditioning, hot water heaters and geo-thermal options.
- Creating developments that use water efficiently and minimize storm water runoff.
- Designing efficient units that reduce energy use, minimize construction waste and utilize durable and easy/inexpensive to repair equipment, fixtures, hardware and finishes.

Healthy Environments

- Using environmentally responsible materials with low embodied energy and clean manufacturing processes.
- Choosing materials and finishes that do not produce unhealthy interior environments.[24]

As the previous section illustrates, the planning, design and production of affordable housing is an interrelated architectural, urban, social, and economic design challenge. Design is the pivot point around which all of these diverse (and divergent) issues revolve. Design is the means by which we can most effectively identify, synthesize, and solve the multifaceted challenges of housing.

IDENTIFYING THE NEEDS

The Need for Affordable Housing in Wake County

Nationally, stagnant wages, rising housing costs, the deterioration of existing housing stock, (especially in low-wealth areas), lack of transportation options, and the diminishment of subsidy programs, all of which have been exacerbated by the recent economic downturn, have resulted in the need for more innovative and effective affordable housing strategies. According to *The State of the Nation's Housing, 2008* by Harvard University's Joint Center for Housing Research, nearly one in three households spend more than 30 percent of their gross income on housing and more than one in eight spend upwards of 50 percent. Children are disproportionally affected with one in six children living in families that pay more than half of their income on housing, and therefore have less to spend on other, often essential, living costs. According to Alex Schwartz, "the nation's housing problems remain acute," with more households with "serious housing problems" or no housing at all, nearly double those who lack health care.[25] Figures for North Carolina align with national averages with over 20 percent of homeowners and 40 percent of renters paying more than 30 percent of their income on housing. Overall, the poor are competing for fewer and fewer affordable units, with one in five children living in substandard housing.

Wake County, though located in a population and economic growth area, has been substantially affected by all of these contemporary (and chronic) conditions. Even though it is one of the more affluent counties in the state, its poverty rates can range as high as the state average, and the percentage of families who pay more than 30 percent of their income on housing continues to rise. Currently there is a shortfall of over 23,000 affordable housing units in Wake County. Homelessness remains endemic with over 1100 homeless on any given night (almost 300 of which are families), and there are over 2200 substandard units countywide. Clearly, Wake County is not immune to national and state problems and trends, and there is a definable need for more rental, home-ownership, supportive, transitional and senior affordable housing.

PROVIDING SOLUTIONS

The Wake County Affordable Housing Project utilized national, state and county contexts as a means to cogently frame current needs and challenges regarding the provision of affordable housing in the county, and propose strategies to address them in the long run. The student design projects were guided by the studio professor, informed by the project and collateral research, and enriched by professional and community input. That said, it should be recognized that the following are demonstration projects that primarily aim to illustrate general design concepts applied to site-specific solutions.

The three Pilot Towns of Cary, Wake Forest and Wendall provided diverse environmental and demographic settings. Taken together, the projects intend to address a range of issues that define the housing challenges the county faces, and to offer timely and applicable strategies to address them.

Overall, the design projects adopted the following strategies:

- Sites that aligned with principles of sustainable urbanism and architecture and provided opportunities for Transit Oriented Development.

- Site planning that maximized economies of scale, responded to their environmental contexts, incorporated the automobile without letting it dominate, and provided generous and convivial shared spaces.

- Planning and architectural design that recognized the enduring symbolism of "home."

- Unit plans that maximized efficiency without compromising livability.

- Materials, building technologies, and water use and drainage strategies to achieve energy efficiency and minimize environmental impacts.

- A variety of rental and ownership models.

- Mixed-use and mixed-income developments, where appropriate, as part of an affordable housing and urban design strategy.

The Cary Amtrak station, designated by the Triangle Transit Authority's Regional Transit Vision as a major hub, could serve as an anchor for a TOD.

Cary

Current urban plans for the City of Cary call for establishing a substantial arts district (centered on an arts center in a former elementary school), at the south end of the city center area, and connected to its downtown by public transportation. Essentially the downtown municipal and commercial center, Amtrak rail station, and city hall and associated facilities, would serve as one "anchor," with the new arts district as the other — with future development along Academy Street connecting the two. Within the context of what became known as the "dumbbell scheme" (echoing mall planning and nomenclature), sites were designated in each of these areas.

Future urban design plans for Cary include the development of the northern and southern ends of its central area, connected by Academy Street. (Diagram by Maria Papiez)

Potential housing and mixed-use sites were identified in the northern and southern districts of central Cary.
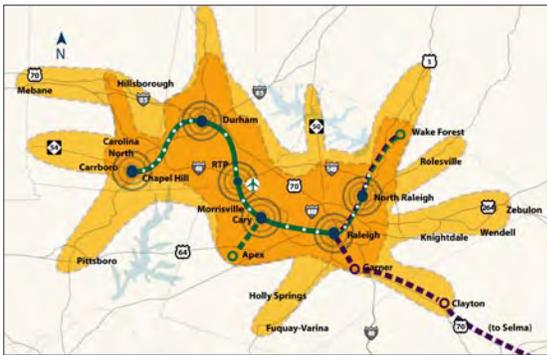
The Triangle Transit Authority's Regional Transit Vision proposes linking the major centers of the Triangle Region with rail and multi-modal transit.

Two downtown sites were identified as appropriate for utilizing transit-oriented development as a means to achieve affordable housing. They were planned in the context of the Triangle Transit Authority plans for linking major urban centers in the triangle area that include the Cary Amtrak station. When these plans are implemented they will provide unique opportunities for building housing and mix-use development integrated with transit in Cary (and throughout the Triangle).
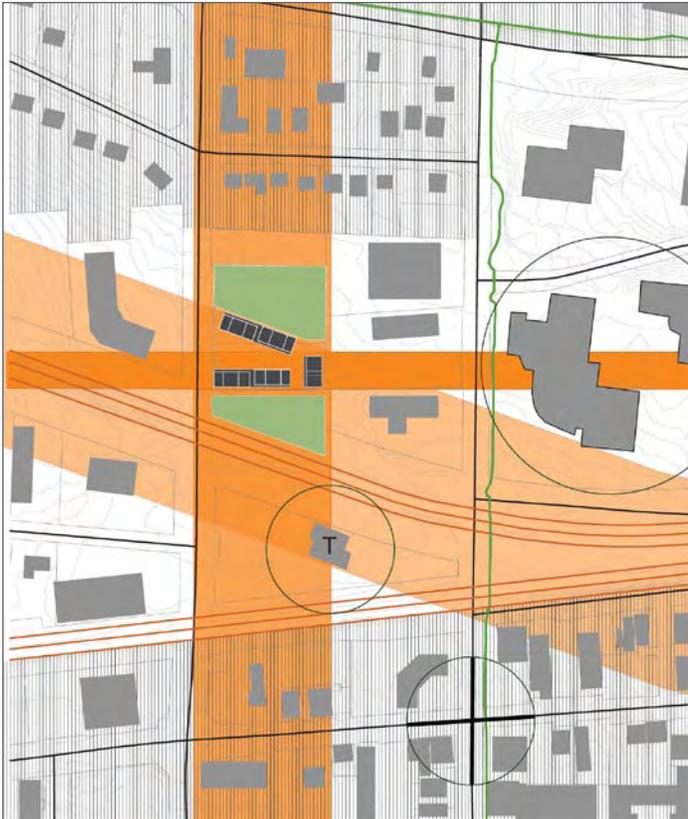
The overall planning of the TTA site aimed not only to provide direct access to transit, but also to provide connections to City Hall and the downtown area. (Maria Papiez)

TTA Site

The first site is currently owned by the TTA and located just to the north of the Amtrak station (across the tracks), with frontage on Harrison Avenue. This mixed-use proposal maximized its footprint to preserve a significant amount of its wooded site, and incorporated a parking structure to serve the needs of the future station. Its overall planning aimed not only to provide direct access to transit, but also to provide connections to City Hall and the downtown area. Three buildings are sited according to sustainable architecture strategies (for example, minimizing their east and west facades), while forming an internal courtyard. Because each building is organized around a single-loaded circulation system, all units receive generous light and cross ventilation. Four unit types—1–4 bedrooms ranging from 650 square feet to 1100 square feet—provide a range of rental and homeownership options. Even though the units maximize their square footage through efficient

Because each building is organized around a single-loaded circulation system, all units receive generous light and cross ventilation. (Maria Papiez)
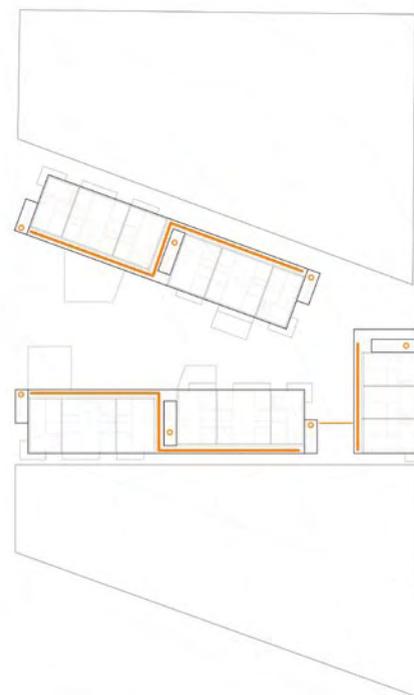
Two downtown sites in Cary were identified as appropriate for utilizing transit-oriented development as a means to achieve affordable housing. (Project sites shown in image by Geoffrey Diamond, on left and Maria Papiez, on right)

circulation, configuration and bedroom sizes, they do so without sacrificing livability. Green spaces that serve as bio-filters for stormwater run-off and green roofs to minimize heat gain are also part of the sustainability strategy. The scale of the five, six and seven story buildings is articulated by a diversity of exterior walkways, balconies, courtyards, materials and fenestration in a manner that responds to its lower density context, while also expressing a civic presence commensurate with its location. The project demonstrates that a large-scale development predominantly composed of affordable units can be compatible with its context and can serve to establish unique character intrinsic to urban identity (and value).
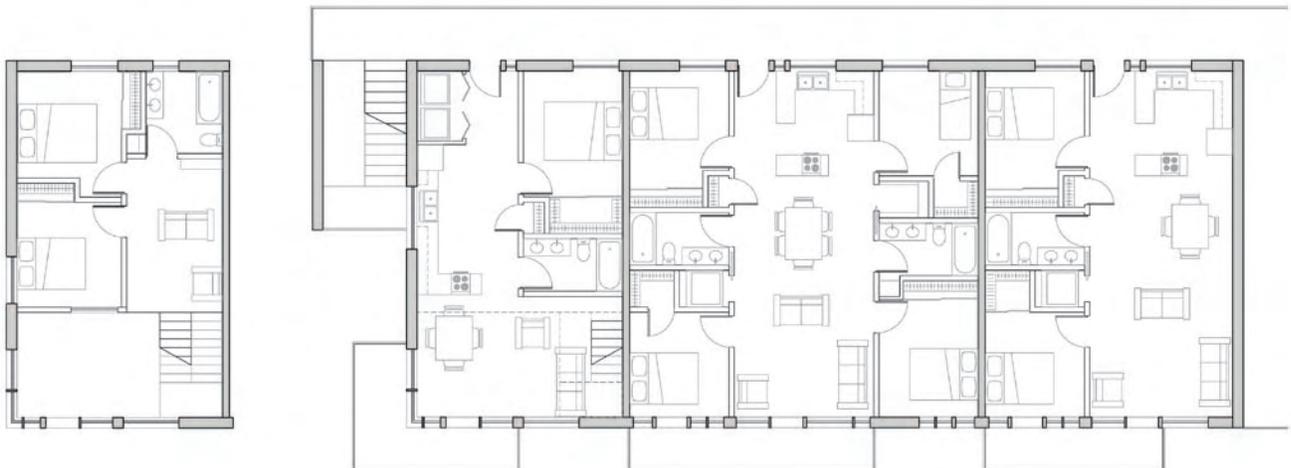
Four unit types, 1-4 bedrooms ranging from 650 square feet to 1100 square feet, provide a range of housing options. (Maria Papiez)

The scale of the five, six and seven story buildings is articulated by a diversity of exterior walkways, balconies, courtyards, materials and fenestration in a manner that responds to its lower density context while also expressing its civic presence. (Maria Papiez)
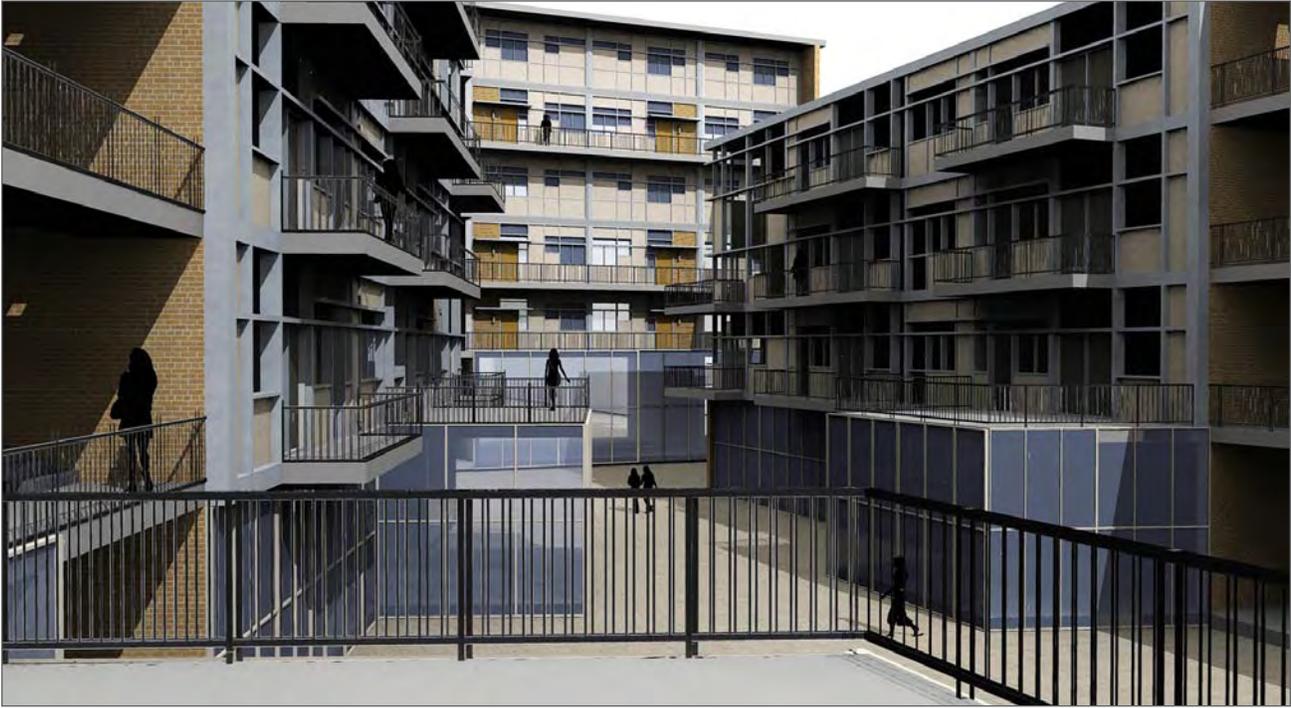
Three buildings are sited according to sustainable architecture strategies (for example, minimizing their east and west facades), while forming an internal courtyard. (Maria Papiez)

The Wye Site

This unconventional site was chosen because of its central location, adjacency to the Amtrak station, and capacity to reveal the value of unused sites. The long narrow site is located adjacent to City Hall between two active rail lines and fronting Academy Street. The mixed-use project, named "The Bridge," positioned itself as both an iconic downtown center and a bridge between City Hall and the downtown. Its two housing blocks, of five and six floors, are placed above a podium of structured parking. The narrow footprints, single-loaded circulation, east-west alignment and sun shading of the buildings, maximize daylighting, mitigate heat gain and provide cross-ventilation to every living unit. A small grocery store and restaurant anchor The Bridge on Academy Street and help to form a southern-facing public garden located on top of the podium. Repetitive plans of the compact 1–3 bedroom units achieve the benefits of economies of scale while the sinuous shape of the building provides a degree of uniqueness to each. The project demonstrates that overlooked or unconventional sites, found in many Wake County towns, should be revisited as they may provide propitious opportunities for affordable housing.

This mixed-use project, named "The Bridge," positioned itself as both an iconic downtown center and a bridge between City Hall and the downtown. (Geoffrey Diamond)
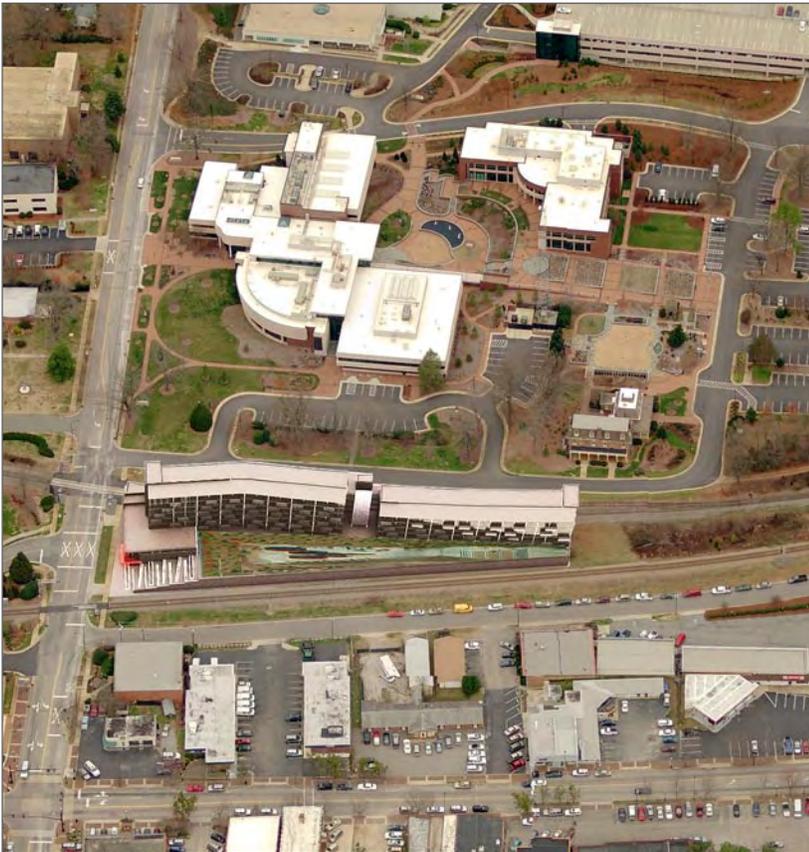
A small grocery store and restaurant anchor The Bridge on Academy Street and help to form a southern-facing public garden located on top of the podium. (Geoffrey Diamond)

A site at the northern edge of a proposed park was identified as appropriate for a mixed-use housing development anchoring the planned arts district. (Hariwan Zebari)
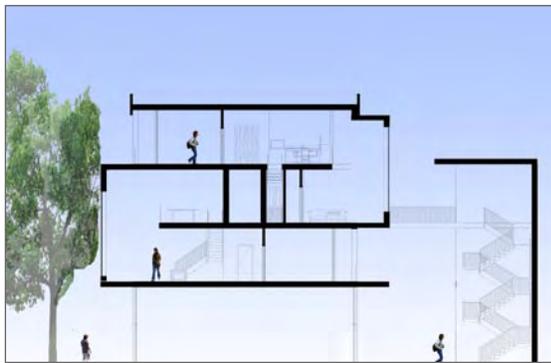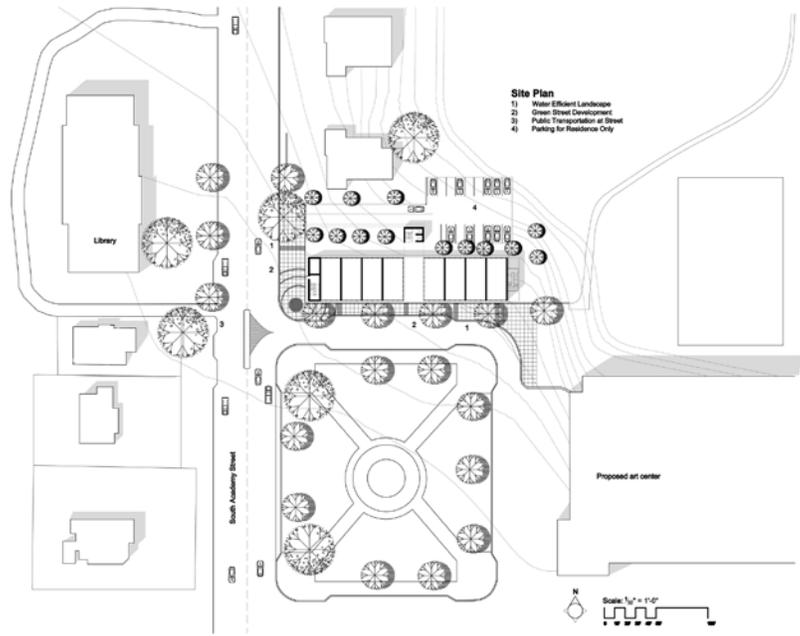
The unique planning of the park site housing includes interior corridors on every other floor, which access cleverly configured floor-through, two-story units. (Hariwan Zebari)

The two sites at the southern end of Cary's municipal and commercial center were identified as appropriate places for affordable housing that would bring the density and pedestrian activity necessary for a vibrant arts district.

The Park Site

Plans for the future arts district include a park located central to new art and performing arts centers and the existing library, and a site at its northern edge was identified as appropriate for a mixed-use housing development. The narrow profile of the building includes ground-floor shops and a day care center. The unique planning of the housing includes interior corridors on every other floor, which access cleverly configured floor-through, two-story units. In this manner, the project serves as a reminder that the requisite compact planning of affordable housing does not have to be achieved at the expense of spatial diversity and architectural interest.

The single family and duplex units propose both an alternative and anti-dote to prominent suburban models. (Erich Brunk)

The Neighborhood Site

Residential neighborhoods adjacent to the planned arts district are predominantly undistinguished single-family houses with numerous empty lots and unclaimed public spaces. This site was chosen because of its potential to connect the proposed arts district with these neighborhoods, and aid in creating a distinct identity for this area. In this context, the single family and duplex units propose both alternatives and antidotes to prominent suburban models. Its site plan includes an interior mews that provides access to garages with accessory units above. These, so called, "granny flats" can provide flexible spaces for growing families, or can serve as rental units to offset mortgage payments. A common model in traditional American cities and towns, they are recognized as an effective means to achieve affordability.

The units are positioned and sized consistent with their context, and are connected to the street through the articulation of entries, porches and exterior spaces. The three-bedroom units are planned around a compact mechanical core in a manner that achieves a variety of

The Neighborhood Site was chosen because of its potential to connect the proposed arts district with adjacent residential neighborhoods, and aid in creating a distinct identity for this area. (Erich Brunk)

generous interior spaces. The units are either single or paired, and only some have garages and accessory units, achieving a variety of houses while utilizing repetitive plans and building components. Designed according to the 4' module of standard building components (which saves on material costs and reduces waste), this proposal demonstrates that a variety of units consistent with neighborhood character can be accomplished using contemporary building methods, technologies and assemblies.

The three-bedroom units are planned around a compact mechanical core in a manner that achieves a variety of generous interior spaces. (Erich Brunk)

single family - 1275 sf
first floor

second floor

The units are positioned and sized consistent with their context, and connected to the street through the articulation of entries, porches and exterior spaces. (Erich Brunk)

The units are either single or paired, and only some have garages and accessory units, achieving a variety of houses while utilizing repetitive plans and building components. (Erich Brunk)

townhome - 1275 sf each
first floor
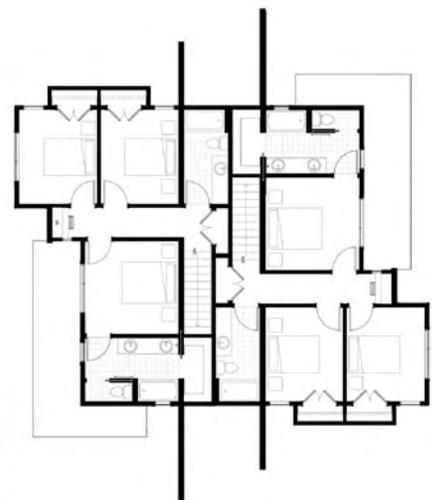
second floor

Affordability and livability can be accomplished using contemporary building methods, technologies and assemblies. (Erich Brunk)

Plans for the future of downtown Wake Forest show it growing toward the south and incorporating a future transit station. With this in mind, a site was identified adjacent to this future station as a means to demonstrate possibilities for transit-oriented development in a small Wake County town. (Jeff Pleshek)
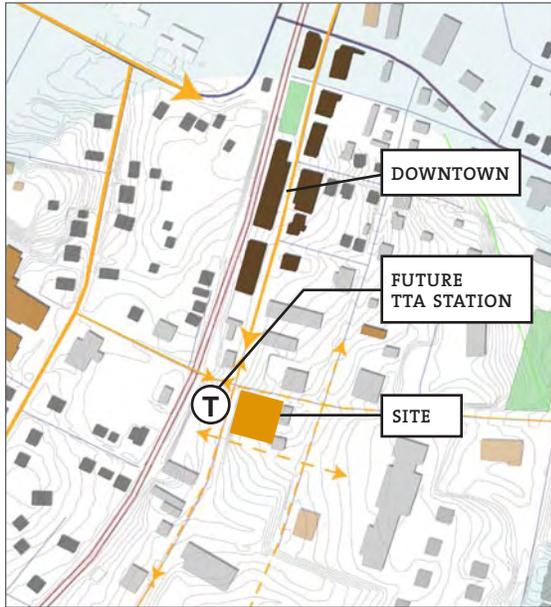
Wake Forest

Similar to Cary, Wake Forest has been identified as an important hub for the proposed TTA intercity rail transit system. Its traditional small town character distinguishes its downtown, which originally grew from its rail connections. Mostly two and three story buildings line its small municipal and commercial center, which offers a limited but diverse collection of shops and services. The future plans for the downtown show it growing toward the south and incorporating a future transit station.[26] With this in mind, a site was identified adjacent to this future station as a means of demonstrating possibilities for Transit-Oriented Development in a small Wake County town. Its location next to transit, on a prominent site within walking distance of the downtown offers rich possibilities for transit-centered affordable housing.

The proposed mixed-use, mixed income project featured three buildings configured in a manner that provided strong street edges for commercial spaces and walk-up units, while also corresponding to the correct orientation for sustainable building performance.

Planned according to a 4' module the buildings were designed to maximize their material use while providing spatially rich interior spaces. (Jeff Pleshek)
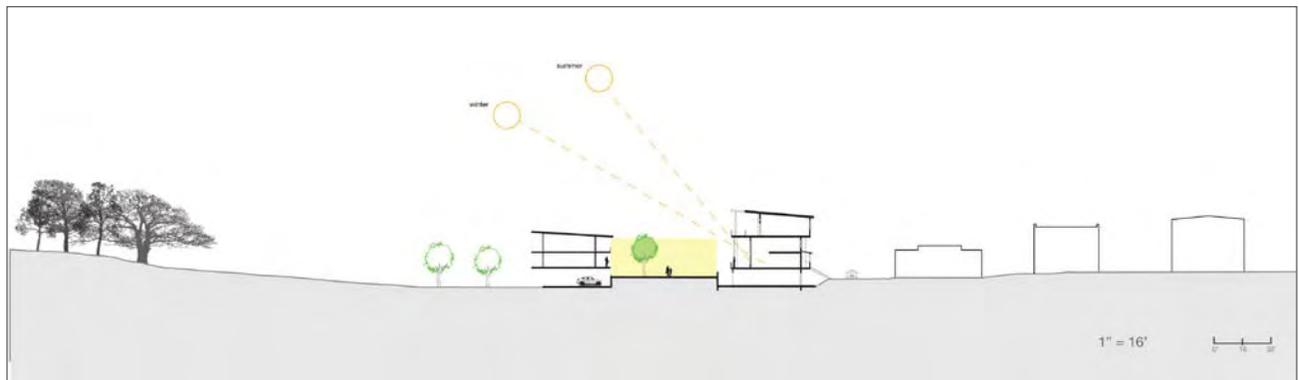
The orientation and articulation of the buildings were designed to maximize winter light while minimizing summer heat gain. (Jeff Pleshek)

It included an interior courtyard that would serve as a community space, a bio-filter for stormwater run-off and a pedestrian link from the transit station to an adjacent shopping center and parking area. Most of the units were floor-through, and included private outdoor areas to connect residents to public spaces and nature. The orientation and articulation of the buildings were designed to maximize winter light while minimizing summer heat gain. Planned according to a 4' module the buildings were designed to maximize their material use while providing spatially rich interior spaces. Exterior materials, details and openings demonstrate that the higher density often necessary for affordability can be designed in accordance with local scale and character.

The proposed mixed-use, mixed income project featured three buildings configured in a manner that provided strong street edges for commercial spaces and walk-up units, while corresponding to the correct orientation for sustainable building performance. (Jeff Pleshek)

Most of the units were floor-through, and included private outdoor areas to connect residents to public spaces and nature. (Jeff Pleshek)

Exterior materials, details and openings demonstrate that the higher density often necessary for affordability can be designed in accordance with local scale and character. (Jeff Pleshek)

Wendell

Wendell is not included in current TTA rail transit plans, but its downtown is linked to Raleigh by new express bus service. Its historic downtown and rural context provided opportunities to propose affordable housing models for settings that are found in a variety of locations in Wake County. Wendell's future plans, documented in *The Town Plan of Wendell, 2007*, envision a denser and more contiguous downtown than one finds today, predominantly through the creation of a range of housing types to serve a more diverse population. The plan identifies a number of potential sites for housing, one of which was chosen as appropriate to explore affordable housing options adjacent to the downtown.

The Town Plan of Wendell identifies a number of sites for future housing that are within a mile walking distance of its historic downtown. The one at the upper right of the plan was chosen for a demonstration project that included single family and duplex units.

M.A. Griffen House Site

This site, within walking distance of the downtown's main street, includes the historic M.A. Griffen House, which fronts the busy Route 64. This typical suburban block offered opportunities to explore alternatives to predominant suburban single or multi-family planning and design to achieve greater affordability. Typically, single-family site plans equally (more or less) subdivide their blocks. Consequently, the purchase price for each house includes its private green space, and there are no provisions for commonly-held or used communal spaces. Typical suburban multi-family housing, on the other hand, provides little, if any, private green space, and instead is planned around anonymous open space or parking. The scheme for the Griffen House Site proposes alternatives to both of these dominant models. Single and duplex units line its streets in a manner consistent with traditional small towns, including front porches for each. Though each unit includes some private garden space, the most substantial green space is commonly held. This private, internal courtyard includes garden allotments and communal spaces. Unlike typical ownership models, the units and common green spaces could be owned as shares of a limited equity co-op, a long-standing and effective affordability model.
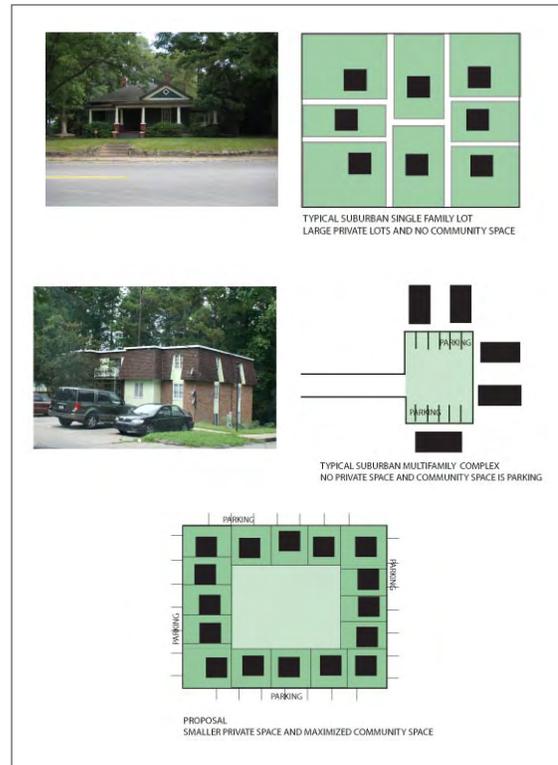
Typical single-family site plans equally subdivide their blocks with no provisions for commonly-held or used communal spaces. Suburban multi-family housing provides little, if any, private green space, and instead are planned around anonymous open space or parking. This project proposes alternatives to both of these dominant models. (Lindsay Ottoway)
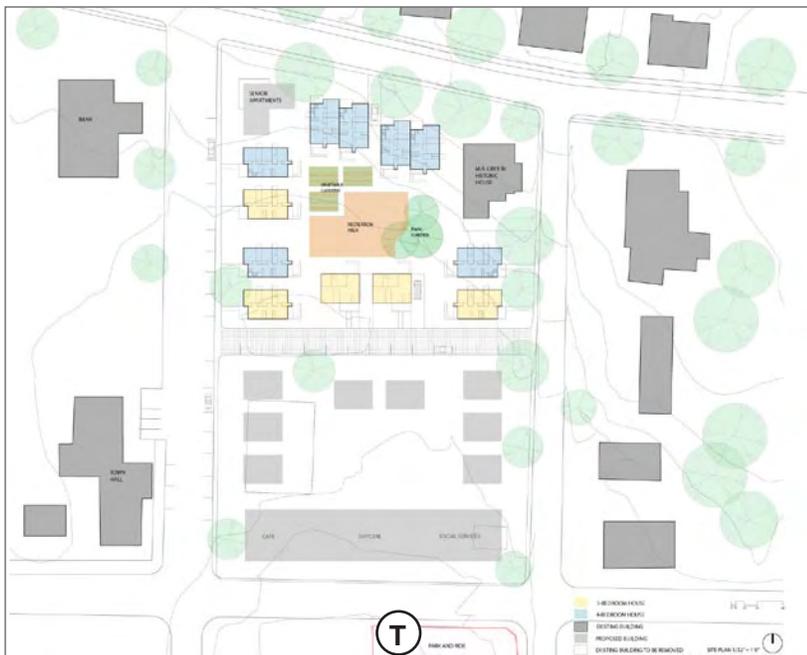
The typical suburban block of the Griffen House Site offered opportunities to explore alternatives to predominant suburban single or multi-family planning and design to achieve greater affordability. (Lindsay Ottoway)

The single-story units, planned around a storage core that provides acoustic privacy for the bedrooms, are efficiently sized but spatially expansive. Even though the units may be compact, they include generous storage and outdoor spaces — and are connected to expansive gardens and parks. Additionally, this proposed development would be within walking distance of downtown restaurants, shopping and municipal services, and lie adjacent to the express bus to Raleigh. This project demonstrates that affordability often depends on an integration of ownership models, transportation choices, pedestrian connections, and innovative architectural design.

Even though the units may be compact, they include generous storage and outdoor spaces — and are connected to expansive gardens and parks. (Lindsay Ottoway)

The single-story units, planned around a storage core that provides acoustic privacy for the bedrooms, are efficiently sized but spatially expansive. (Lindsay Ottoway)

MAKING IT HAPPEN
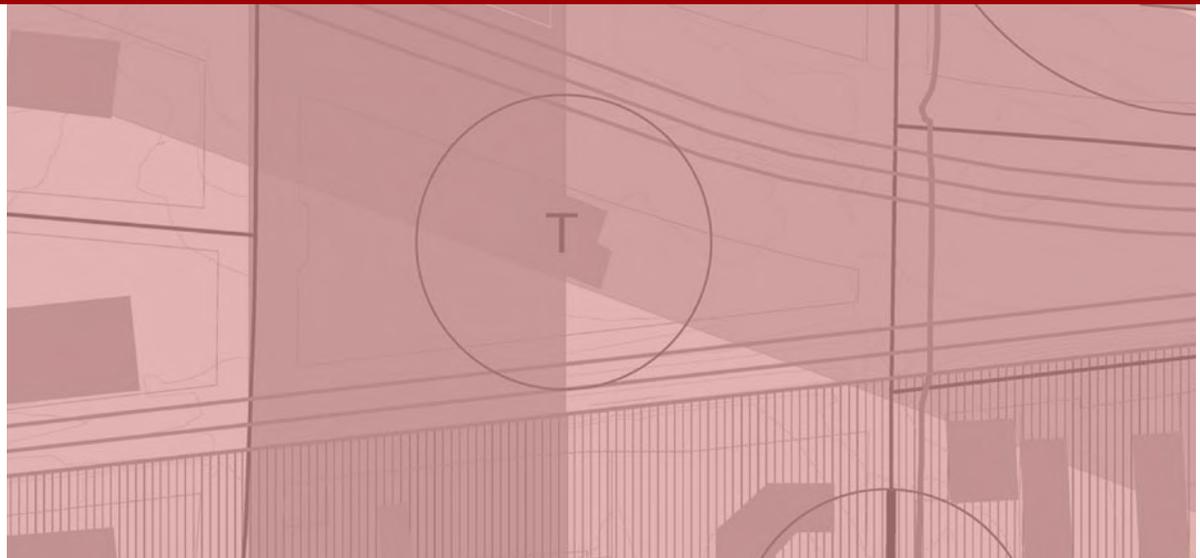
National Affordable Housing Precedents and Strategies

Nationally, savvy counties and cities have learned that proactive and comprehensive housing policies, legislation, funding models and design strategies are essential to provide for current—and anticipate future—housing needs. Moreover, those on the leading edge of housing recognize that fair housing programs contribute to long-term economic growth and serve to create a more sustainable future. Areas of the country with long-standing innovative housing programs have typically been economic and cultural centers and high growth areas. These aspects, of course, are interrelated, as desirable places to live, work and play attract people and businesses, which can lead to shortages of housing and, in particular, affordable housing. To provide housing to *all* who contribute to the value of a county or city requires a range of housing and ownership models, as well as the support services necessary for affordable communities. In this context, national best practices can provide meaningful contexts and applicable strategies for Wake County, which currently is one of the most attractive and high growth areas of the country.

Best Practices

Successful precedents and best practices can provide valuable resources and assist in developing appropriate strategies for Wake County. The following are selected examples that provide a range of approaches germane to the Wake County Affordable Housing Project.

Pacifica Cohousing
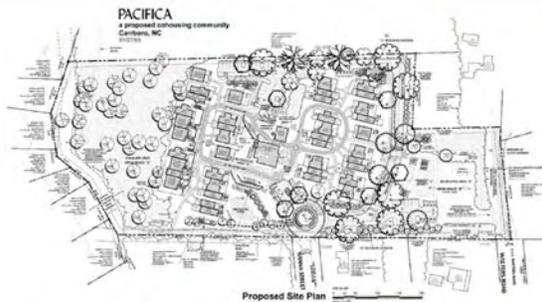
Biography

Project Type: Cohousing
Project Context: Ex-urban community
Completion: 2006
Budget: N/A
Building Size: 610 - 1460 square feet
Cost per Square Foot: $143-$179 USD

Pacifica Cohousing is a resident managed group of 46 homes divided into 2 neighborhoods on 8 acres in Carrboro, NC. There is an emphasis on community and participation throughout there decision making process.

Context

Carrboro is a mainly residential community consisting of 68% rental housing. The current efforts are towards having a more ownership inclined model, and the trends are indicating more growth in ownership than in rental. Carrboro has a density of 3,753 people per square mile while the median cost per unit of owner occupied housing is $143,242. The median household income is is $35,273 while the per capita income is $22,303. Most of the jobs are in Retail and Service industries.

Sustainability

Site Design Bioretention areas and pond for stormwater management.
Unpaved overflow parking.
Street trees every 4-5 spaces in parking lot.
Solar access provided for all buildings on the south side of building.
Minimum site lighting to reduce night sky radiation.
Energy efficient house design.
At minimum, passive solar design of homes.
Houses sited on N/S axis.
Concrete or tile flooring on first floor.
More windows on south side of house.
Windows on side of end units.
Houses designed for modular construction as baseline.
Covered bicycle storage.
Bicycle repair area and air compressor.

Affordable Housing

Pacifica is made affordable through density and membership. First, the site is very dense (6 units per acre). This gets as many units possible (allowed by the town of Carrboro) onto the site which in turn gets as much revenue generated from homeowners as possible. This money doesn't go to the profit of a developer, but instead goes to community spaces. There is a community center and playing fields, etc. On the roof of the community center, there is a system of photovoltaic cells that generates enough electricity to sell power back the grid.

Each member is required by the board of directors, who are themselves members elected by other members, to do a certain amount of work or its equivalent for the direct benefit of the community. In this way, the members of the community maintain it and there is no direct cost of keeping a large staff.

Proposed Site Plan

SOUTH ELEVATION
scale: 1/8" = 1'-0"

Pacifica Cohousing, Carboro, NC

Armstrong Place
AFFORDABLE HOUSING

Biography

Project Type: Townhouse Community
Project Context: Urban Site
Completion: Under Construction
Architect: David Baker
Project SF: 238,400 square feet
Units /Acres: 53

Located in San Francisco's Bayview District, this affordable family townhouse community is part of a trend of transit-oriented development along Third Street, and lies just a block from a stop of the new Muni Third Street Light Rail. Designed and built in conjunction with the adjacent Armstrong Senior Housing, which brings new neighborhood-serving retail space and community services to the area.

This development features two sections of stacked townhouses that flank a large shared public courtyard and also each have a private gated courtyard. The central court features allotment gardens for resident families, as well as a rain garden and bioswale plantings to manage and clean stormwater runoff biodynamically.

Context

The townhomes have a unique configuration, stacking an "upside down" townhouse on top of one with a more conventional plan. The lower level homes are entered directly from the podium level and in many units, via stoops from the sidewalk, into the main living level, with the bedrooms upstairs. The upper townhouses are entered from elevated fourth floor catwalks into the living level and descend to the bedroom area downstairs. This arrangement keeps the private quarters above street level, manages internal noise by not having active spaces above neighbors' bedrooms and avoids public walkways along bedroom levels. More than half of the homes have three or four bedrooms, to accommodate growing families.

Sustainability

Additionally ten three-story townhomes with private garages line Mendell Street, which is designed with pedestrian-friendly features such as pavers and extensive plantings. Surrounding the development, the street edge is lined with curbside bioswales-landscaped swaths that add green and collect and manage stormwater runoff. The central court features allotment gardens for resident families, as well as a rain garden and bioswale plantings to manage and clean stormwater runoff biodynamically.

Project Data

Armstrong Place is separated from Armstrong Senior Housing by landscaped pedestrian way linking Armstrong and Bancroft streets to bring new neighborhood-serving ratils space and community services to the area. Total number of units, density and parking is as follows:

Number of Units	
2 bedroom	52
3 bedroom	48
4 bedroom	24
Total	124

Density Ratios	
Project sf	238,400
Site sf	101,700
Acres	2.33
Total Bedrooms	344
Bedrooms/Acre	148
Units/ Acre	53

Parking	
Total	124
Spaces/ Unit	1
Type	garage

Project During Construction

Site Plan

First Level

Podium Plan

Conceptual Sketch of the Courtyard

Elevation

Armstrong Place, Oakland, CA

Plaza del Sol

San Francisco, CA
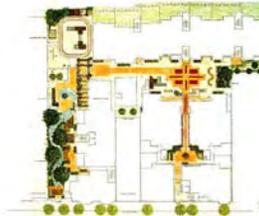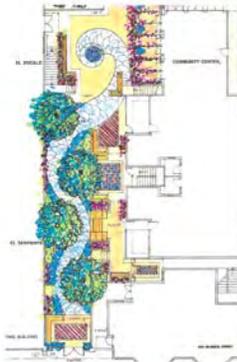
Biography

Project Type: Single family attached housing (rowhouse, townhouse),
            Multi-unit housing, mixed use development (e.g. commercial/residential)
Project Context: Urban
Completion: 1994
Budget: Confidential
Building Size: 85,000 square feet
Cost per Square Foot: ~$88 USD

The Plaza de Sol is a project that embodies a number of good practices for anyone designing affordable housing units. The project was designed by Hood Miller Associated, Inc. and was developed by the Mission Housing Development Corporation in San Francisco. Embodying very successful space planning strategies, a vibrant materials palette, and several interior courtyards, Plaza de Sol provides its residents with a secure living environment that also supports family activities through design that encourages communal access to well designed outdoor spaces.

Context

The Plaza de Sol was designed with a goal of meeting very high aesthetic standards. Located in San Francisco, CA, Hood and the architectural team sought to make the aesthetics of this project indistinguishable from other market locations. Infusing the project with lots of artwork throughout the interior courtyards, the Plaza de Sol features a great deal of local artwork that reflects the Hispanic character of its surrounding buildings.

Hoods philosophy was that art could be used as a way to transform some of the less desirable design elements so that the buildings weave seamlessly throughout the project. In this instance, art is both aesthetic and functional. One motivating factor behind much of the art is that if the spaces were already decorated in a pleasing way, it would discourage graffiti.

In other areas the art and lively colors are used to incorporate more mundane design elements. The handicap ramp, for instance was transformed into the Paseo de Serpiente, a winding ramp of colored concrete. Similarly the project features what is named "The Bridge of Sighs", a screened bridge that not only offers interesting vistas into one of the courtyards, but also one of the main ways to access the fire escapes. Finally, the entry gate itself is also ornamented with a large metal sun sculpture as a means of providing essential security to the complex, but in a way that does not read as foreboding or uninviting. Hood mentioned that the last thing they wanted was for the project to look like a fortress.

Sustainability & Strategies

Hood sought to be economic in this project not only with material usage, but also with space layout. One strategy used throughout the building was to not double-load any of the corridors or lobbies. Thus, with a smaller area being dedicated to circulation, more than 85% of the housing is in net rentable areas. Like with other affordable projects studied, the architects chose to work in materials that were not initially cheapest, but offered the lowest maintenance cost to save money and preserve aesthetics over time. Some examples of this mindset of inexpensive, but attractive and durable were the landscape products used. Hood utilized colored concrete in much of the interior to achieve an extremely low landscaping budget. Despite a variety of interesting courtyards, colored and designed by local artists, the cost of landscaping was less than $4/sf.

Other Strategies Used
- cost-effective construction practices
- volunteer labor
- permit fees waived
- contributed developer's
- tax credits, low interest loans
- financial subsidies

Social Services & Community.

It is my personal belief that one key facet currently lacking in affordable housing is the amount of social services offered. While providing an affordable and well-designed habitat for others is the primary goal of these projects, with a keen eye for design and a creative use of existing infrastructure and local organizations, we as designers have the ability to create more than a home for the needy, we can create communities. In the end, the community atmosphere of any affordable housing is one of the main contributors to the success or failure of any project. Despite the difficulty of creating such an ephemeral quality, the feeling of 'ownership' and "place" within these projects has been show to help deter crime and drug abuse, and contribute to less turnover of renters.

How does one establish a sense of "community"? One solution is to offer more social services to the tenants. Typically, housing is not the only need for those whose income falls well below the AMI of any given area. For single, working mothers, day cares and after-school programs can be provided so that kids can be ensured safety as well as development. This is precisely the model used at Plaza del Sol. The designers recognized that the services of a local teaching college could be cheaply utilized, allowing student teachers to arrive at 3PM in the Learning Room and teach "latch key" children. This provides the students with valuable experience and intern hours, while the children receive an education as their parents continue to work.

This is only one of many examples. One affordable multi-family home in Atlanta, GA catered to women and children with HIV/AIDS. Work development programs for the homeless are also common. Given the broad range of those requiring affordable housing and social service, from the former homeless to firefighters and teachers struggling to make a living, incorporating a vision for a service-oriented project in the early stages of design can create a lasting impact, offering some a helping hand and other an opportunity to get involved.

Plaza del Sol, San Francisco, CA

Davis Residence

Biography

Architect: Erik Mehlman, AIA
Project Type: Single Family Home
Project Context: Habitat For Humanity Home - Downtown Raleigh
Completion: 2003
Budget: $120,000 - $170,000 (depending on site location)
Building Size: 1,070 HSF
Cost per Square Foot: ~$112 - 159 USD
3 Bedrooms, 2 Bathrooms
Living Room, Dining Room, Kitchen, Porch and Outdoor Storage

The Davis Residence (also known as Biltmore Trace - Habitat for Humanity) began as a competition with the Young Architects Forum, YAF and Habitat for Humanity. Even though the design was not selected as the winner a homeowner working with Habitat liked the plan and decided the build it for her family. The home was not designed for a specific lot but rather as a model for affordable housing in the region. Working side by side with the owner, the architect was able to make design choices based on the families needs like installing hardwood flooring instead of carpet due to Davis' allergies. Working side by side with the family to build the home also provided a personal satisfaction of giving good design to a family in need.

Context

Located in Downtown Raleigh, the Davis' residence is an example of how far a well designed home can go. The architect provided careful consideration of the needs of a family while maintaining a tight budget within a tight program. 3 bedrooms, 2 bathrooms, kitchen, living and dining rooms all were carefully placed into a footprint of just over 1000 sf. The public and private spaces are seperated by the kitchen/bathroom utility core with a sloped cieling that adds volume to a smaller communal space. Another version of this plan has been built utilizing a different, more traditional skin proving that an innovative plan can still fit within a traditional community.

Sustainability

Natural daylighting - The home is oriented for natural sunlight from the south. North facing clerestory windows bring in additional light from the north.

A "Stack Effect" ventilation design draws in cool breeze from the south facing windows and out the north facing operable clerestory windows. The system worked so well that workers took lunch breaks inside even before the air-conditioning was turned on.

The natural daylighting and natural ventilation are cost-free additions that have saved the owner significant amount of money while providing a more comfortable living environment.

Designed and Affordable

The key design concepts were to provide an affordable home that was an open plan and provided economic savings through solar orientation and passive thermal comfort.

The location of the kitchen was carefully considered. In many affordable housing models the kitchens are often tucked into a corner. Mehlman placed the kitchen in the center of the home creating a central communal space. The kitchen being the most used space in a home was placed in the center of the home and in the center of the "stack effect" for optimal comfort.

Habitat for Humanity started is a "nonprofit, ecumenical Christian ministry founded on the conviction that every man, woman and child should have a decent, safe and affordable place to live." Habitat for Humanity is one of the largest home builders in the country. There is a greater responsibilty and opportunity to provide sustainable homes while investing in good design.

"When the house on Lot 17 was done, Habitat was like, 'Yeah, this is a little bit nicer than what we're typically doing.' But I don't think there was a whole lot more to it besides good light quality, smart solar orientations, and a little bit more design thought."
-Erik Mehlman, AIA -Metropolis Magazine, October 2008.

Davis Residence, Raleigh, NC

Learning from Others

There are a number of North American cities that have established substantive and longstanding track records regarding affordable housing programs. Portland (OR); Seattle (WA); Vancouver, British Columbia, (Canada); and the San Francisco Bay Area are perhaps the most well known. The San Francisco Bay Area, for example, has a long history of being out-in-front of housing issues — a response to necessity but also in recognition of the economic and cultural benefits of creating a range of housing choices. Through the collaborative models of the Association of Bay Area Governments, effective policies including Transit Oriented Development, have produced a range of strategies for the provision of affordable housing and measurable outcomes. For many years Portland (OR) has been a leader in both government and non-profit affordable housing. For example, Central City Concern, founded in 1979 through a collaborative effort by the city and Multnomah County, has built thousands of affordable and supported units in downtown Portland and today has a staff of over 500 and serves more than 13,000 individuals annually. In 2008 the city sponsored a nationally recognized courtyard housing competition that produced leading-edge models for affordable housing.

The Washington, D.C. metro area has been another high growth area that has necessitated the need for effective responses to rising housing prices and the loss of affordable housing units. Fairfax and Montgomery Counties are nationally recognized for their housing policies, including Inclusionary Zoning, which has produced much needed affordable units. According to Policy Watch, the Montgomery County Inclusionary Zoning Program, adopted in 1974, has resulted in over 13,000 new affordable units. Recently Fairfax County adopted a tax on real estate transactions, which will be used for the development of affordable housing. They also have employed strategies such as overlay districts, streamlined approval processes and established home-ownership support programs to both promote and

The Richard Harris building, developed by Central City Concern, provides a range of units and services for those who need it the most in downtown Portland.

preserve affordable housing countywide. Recent recommendations by the Montgomery County Affordable Housing Task Force include strategies such as impact fees for all non-residential development to be used for affordable housing, fast-tracking of affordable housing approval processes, reducing parking requirements for new affordable housing developments, home purchase assistance for public employees, and compiling an inventory of all publically owned properties as potential affordable housing sites.

Cities and counties have also adopted proactive housing policies centered on transit-oriented development. Cities such as Boston (MA), Denver (CO), Portland (OR), and the Twin Cities (MN), have created policies and strategies that have produced tangible results. In 1998, Charlotte (NC) approved a ballot-initiative to fund a new light rail system that would include TOD's at major stations. Since the system opened in 2007, ridership numbers have exceeded projections. However, due to market conditions and other factors, housing at TOD's have not matched aspirations, and affordable units have had even less success. That said, with a Housing Trust Fund in place to support affordable housing development, and a program dedicated to producing affordable housing at station areas (the Assisted Multifamily Housing at Transit Station Areas Program), strategies are in place that suggest future successes. Austin (TX) which is the state capital located in Travis County, has recently opened a new 32-mile rail transit system (on existing freight tracks) that incorporates TOD station planning.[27] Each station has been carefully planned to create context-dependent identity and character. Additionally, all have requirements for mixed income housing, and the city's TOD Ordinance and TOD Housing Resolution includes the goal that 25 percent of the new housing units in each TOD area should be affordable. These two recent examples illustrate how progressive housing policies can be supported by transportation policies and provide case studies worthy to be studied now and as they develop in the future.

Counties and cities that have been successful in implementing affordable housing initiatives usually took pains early in the process to educate the public on the terms and scope of their plans. Efforts to derail affordable housing usually stem from basic misunderstandings of what is being proposed. Effective educational programs can illustrate that the inaccessibility of decent housing options is not limited to the very poor, but affects a broad spectrum of the community. And, proactive and progressive policies and programs are essential to the long-term economic health of our cities and counties. Moreover, savvy counties and cities value good design as the principle means to reassure citizens that affordable housing can fit seamlessly into their communities, contribute to the character and value of their neighborhoods, and support the economic health of their municipalities. In addition to effective policies and strategies, Wake County would be well served to utilize substantive educational programs to achieve its goals for equitable and timely solutions to the housing challenges it faces.

Since it opened in 2007, ridership numbers for Charlotte's light rail have exceeded projections.

LAW
OFFICE

SENIOR
APARTMENTS

BANK

M.A. GRIFFIN
HISTORIC
HOUSE

VEGETABLE
GARDENS

RECREATION
AREA

RAIN
GARDEN

CAFE   DAYCARE   SOCIAL SERVICES

CONCLUSION
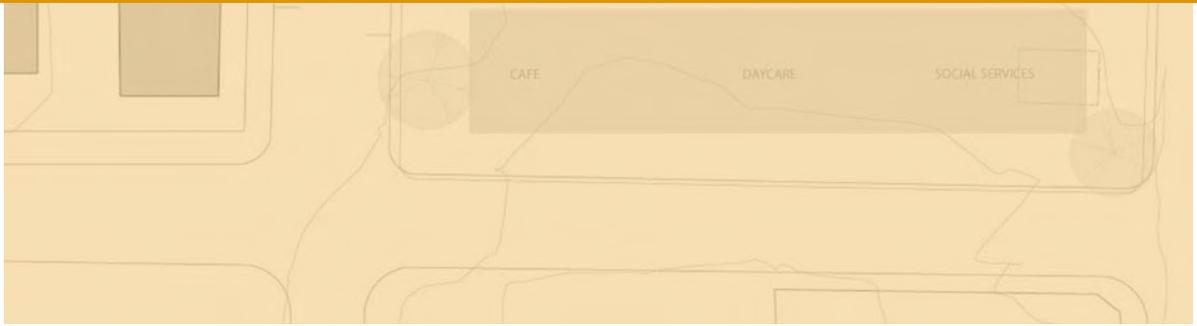
As the issues germane to affordable housing have become more complex and their solutions increasingly diffuse, the need for clear strategies that recognize perennial issues while incorporating contemporary parameters have never been more necessary. Overarching the exigencies of financing, building and managing affordable housing is the need for multifaceted and regional collaboration and coordination. Even though county governments and regional planning commissions traditionally have had limited power to enforce policy, our time calls for more countywide and regional approaches. Wake County can distinguish itself as a national leader in affordable housing through the articulation, promotion and production of leading-edge affordable housing policies, strategies, and models. The following are general recommendations on how this might be accomplished.

Recommendations

Locate Near Transit
Plan for a more multi-modal, transit-based future. Working proactively and collaboratively with municipalities, transit authorities, developers and funding agencies, locate new affordable housing or mixed-income developments within walking distance of dependable transit — and preferably fixed-rail or route transit. Consider the promotion of transit-oriented development as part of a comprehensive affordable housing strategy.

Build Sustainably
Plan and build all new or rehabilitated housing according to the highest standards of sustainable development and architecture. Cost projections for living expenses should include the economic benefits of reduced energy and transportation costs.

Promote Mixed-Use, Mixed-Income Development
Mixed-use and mixed-income developments can support affordable housing, serve as an antidote to concentrations of poverty, provide local services and jobs, and contribute to the diversity and economic viability of neighborhoods and communities.

Create Local and Individual Character
New housing should respond to the context of the natural and built environment in which it is built. An astute understanding of local architecture types and styles often reveals timeless characteristics adaptable to contemporary requirements. Houses that are sympathetic to their surroundings are more energy efficient, blend seamlessly with their neighbors, and promote community acceptance.

Include Community Spaces
Incorporating shared community spaces can maximize the amount of play, green or garden space for families while minimizing their individual investment. Generous community spaces can compensate for smaller units and serve affordable ownership models such as co-housing or limited equity co-ops.

Make Connections
The design of new housing should go beyond housing units to include considerations of their neighborhood, city and natural contexts. We should build not only for individuals and families, but also for the neighborhood and community. And, we must remind ourselves that walkable neighborhoods provide connections to shopping, services and recreation in ways that enrich the lives of our families, particularly children, without adding to its costs.

Make it Flexible and Adaptable
Adaptability is intrinsic to affordability. All families grow or shrink and their needs change over time, but the homes of low-wealth families often are in need of the most flexibility. Adaptable housing can accommodate the recently homeless relative, an elderly parent who needs care, or a fledgling business in ways that traditional housing often cannot.

Advocate and Educate
Few social, political and economic arenas are more susceptible to misunderstandings or more in need of accurate information and skillful dissemination than affordable housing. Much effort, time and expense can be saved when our partners, municipal leaders, and members of the community are informed and educated about the long-term benefits of comprehensive housing policies that include affordable housing.

Make it Home
Everyone deserves well-designed housing and communities, and places that nourish our souls. Good design is intrinsic to this fundamental goal.

APPENDIX

Project team

Project Director
Thomas Barrie, AIA, Professor of Architecture

Funding Agency
Wake County Human Services Housing and Community Revitalization Division

– Annemarie Maiorano, AICP,
  Housing Division Manager

– Emily Fischbein, AICP,
  Community Development Specialist

Pilot Town Workshops Partners and Participants
– **Cary**: Mayor Harold Weinbrecht, Jr.; Planning Manager Phillip Smith; Senior Planner Juliet Andre; Senior Planner Tracy Stone-Dino, Ray Boylston, Town of Cary Transit Administration, Chuck Dopler, Habitat for Humanity of Wake County, Terry Ashe, Firm Foundations Community Services, Barbara Garlock, St. Francis UUC Emergency Services, and Shawn McNamara, City of Raleigh Community Development Department

– **Wake Forest**: Mayor Vivian Jones; Planning Director Chip Russell; Candice Davis, Planning, Anne Ayers, Planning, Agnes Wanman, Planning, Marshall Harnett, WEB DuBois CDC, Kevin Jones, East End Association, Doug Nalley, Southeastern Seminary, Bob Polanco, Prominence Homes, Matt Hale, David Williams, and Gregory Walton

– **Wendell**: Mayor J. Harold Broadwell; Town Manager David Bone; and Planning Director Teresa Piner

Guest Critics
Robin Abrams, Georgia Bizios, Emily Fischbein, Randy Lanou, Annemarie Maiorano, Wendy Redfield, Carly Ruff, Kristen Schaffer, Paul Tesar, Sean Vance and Jim Zuiches

Research Assistants
Katherine Ball, Brielle Cordingly and Lauren Westmoreland

Graphic Design
Liese Zahabi

Production Coordination
Eric Larson, College of Design Communications Director

Students
Erich Brunk, Jessica Cochran, Geoffrey Diamond, Stephanie Greene, Patrick Madrigan, Trey McBride, Tyler Morrison, Lindsay Ottaway, Maria Papiez, Jeffrey Pleshek, Keith Wales and Hariwan Zebari

About NC State, the College of Design and the School of Architecture

NC State University is a member institution of the sixteen-campus University of North Carolina system and has a long and distinguished history. When it opened in 1889 as the North Carolina College of Agriculture and Mechanic Arts it offered courses in agriculture, horticulture, pure and agricultural chemistry, English, bookkeeping, history, mathematics, physics, practical mechanics, and military science. During the ensuing 120 years, its leadership has established new programs and expanded the breadth and scope of the institution, and in 1917 the institution's name was changed to North Carolina State College of Agriculture and Engineering. The faculty and student population more than doubled during the post–World War II period, and in 1965 the name of the institution was changed to North Carolina State University, signifying its new role as a comprehensive university.

Since its founding, NC State has been a nationally recognized leader in science and technology with historic strengths in agriculture and engineering. But NC State has evolved into a comprehensive community of scholars that also has outstanding degree programs in design, the humanities and social sciences, education, life sciences, management, natural resources, physical and mathematical sciences, textiles and veterinary medicine. NC State serves all North Carolina communities through statewide research, extension and engagement activities.

The School of Design was established in 1948 with two original academic components: the Department of Architecture and the Department of Landscape Architecture. In its early years the School of Design experienced a remarkable period of creative and intellectual development. Designers and theorists such as Buckminster Fuller, Matthew Nowicki, Lewis Mumford, and Eduardo Catalano joined the faculty and helped build a reputation for innovation and experimentation. Frank Lloyd Wright, Mies van der Rohe, Walter Gropius, Louis I. Kahn, Pier Luigi Nervi, Charles Eames, Marcel Breuer, and numerous other internationally prominent figures came to lecture, to conduct design experiments,

and to inspire a new generation of designers. The legacy of imagination, diversity, and excellence set by this first generation has continued throughout the school's history.

The College of Design

In 1958, the School of Design added what is today called the Department of Industrial Design. The Department of Graphic Design was created in 1991, and the Department of Art + Design was formed in 1998 to address the growing trends in new media and multimedia, including animation.

In 2000, the School of Design was renamed the College of Design. It stands as one of 11 colleges at the University. The architecture department concurrently became the School of Architecture. The School of Architecture has approximately 25 full-time and part-time faculty who instruct over 250 undergraduate and graduate students. The accredited school offers three degrees: the Bachelor of Architecture, the Bachelor of Environmental Design in Architecture, and the Master of Architecture.

Following the mission of a land-grant university to engage communities, the College of Design boasts several helpful research and extension programs within its Laboratory for the Design of Healthy and Sustainable Communities. The Affordable Housing and Sustainable Communities Initiative, led by Thomas Barrie, AIA, seeks to provide educational resources for leaders in government, non-profit organizations and the community to help create innovative solutions to the housing and urban challenges facing North Carolina.

Learn more at design.ncsu.edu.

Endnotes

[1] According to *The Brundtland Report*, UN Commission on the Environment and Development (1987), sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs."

[2] Claire Cooper Marcus, *The House as Symbol of Self: Exploring the Deeper Meaning of Home*, Berkeley, CA: Conari Press, 1995, p. 4.

[3] According to the Congressional Budget Office total government subsidies for housing in 2009 were $230 billion. *New York Times*, June 12, 2010.

[4] Paul Krugman, "Home Not-So-Sweet Home," *New York Times*, June 23, 2008.

[5] See Robert Fishman, *Bourgeois Utopias, The Rise and Fall of Suburbia*, New York: Basic Books, 1987.

[6] See Fishman, p. 7 and Kenneth Jackson, *Crabgrass Frontier, The Suburbanization of the United States*, New York: Oxford University Press, 1985. Especially see Chapter One: "Suburbs as Slums."

[7] "Locke in effect set a challenge: once he articulated the notion of a politically free self who was able to appropriate property for private purposes, there lay an opportunity in architecturally elaborating that property, especially what was regarded as one's most private property, the home, to articulate a person's individuality and selfhood." John Archer, *Architecture and Suburbia, From the English Villa to American Dream House, 1690-2000*, Minneapolis and London: University of Minnesota Press, 2005, p. xviii.

[8] Fishman, pp. 34-38.

[9] John Archer, p. xvi.

[10] Op cit., pp. 91-92.

[11] Use of aristocratic place names ignores the history of the often-impoverished lower-class poachers subject to the death penalty. It is rather perplexing that a country that fought a celebrated war of independence to free itself from a dictatorial monarchy and hierarchical class system so readily adopted its domestic symbols.

[12] Douglas Kelbaugh, *The Pedestrian Pocket Book, A New Suburban Strategy*, New York: Princeton Architectural Press, 1989, p. ix.

[13] Pedestrian Pockets were developed specifically for suburban conditions.

[14] *The Transit Cooperative Research Program Report 102, Transportation Development in the United States: Experiences, Challenges and Prospects*, Washington, D.C.: Transportation Research Board, 2004, p.5.

[15] It goes on to argue: "At the same time (it can) expand access to jobs, educational opportunities and prosperity for a range of income groups. By offering: (1) affordable housing, (2) a stable and reliable base of transit riders, (3) a broader access to opportunity and (4) protection from displacement, mixed-income TOD holds the potential to address the problems of worsening traffic congestion, the need for affordable housing in metropolitan areas and the growing gap between lower income and wealthier residents." *Realizing the Potential: Expanding Housing Opportunities Near Transit*, The Center for Transit Oriented Development, 2007, p. 3.

[16] American Public Transportation Association.

[17] Peter Calthorpe, *The Next American Metropolis: Ecology, Community and the American Dream*, New York: Princeton Architectural Press, 1993, p.29.

[18] *Realizing the Potential: Expanding Housing Opportunities Near Transit*, The Center for Transit Oriented Development, pp. 7-10.

[19] Op cit., p. 6.

[20] The General Assembly of North Carolina, Session 2009, House Bill 148.

[21] Lauren Westmoreland prepared portions of this section.

[22] David J. Brown, Ed., *The Home House Project: The Future of Affordable Housing*, Cambridge, Mass: MIT Press, 2004, p. 19.

[23] *Eco-City Dimensions – Healthy Communities, Healthy Planet*, by Mark Roseland, Ed., New Society Publishers, 1997.

[24] Walker Wells, Ed., *Blueprint for Greening the Affordable House*, Washington: Island Press, 2007, pp. 2 -3.

[25] According to 2005 figures cited by HUD. Alex F. Schwartz, *Housing Policy in the United States, Second Edition*, London: Routledge, 2010, p. 1.

[26] *The Renaissance Plan for the Heart of Wake Forest* was completed in 2004.

[27] Austin is located in Travis County, Texas. Similar in population to Wake County, the area is experiencing similar amounts of growth.