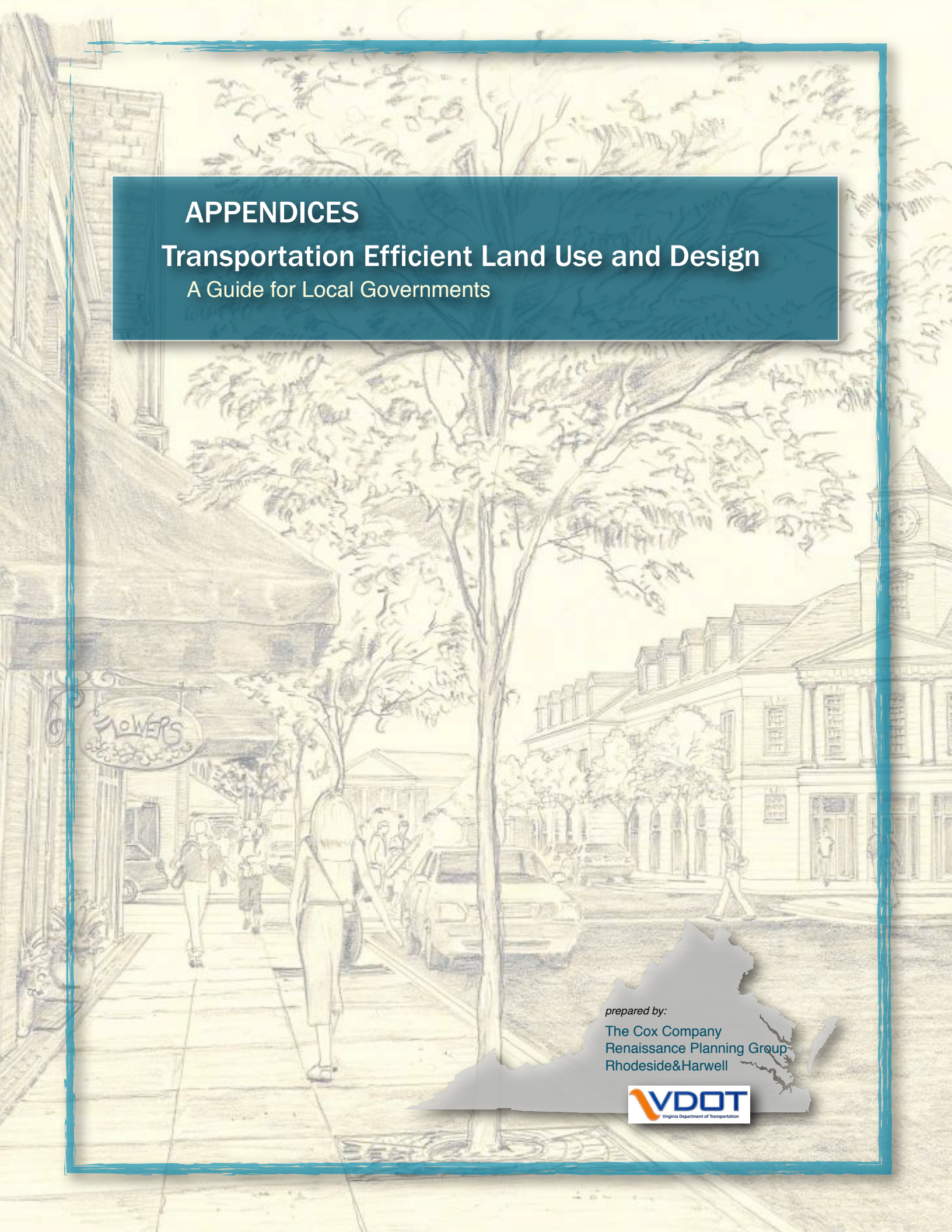
APPENDICES

Transportation Efficient Land Use and Design

A Guide for Local Governments



prepared by:

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Rhodeside&Harwell

VDOT
Virginia Department of Transportation

APPENDICES

Transportation Efficient Land Use and Design

A Guide for Local Governments

This Guide was prepared under a contract for the Virginia Department of Transportation and the Office of Intermodal Planning and Investment. The authors are responsible for the facts and the accuracy of the information presented herein. The contents do not necessarily reflect the official views or policies of the Virginia Department of Transportation or the Commonwealth of Virginia Transportation Board. The Guide does not constitute a standard, specification, or regulation.

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APPENDIX CONTENTS

The accompanying Appendices have been organized to provide examples of adopted plans, ordinances, and other exhibits that embrace principles for the practical application of transportation efficient land use planning and design. Design illustrations and photographic exhibits reflect case studies of actual and proposed TND projects. Each appendix document was selected on the basis of its applicability to a locality's specific needs and circumstances. They are intended to demonstrate techniques that would benefit the local planner and public official in the preparation of similar documents. These documents have been prepared by professional consultants working directly with individual jurisdictions. The reader is encouraged to contact the consulting firm as subjects arise for further inquiry.

A. Development Area Planning Examples

A.1 Residential Infill Development Guidelines – The Town of Blacksburg

The purpose of **Blacksburg's** residential infill design guidelines is to serve as a resource for Town residents, architects, planners, and builders. Focusing on the unique aspects of both infill and new development properties, these guidelines provide a clear and concise view of the essential fabric of traditional neighborhood development. Further, the document identifies a wide variety of design features that affect the success of compatible projects, dealing with setbacks, building orientation, parking, landscaping, massing, and open space. More importantly for an established community like Blacksburg, the guidelines provide suggestions to help integrate new projects effectively into existing neighborhoods throughout the Town. *(contact: Renaissance Planning Group)*

A.2 Bealeton Area Plan for the Route 17 Corridor – Fauquier County

The **Bealeton** plan has been included to illustrate how planners may address a strategy area that has transportation and land use issues that are deeply rooted. Rt. 17 is a highly traveled transportation corridor that traverses the state. The Bealeton community has concerns with congestion, safety, and the lack of community vision. Long established as an urban development service district by the Fauquier County Comprehensive Plan, the Bealeton Area Plan unfolds a very creative and workable plan that promulgates traditional neighborhood development practices for the long-term physical development of the corridor, interconnected streets, and surrounding land areas. *(contact: Renaissance Planning Group)*

A.3 Demographic Analysis and Land Area Demand Projections – The Town of Orange

Supplementing the discussion of population projections, this document provides a more detailed example of projecting population and employment demand growth and translating this into land area requirements within a jurisdiction's designated development area. In this case, the focus was to apply demographic growth guidelines as required by the Urban Development Area legislation. However, the documentation reveals that there is much more to consider in making land area assignments than just estimating UDA-defined uses. The spreadsheet approach can be applied to any community. The **Town of Orange** was selected due to the fact that there are no *town-level* projections prepared by the VEC. Thus, for Virginia towns and villages, it is first necessary to analyze, adjust, and pro-rate county and regional statistics as well as those of jurisdictional peer groups to best predict future population and employment growth. *(contact: The Cox Company)*

A.4 Development Area Build-Out Analysis – Isle of Wight County

This appendix is useful in demonstrating how to move from the demand side (population and land area projections) to the supply side (land availability). Responding to anticipated residential and employment growth levels, a range of uses and densities were tested, including both compact TND land uses and conventional suburban uses. **Isle of Wight's** adopted Urban Development Areas were the focus of this assessment of the buildout potentials for specific areas. Estimates of net developable acreage were prepared to guide the options for a physical master planning exercise. The net developable area technique has emerged over the past generation in order to get a more accurate qualitative assessment of the build-out opportunities when preparing comprehensive plan updates. *(contact: The Cox Company)*

B. Transportation Benefits Studies

B.1 TND Transportation Plan – Fluvanna County

This study examines the potential benefits of TND transportation principles and grid design techniques as they apply to **Fluvanna County's** Zion Crossroads development area. As the name implies, this designated growth area is a major crossroads, but it lacks the secondary roads and streets necessary to serve a disparate arrangement of existing land uses. The Future Land Use Plan envisions the area for intense growth at compact densities. This appendix examines a range of transportation opportunities and traffic planning strategies to accommodate future demands. *(contact: The Cox Company)*

B.2 TND Transportation Benefits – Albemarle County

The benefits of transportation efficient land use and traditional neighborhood development practices are thoroughly examined in this **Albemarle County** study. Based on extensive research of existing land use characteristics and future population demands in the county's growth areas, this document examines the comparative transportation impacts of suburban (sprawl) development patterns in relation to well planned, TND forms of land use. *(contact: Renaissance Planning Group)*

C. Implementation Ordinances

These zoning ordinance examples explore three separate approaches to implement TND forms of land use. The needs and circumstances within each community dictated the preparation of a individualized districts that responded to a combination of market, political and physical issues.

C.1 TND Ordinance – Montgomery County

The **Montgomery County** ordinance is highly illustrated and establishes extensive guidelines and regulations that aim to establish the form and function of the neighborhood. The application of this ordinance must be generated by a private sector-initiated zoning map amendment. *(contact: Renaissance Planning Group)*

C.2 TND Zoning District – The City of Martinsville

The approach for the **City of Martinsville** was to create a by-right option for TND development, essentially inviting the development community to take advantage of mixed-use opportunities not otherwise available under the existing zoning districts. At present, the City has adequate infrastructure and facilities, so there is little or no need for a district that extract proffers and cash from an applicant. The City's principal growth management objective was that quality projects could be reviewed and negotiated at the staff and planning commission level without the requirement for extensive, time consuming public hearings. *(contact: The Cox Company)*

C.3 TND/PUD Zoning District – Fluvanna County

The implementation method for **Fluvanna County** was to modify their existing Planned Unit Development (PUD) district. Similar to the Montgomery County zoning district, it requires a landowner- or developer-initiated zoning application. The county staff did not feel the political interest was there to undertake and adopt an entirely new ordinance. In this case, internal modifications to the county's existing, but somewhat deficient, PUD district made traditional neighborhood development possible through a simple and workable procedure. *(contact: The Cox Company)*

D. Miscellaneous

D.1 Community Opinion Survey – The City of Martinsville

D.2 TND Prototype Residential Lot Types

D.3 TND Prototype Street Types

D.4 TND Projects in Virginia

APPENDIX A.
Development Area Planning Examples

TOWN OF BLACKSBURG

RESIDENTIAL INFILL DEVELOPMENT GUIDELINES

DRAFT 10-2011

introduction

Residential neighborhoods are the basic building blocks of a community. Within the Town of Blacksburg, strong neighborhoods are more than just a collection of nice houses within an isolated subdivision. Instead, Blacksburg's traditional residential neighborhoods have a variety and mixture of housing types that are connected to the Town's existing fabric and create the unique sense of place and community identity that Town residents enjoy.

As a university town, the desire for well-designed neighborhoods that meet housing demand and contribute to quality of life has been in the forefront of community concerns for a number of years. With limited on-campus housing available, many Virginia Tech students live off-campus in apartments and other rental properties including duplex, townhome, and single-family residences in residential neighborhoods. This type of market influence makes purchasing homes or vacant lots for conversion to rental or investment property attractive to residential developers. At the same time, national market trends confirm a growing demand for residential infill projects that cater to the older baby boomers (aged 55-64) and generation Y (late teens to early 30's) that want to experience the convenience and downscaled lifestyles of vibrant, mixed use urban areas like the Town of Blacksburg. As residential infill construction continues, the Town of Blacksburg must consider how new structures can meet the demand for all of these markets, and can be designed to create a seamless transition between new development and existing housing patterns to ensure the long-term viability of its neighborhoods.

At the heart of these residential infill design guidelines is the principle of maintaining and reinforcing community character. Without attention to community design, the appearance of Town of Blacksburg's neighborhoods in the future could lose some of the small town charm that contributes to the property values of residents in those neighborhoods. Design guidelines provide a commitment and a blueprint for maintaining the character of residential neighborhoods over time. In addition, ensuring that future development maintains the design character of a neighborhood can provide property owners with some assurance that the form of future appearance of the neighborhood will not degrade investment in their own property and will enhance the beauty of the Town as a whole.

Purpose of the Guidelines

The purpose of the following Residential Infill Design Guidelines is to serve as a resource for Town of Blacksburg residents, property owners, builders and developers who are involved in planning, designing, and building residential projects in existing neighborhoods. Residential "infill" development can be either construction on vacant land or redevelopment that replaces existing buildings. These residential infill guidelines encourage the efficient use of developable land and provide direction to developers, staff, and elected officials alike, to implement the Town's design-related goals and objectives for residential development. Compatible infill development can help reinforce the cherished aspects of community character and support neighborhood walkability and overall quality of life. A variety of design features affect the success of compatible infill projects, namely building orientation, parking, setback patterns, landscaping, architectural features, massing, and usable open space. These guidelines provide suggestions to help integrate new projects effectively into existing neighborhoods throughout the Town.

How and Where the Guidelines Could be Applied

The Town's recently amended Comprehensive Plan seeks to direct growth to designated Urban Development Areas (UDA). While UDAs certainly are opportunities for residential infill development, a significant portion of the Town's land area is comprised of residential neighborhoods. It is expected that infill development will occur in both of these locations and the guidelines will apply in all cases.

Although these guidelines are advisory only and do not constitute a code or ordnance requirement, the Infill Design Guidelines have Town-wide applicability and are intended to serve as a framework within which architectural and landscape design excellence can thrive. Working within the Town's zoning bylaws and other requirements, such as the HDARB guidelines and historic district regulations, these guidelines can help to articulate and clarify the 'public interest' in site design and built form, to achieve good neighborhood design. In many cases, residential infill will require planning approvals, and the guidelines will serve as useful, though advisory, tools in the review and approval of planning applications.

This document is organized into three sections:

Section 1 describes the existing policy and regulatory framework guiding residential development within the Town.

overview of policy and regulatory documents

The Town lays out its vision and standards for residential development in the Comprehensive Plan and Zoning Ordinance. While these documents provide a basic framework and design standards for infill development that are compatible with existing neighborhoods, these guidelines can add further detail to this framework from a community design standpoint, to help the Town achieve the quality of development that is desired.

TOWN OF BLACKSBURG COMPREHENSIVE PLAN (2006-2046)

The Town of Blacksburg's Comprehensive Plan outlines a number of community planning factors related to housing and community character. The following planning factors are particularly relevant to these infill design guidelines:

- The preservation of Blacksburg's neighborhoods can be threatened by new structures that, while technically meeting legal requirements, are out of character with those neighborhoods. Of particular concern is the placing of extremely large houses geared towards student housing on existing lots, or on adjacent lots that would normally hold two or more structures. When there is new development, the Town encourages that it be in scale with the rest of the neighborhood. *(Community Planning-14)*

- Blacksburg is becoming an attractive area to retirees, who come here for the amenities associated with Virginia Tech, a lower cost of living, and a mild climate. *(Community Planning-14)*

- As the general population ages, accessibility issues will increase. *(Community Planning-14)*

- As Blacksburg develops, there is an increasing demand for a variety of housing options: style, size, location and price, for all segments of the population. *(Community Planning-14)*

These community planning factors set the stage for the Community Planning Chapter Goals, Objectives and Action Strategies that are articulated in the plan. These include:

- Provide a quality mix of housing styles and choices in a variety of price ranges that are available throughout Town.

- Increase the number of housing units attractive to and suitable for retired people.

- Preserve and enhance the integrity and quality of existing residential neighborhoods.

- Clearly articulate the Town's development standards and requirements to the development community and the general public.

- Protect the historic fabric and sense of place of neighborhoods to enhance community pride.

- Promote pedestrian access and safety within the historic district.

While these are all relevant to encouraging compatible residential infill development, there is an opportunity to identify a more specific design vision for infill development to ensure that new development on vacant lots or modifications to existing buildings are compatible with existing neighborhoods. Adding a new goal regarding infill development with supporting objectives and strategies to address design standards and development review procedures should be considered in future Comprehensive Plan updates.

ZONING ORDINANCE

The Town's Zoning Ordinance contains nine residential districts and a mixed use district, each with a description of purpose, permitted uses, and site development regulations. The ordinance defines all of the residential use types that are permitted by right and by conditional use for each district. For the purposes of this study, the definitions of residential use types which are permitted by-right and by conditional use permit for the R-4, R-5, and RM-27 districts are defined on page 7.

In addition to general district standards, the Use and Design Standards section of the ordinance provides design guidance for each use type with particular attention to design features, such as locating parking behind a building, orienting entrances to the street, providing for sidewalk connectivity, and screening objectionable features. Separate sections of the ordinance further address parking requirements, landscaping, screening and lighting.

As a whole, the Town's ordinance provides some very specific development parameters within individual districts, but does not always address all of the design elements necessary to achieve the desired development pattern. For example, all infill residential lots must meet front building setback requirements, regardless if these setbacks are in alignment with older homes in the area. Currently, the Zoning Ordinance does not provide any options for changing these setbacks requirements to allow for new construction to align with existing structures.

These guidelines are not intended to replace or modify any existing zoning standards, but to provide additional advisory guidance in reviewing the design of new infill development for compatibility with existing neighborhoods.

The following images describe some of the types of development as defined in the current Town Zoning Ordinance

ACCESSORY APARTMENT—A secondary dwelling unit or units established in conjunction with and clearly subordinate to a primary dwelling unit, whether a part of the same structure as the primary dwelling unit or a detached structure or structures on the same lot. All existing units are non-conforming uses.

MULTI-FAMILY DWELLING—A building or portion thereof which contains three (3) or more dwelling units for permanent occupancy, regardless of the method of ownership. Included in the use type would be garden apartments, low and high rise apartments, apartments for elderly housing and condominiums.

SINGLE-FAMILY DWELLING, ATTACHED—Two (2) or more single-family dwellings sharing two (2) or more common walls, each on its own individual lot. Attached dwellings are not vertically stacked.

SINGLE-FAMILY DWELLING, DETACHED—A site built or modular building designed for or used exclusively as one (1) dwelling unit for permanent occupancy, which is surrounded by open space or yards on all sides, is located on its own individual lot, and which is not attached to any other dwelling by any means.

TOWNHOUSE—A grouping of three (3) or more attached single-family dwelling in a row in which each unit has its own front and rear access to the outside, no unit is located over another unit, and each unit is separated from any other unit by one (1) or more common walls.

TWO-FAMILY DWELLING—The use of an individual lot for two (2) dwelling units which share at least one (1) common wall, each occupied by one (1) family, that separates living space (i.e., living room, kitchen, bedroom, bathroom, etc.) also referred to as a common example of which is a duplex. Each dwelling unit may be vertically stacked. The exterior appearance of the whole resembles a single structure.

WHAT CAN BE BUILT?

The R-4, R-5, and RM-27 zones allow a wide-range of residential building types and are the most commonly used for both single family and multi-family residential infill development within the Town. Below is a summary of some of the basic regulatory parameters governing the intensity and scale of development allowed in these residential zones. The images below are examples of projects built in each zone.

R-4: Low Density Residential	
Single-Family, Detached	
Max Allowed Density	Not Specified
Min Lot Requirements	
Lot Area	10,000 SF
Lot Frontage	40 feet
Minimum Building Setbacks	
Front	30 feet
Side	10 feet, except on corner lots
Rear	25 feet
Building Height	
Max	30′ or 40′ with an additional 1′ setback/1′ of add′l height
Maximum Coverage	
Lot	45 percent
FAR	.25

R-5: Transitional	
Single-family, Detached; Two-family dwellings	
Max Allowed Density	20 bedrooms/acre
Min Lot Requirements	
Lot Area	8,500SF
Lot Frontage	45 feet
Minimum Building Setbacks	
Front	35 feet
Side	10 feet, except on corner lots
Rear	25 feet
Building Height	
Max	35′ or 45′ with an additional 1′ setback/1′ of add′l height
Maximum Coverage	
Lot	55 percent
FAR	.35

RM-27:	
Boarding House , Home Occupations , Multi-family Dwellings , Single-family, Attached , Single-family, Detached, Townhouse , Two-family Dwellings	
Max Allowed Density	27 bedrooms/acres
Min Lot Requirements	
Lot Area	8,500 SF
Lot Frontage	60 feet
Minimum Building Setbacks	
Front	35 feet
Side	10 feet, except on corner lots
Rear	25 feet
Building Height	
Max	35′ or 45′ with an additional 1′ setback/1′ of add′l height
Maximum Coverage	
Lot	60 percent
FAR	.40

infill development guidelines

best practices for residential infill

This section presents a summary of best practices for integrating new housing into the fabric of existing neighborhoods. The strategies presented are particularly oriented to duplex, single family attached, townhouse, and multi-family residential development in the R-5, and RM-27 residential zones. However, the principles and strategies presented in this guidebook can also be relevant to infill development in single family (R-4) and other residential zones and to residential projects in commercial and mixed use zones.

The following design objectives are derived from the Town's existing planning and regulatory framework and serve as the basis for the best practices contained in this guidebook:

RESPECT NEIGHBORHOOD CONTEXT AND ENHANCE COMMUNITY CHARACTER

The residential streets of Blacksburg's neighborhoods often include a diversity of architectural styles and housing types, yet come together to create a cohesive identity based on consistent patterns—such as street-oriented buildings, fine-grain "rhythms" of development, and green street edges created by front yards and gardens.

PROVIDE TRANSITIONS

Providing effective transitions of building scale, building design, form and color helps to integrate infill development into exiting neighborhoods and helps to and mitigate visual impacts. Complementary architectural design, materials, scale, massing, and the use of landscape, screening, and open space are strategies to achieve compatibility within the neighborhood and the Town.

CREATE PEDESTRIAN FRIENDLY STREETSCAPES

Blacksburg's sector/neighborhood plans and design-related policies frequently call for new development to contribute toward a pedestrian-friendly street environment. Besides the essential provision of sidewalks, pedestrian friendly design can be achieved by providing visual interest and a human-scaled level of detail; providing convenient pedestrian access to destinations, with strong connections between main entrances and sidewalks; using trees and vegetation, particularly along residential streets.

MINIMIZE VISUAL IMPACTS OF PARKING

The visual and pedestrian connectivity impacts created by parking can be mitigated through good parking design, landscape, location of parking relative to buildings, quantity of on-street and off-street parking, and overall improved pedestrian connectivity and access.

CREATE USABLE OUTDOOR SPACES

At higher densities, outdoor space is too valuable to waste. The design of both the site and buildings needs to be carefully coordinated to allow for strategies that will create outdoor spaces that are usable. Not only must usable outdoor spaces be sufficiently sized, but buildings should be designed to provide convenient access to these spaces. Whenever possible, outdoor areas should be designed to be multifunctional, simultaneously serving recreational, environmental, and even vehicle access functions.

GENERAL DISCUSSION:

Buildings oriented toward streets are a key characteristic of Blacksburg's residential neighborhoods. This is achieved by having features such as windows, main entrances, and porches oriented toward the street. This street orientation also contributes toward a pedestrian-friendly street environment, providing a visually-rich street edge; and contributes to safety by allowing residents to survey street activity (the "eyes-on-the-street" concept).

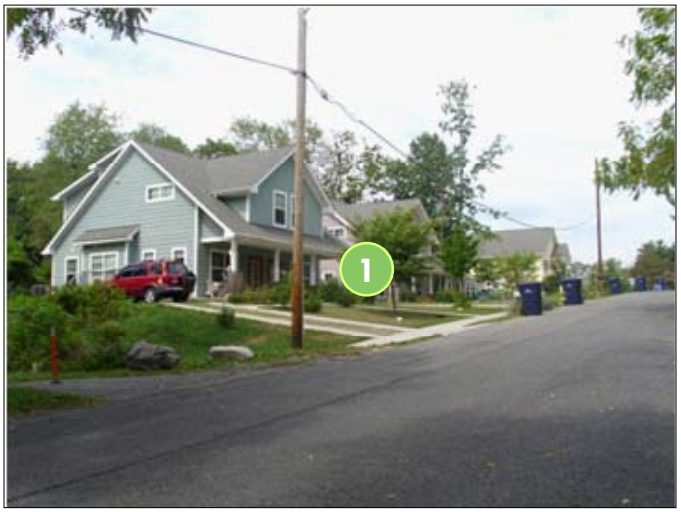
DESIGN GUIDELINE:

- **Locate the primary entrance towards the street.**
- **Clearly define the primary entrance by using a front porch or stoop, and other architectural building details.**

DISCOURAGED

1 Back side of houses and fencing face the primary street

ENCOURAGED



1 Front porches and primary building entry face the street

site design & parking | setback

GENERAL DISCUSSION:

Some streets feature consistent front building setbacks that help define neighborhood character. It is important for the front setback and the placement of the building on the lot to correspond to the prevailing setbacks of other homes on the block to create a consistent appearance along the street. When multi-family residential structures are placed on busy commercial or neighborhood streets, smaller setbacks that locate the building closer to the street are the norm. Multi-family structures constructed near single-family residential neighborhoods should reflect the setbacks typically found in those areas.

Note: deep front setbacks can compromise the ability to provide backyard space and/or rear parking, particularly at higher densities.

DESIGN GUIDELINE:

- **Provide a front yard consistent with those found on the block facing the street.**
- **Front porches are encouraged and may extend into the required front yard setback.**
- **Large multi-family developments should be designed with varied setbacks that contribute to an interesting streetscape and avoid a monotonous streetwall. Continuous lines of buildings with the same setback should be avoided.**
- **Individual buildings can also be designed with an articulated front, with porches closer to the street.**
- **In residential neighborhoods, multi-family housing should adopt the predominant setback, but should also vary the building facade to relieve the appearance of mass.**

DISCOURAGED

1 Infill houses (upper image) and multi-family units (lower image) set back farther than prevailing setback on the block.

ENCOURAGED

1 New multifamily residence aligns with setback of neighboring house.

site design & parking | building frontage/entries

GENERAL DISCUSSION:

Most neighborhood residential streets in Blacksburg are characterized by landscaped setbacks between the fronts of buildings and sidewalks. This "green edge" provides residential streets with a clearly-identifiable character. In many areas, this green edge is reinforced by planting strips and street trees. In addition, entry features accent the front facade of a home and add visual interest. Entry features and their components, such as columns and steps, should be proportional to the overall scale of the home. Porches and other entry features are a common architectural element in homes in the Town. Entry features on infill homes should be consistent in design and scale with the new home and the predominant style on the block.

DESIGN GUIDELINE:

- **The building frontage should contain landscaping or plantings to create a green edge consistent with the character of residential streets.**
- **Parking should not obstruct the building frontage; rather, it should be located behind, to the rear or side of the principle structure.**
- **Entry features are encouraged on all new infill structures.**
- **Entry porches and porticoes in two-story homes should be one story to minimize the appearance of bulk.**
- **The scale and style of porch and portico elements should be consistent with the scale and style of the home, and should strive to respect the scale and style of porch and portico elements in the other homes on the block.**

DISCOURAGED

1 Inadequate yard and landscaping (upper image) and/or large expanses of asphalt (lower image) are not consistent with traditional neighborhood patterns for frontage

2 Garages and parking are the dominant frontage feature of these houses.

ENCOURAGED

1 Landscaping between the front door and sidewalk creates a "green edge" and a more traditional pattern of residential street frontage

2 A large porch defines the entry to the front doors of this duplex

site design & parking | off-street parking

GENERAL DISCUSSION:

Residential parking is a significant component of most of the Town's neighborhoods. The proper supply, placement and design of parking are key elements in developing residential infill projects that respect the character of an existing neighborhood. Not only is this important for continuing neighborhood patterns, but this helps create pedestrian-friendly streets. Parking located between the sidewalk and buildings is not consistent with traditional neighborhood patterns and creates an inconvenient and potentially unsafe barrier to pedestrian activity. Parking for residential areas should play down the visual impact of cars and parking garages. Parking should be located to the rear or side of buildings wherever possible. Other solutions that minimize the visual impact of driveways include sharing driveways, using alleys, or other innovative approaches. In larger multifamily developments, long aisles of parking bays should be broken up with landscaped islands. Pedestrian access should be designed around the perimeter of on-site parking and between parking aisles.

In addition, on-street parking can reduce on-site parking needs by providing parking spaces within the thoroughfare right-of-way. It provides convenient front door parking opportunities, contributes to the street environment, and creates a protective buffer between pedestrian and vehicular traffic. Spaces are distributed evenly along the street edge, helping maintain visual consistency and appeal in residential neighborhoods. On-street parallel parking is preferred over angled parking, as it leaves more space for bike lanes and wider sidewalks.

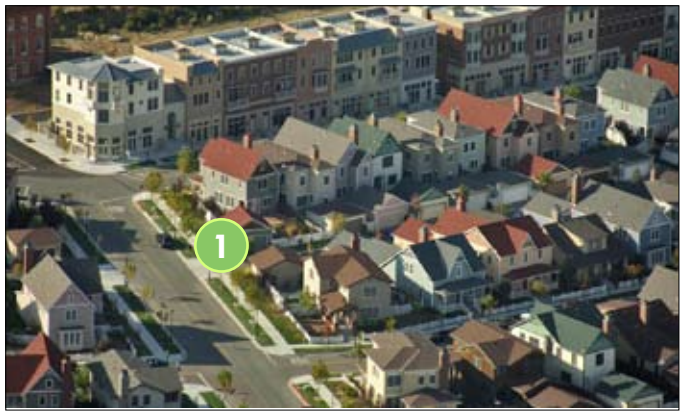
DESIGN GUIDELINE:

- **Parking spaces or garages should not dominate the street scene. Instead, parking should be located to rear of the lot or building or screened from the public way with landscaping, low fencing, or garage orientation.**
- **Shared driveways are encouraged to reduce the amount of paving and number of curb cuts.**
- **Where applicable, parking should be accessed from existing alleys.**
- **Parking should not disrupt the quality of common spaces/pedestrian environments of multifamily development.**
- **Large surface parking areas should be distributed throughout the site in discrete areas or garages and broken up with landscaping.**

DISCOURAGED

1 The repetition of parking garages dominate the view from the street

ENCOURAGED



1 Parking garages are tucked behind the buildings

NOTE: Reduced or no on-site parking can greatly simplify the design of infill development with no need to find space to fit vehicle areas onto small infill sites, and entirely avoids the problem of how to minimize the visual and environmental impacts of parking. This option is made possible by Zoning Code provisions (Sec. 5211) that waive minimum parking requirements upon approval of a mass or alternate transportation plan. In addition, the Town should consider on-site parking reductions through reductions in parking minimums, use of parking maximums, shared-parking agreements, or similar strategies.

GENERAL DISCUSSION:

For higher-density infill, shared structured parking, such as in the form of basement parking garages, is the optimum parking solution, as it accommodates more parking than otherwise possible on small sites. While construction costs can be a drawback of structured parking, there are cost-efficient strategies that make structured parking practical in many situations.

Note: Care must be taken so that structured parking does not dominate the ground level of street frontages. This can be achieved by excavating the parking, so that living space above is brought closer to ground level, or by wrapping the front of structured parking with active building spaces.

DESIGN GUIDELINE:

- **The presence and appearance of garage entrances should be minimized so that they do not dominate the street frontage of a building.**
- **Buildings containing above-grade structured parking should screen parking areas with landscaped berms, or incorporate contextual architectural elements, that complement adjacent buildings or buildings in the area.**

ENCOURAGED

Parking is located under these multifamily apartment buildings and the entrances are discreetly situated

site design & parking | alleys

GENERAL DISCUSSION:

Alleys are a part of the Town's historic street pattern. In residential areas, alleys are effective in providing service access and additional parking. In some of Blacksburg's residential neighborhoods, alleys provide access to parking without impacting the pedestrian friendliness of the residential streets. In addition, there is a history of developing secondary structures along the alleys with accessory units. Many communities are encouraging the development of new neighborhoods that have the capacity for accessory units as a method for increasing density and maintaining the appearance of a single family community. Alleys should be utilized as opportunities to create new quiet and walkable secondary residential addresses and provide for off-street parking.

DESIGN GUIDELINE:

- **Alley access parking is preferred in areas where it is available.**
- **Parking garages should be setback from the edge of the alley.**
- **The development of accessory units over or adjacent to parking accessed by existing alleys is encouraged.**
- **Secondary structures with accessory units should be built along the edge of the alley to maintain the pattern of back yard open space in neighborhoods.**

DISCOURAGED

1. Garages are located off alleys, but lack of landscaping creates sea of asphalt
2. Alley does not continue to the next block

ENCOURAGED

1. Garages are located off alleys to conceal parking
2. Accessory units are located above the garage as a way to increase housing variety and provide affordable housing
3. Landscaping is provided to help soften the additional pavement

site design & parking | screening/landscaping

GENERAL DISCUSSION:

Hedges, trees, shrubs, and fences are often used for transition between public and private space and can contribute to a more private frontage space or screening device. Aesthetically, it is important to select plant and fencing that complement architectural features and materials. Besides providing pedestrians shelter from the sun during summer months, studies have shown that people respond positively to environments rich in trees and landscaping. Street trees and planting strips also help buffer pedestrians from vehicle traffic.

DESIGN GUIDELINE:

- **The view of parking should be screened from the public way with landscaping or low fencing.**
- **All site areas not covered by structures, walkways, driveways or parking spaces should be landscaped.**
- **Landscaping and fencing should support the distinction and transition between private, common and public spaces. Chain link fences are not desirable.**
- **Natural features and existing trees should be retained.**
- **Parking lots should be generously landscaped to provide shade, reduce glare and provide visual interest.**

DISCOURAGED

1 Parking is located behind the building but is not screened from view

ENCOURAGED

1 Parking is hidden with landscaping and stone walls or-fencing

site design & parking | open space

GENERAL DISCUSSION:

Provision of open space is a critical for multi-family development projects. Particularly in larger projects, it is important to provide comfortable outdoor places for residents to sit, rest, and interact. Multi-family residential development should provide open space that is easily accessible to residents. Individual units adjacent to common open spaces should be designed with entry features and windows that open onto those outdoor spaces and should ideally foster a sense of community. This can be facilitated by building facades that allow residents to see and easily use common spaces. Common open spaces should offer amenities that invite use, such as seating, shade, and tot lots.

DESIGN GUIDELINE:

- **New developments should use open space and community facilities to provide social and design focal points.**
- **Multifamily development must provide both common and private open space for each unit consistent with development standards in the Zoning**
- **Common spaces and amenities should enhance the sense of community in multifamily projects.**
- **Play spaces for children are strongly encouraged and should be both secure and observable.**
- **Common open space should be centrally located and have a physical and visible connection to public open space.**

DISCOURAGED

1. This courtyard is too narrow to function as usable open space, particularly given the height of the building (upper image).

2. Hardscaped community park with no landscaping and bordered by a chain link fence is uninviting (lower image).

ENCOURAGED

1. Good examples of residential common open space.

2. Community park with a blend of hardscape and landscape is open and connected with residential community.

site design & parking | connectivity

GENERAL DISCUSSION:

Many areas of Blacksburg's downtown and historic neighborhoods, such as the original "Sixteen Squares," have a connected network of streets. In addition, a number of unbuilt "paper streets" demonstrate the original historic grid pattern. As the Town develops its remaining vacant lands zoned for residential use, there is a desire to promote mixed density and mixed income neighborhoods that are connected to the community and serve existing residents. An interconnected street network provides the framework for a greater diversity of building types within close proximity and promotes pedestrian and bicycle activity by making connections between destinations accessible and convenient. New streets should be designed in a manner that reflects the original street scale, pattern, and block size of the surrounding established neighborhood.

DESIGN GUIDELINE:

- **Principal access roads into new development areas should be of similar scale as streets they are connected to.**
- **The street patterns at the edges of the new project area should be extended into the site.**
- **Gateways and edges of new development should promote landscape and street improvements as common amenities that are shared with adjacent neighborhoods in the future.**

DISCOURAGED

POORLY NETWORKED USES/STREETS

ENCOURAGED

WELL NETWORKED USES/STREETS

walkways

GENERAL DISCUSSION:

Internal walkways are needed within larger residential developments to promote pedestrian movement by connecting users from the public sidewalk network and parking areas to ultimate destinations within a site. Walkways should be built between adjacent residential buildings to connect all primary building entrances, surrounding streets, external sidewalks, adjacent trails, transit stops, parking areas and recreational facilities.

DESIGN GUIDELINE:

- **Walkways should connect public sidewalk and parking areas to all main entrances on the site. For townhouses or other residential units fronting on the street, the sidewalk may be used to meet this standard. For multiple-family developments, walkways should connect all pedestrian areas of the site, such as parking areas, recreational areas, trails, common outdoor areas, adjacent pedestrian ways, and any pedestrian amenities**
- **Walkways should be at least 5 feet wide and should be clearly marked to ensure vis-**

DISCOURAGED

1 This walkway connects the public sidewalk to parking areas, but the scale of buildings, large numbers of cars, and no clearly marked space communicate that this area is meant to be used for cars, not pedestrians.

ENCOURAGED

1 This landscaped walkway clearly marks the pedestrian realm and connects entrances to individual units and parking areas

GENERAL DISCUSSION:

Architectural designs need to be sensitive to the vernacular and traditional architecture found in the Town of Blacksburg and Southwest Virginia. The following are some examples of traditional home architecture in the Town that should be used in designing all new residential buildings and renovating or adding to existing residential buildings in the Town.

DESIGN GUIDELINE:

- **The architectural design of infill construction should complement the architectural styles of existing homes on the block. If there is a mixture of styles on a block, then the design may be more flexibly interpreted.**
- **New stylistic interpretations of traditional architecture are encouraged.**
- **Architectural features and detailing should be proportional to the scale of the structure, as well as to other homes on the block of a similar architectural style.**

building design | scale & massing

GENERAL DISCUSSION:

Buildings should be designed to fit within the context of the surrounding structures and provide visual interest to pedestrians. Massing describes the physical form of a building or group of buildings. The massing of residential buildings in the Town varies but can generally be described as the repetition of simple rectangular forms. One and a half story bungalows or two story four-square homes is an often recognized type common in Virginia. New residential buildings should generally follow this traditional approach to building massing, and renovations/additions should respect the combination of masses in the original home. The scale and mass of larger multi-family residential structures end should use design and construction methods that minimize the appearance of mass with height variations, multiple rooflines, articulated facades, and architectural detailing that break up the facade.

DESIGN GUIDELINE:

- **The mass and scale of new infill residential buildings should appear to be similar to the buildings seen traditionally in the neighborhood.**
- **The width of building face of an infill project should not exceed the width of a typical residential structure on adjacent lots.**
- **The perceived scale of new infill buildings should be minimized by stepping down its height toward the streets and neighboring smaller structures.**
- **Larger buildings should be divided into smaller "modules" of similar size to traditional houses seen in the neighborhood.**
- **Building roof forms that are similar to those seen traditionally in the neighborhood, such as gabled and hip roofs, should be used.**

DISCOURAGED

1. Long, unadorned walls make the building look bigger than it is
2. Windows are small with no articulation of frames, lintels or multiple panes
3. Infill buildings are out of scale with existing buildings

ENCOURAGED

1. Front stoops break up the massing of this multi-family building.
2. Multiple roof lines provide variations in height.
3. Windows are scaled and designed compatibly with neighboring houses

building design | architectural features

GENERAL DISCUSSION:

Some neighborhood areas are characterized by recurring architectural features that are valued as key aspects of community character. An infill structure should be designed in a cohesive architectural style that complements the best examples of existing residential development on the block. Structures that are compatible with existing homes contribute to a sense of place and add to the character of the neighborhood. Use of stylistically cohesive, character-defining features, such as porches or other entry treatments, window patterns, roof forms, building details, etc., enhances visual compatibility..

DESIGN GUIDELINE:

- **New infill projects should have a coherent architectural design concept where windows, doors, roof forms, siding materials and other building elements create a pleasing composition.**
- **The patterns of windows and doors should reflect the scale and patterns in the neighborhood. Windows should be proportioned and grouped to provide a similar composition.**
- **New development should use a mix of patterns and materials that are indigenous to the Town.**

DISCOURAGED

1. Window openings are not symmetrical
2. Roof lines are complex and not part of an integrated design
3. Garage doors and driveways are a predominant feature of the duplex

ENCOURAGED

1. Window openings reflect traditional patterns
2. A large porch frames the doors defines the entry to the front doors of this duplex

GENERAL DISCUSSION:

The design of the space between the edge of the curb and the front of a building is essential for encouraging pedestrian activity and promoting safety and security. In addition to providing a spatial buffer between vehicles and pedestrians, the streetscape should consist of trees for shade and softening the urban environment, pedestrian-scaled lighting for security and aesthetics, and benches, drinking fountains, newspaper boxes, or other pedestrian-oriented amenities. For high-pedestrian use sidewalks, six feet of sidewalk width should always be maintained as an obstacle-free throughway zone with the trees, lighting, and other amenities located either in the planting strip between the street and sidewalk or in the frontage zone next to the buildings.

DESIGN GUIDELINE:

- **All large scale residential developments should include a comprehensive streetscape plan that achieves street design, pedestrian comfort, and visual amenity objectives.**
- **In new residential areas, new projects should include street trees.**
- **Pedestrian-scaled lighting and other amenities should also be included.**

DISCOURAGED

1. Lack of street trees creates unpleasant pedestrian conditions
2. Street is too wide without on-street parking
3. Pedestrians must walk in the street because there are no sidewalks

ENCOURAGED

1. Street trees soften and shade the street
2. On street parking provides convenient front door parking, contributes to the street environment, and creates a protective buffer between pedestrian and vehicular traffic
3. Continuous sidewalk allows pedestrians to walk safely throughout the neighborhood

streetscape | sidewalks

GENERAL DISCUSSION:

Sidewalks are an important element of neighborhood design. Sidewalks should be required on both sides of all streets, with a minimum width of 5 feet.

DESIGN GUIDELINE:

- **Neighborhood streets should include an interconnected system of sidewalks.**
- **Neighborhood streets should include a sidewalk design that reflects the existing patterns in the neighborhood.**
- **Primary streets should utilize planting strips and streetscape to separate sidewalks from the street's edge.**
- **Sidewalks & corner curbs must meet accessibility requirements.**

DISCOURAGED

1 Poorly maintained sidewalks are a barrier to pedestrian activity

ENCOURAGED

1 Well-maintained sidewalks encourage walking

streetscape | crosswalks

GENERAL DISCUSSION:

Crosswalks are needed to provide higher visibility to pedestrians at logical crossing points. Basic crosswalks consist of reflective white striping, although crosswalks with higher visibility, traffic calming measures (raised crosswalks), or those that are more aesthetically pleasing (colored, brick crossings downtown) are more appropriate in commercial areas or locations with a high volume of pedestrians. Care should be used so that the surface does not impede wheelchair access or provide a hazard for the visually impaired or elderly. Crosswalk lighting should be provided at least to the level of general street illumination, although higher luminance should be used at key pedestrian crossings. Countdown pedestrian signals also facilitate pedestrian movement at intersections or signalized mid-block crossings.

DESIGN GUIDELINE:

- **Neighborhood streets with high pedestrian volumes and/or located close to Downtown, Virginia Tech or other important destinations should include crosswalks with enhanced paving materials and be consistent with Town standards.**
- **On wider streets where there is more local traffic, "pedestrian crossing zones" where the street narrows and ped buttons are available for safe and comfortable crossing should be encouraged.**
- **Crosswalks should be designed with ADA accessibility guidelines in mind.**

DISCOURAGED

1 Lack of crosswalks create unsafe conditions

ENCOURAGED

1 Adequate sidewalks and high visibility crossings encourage walking

GENERAL DISCUSSION:

Streets must provide an efficient and interconnected network for bicyclists. Bicycle connections should include safe, direct routes between popular destinations including schools, parks, and business districts. Accessible bicycle lanes and bicycle parking areas are needed to make bicycling an appealing transportation alternative. Bicycle lanes and crossings should be clearly marked to ensure the safety of bicyclists and secure bicycle parking areas should be located adjacent to building entrances to provide an incentive for bicyclists.

On-street bike lanes should be a minimum of 4' in width or 5' in width when on-street parking is present. If there is no opportunity to include dedicated bike lanes, a wide outside lane of a minimum 14' in width, or 15' when on-street parking is present, can be used. Multi-use trails that allow for bicycle access should be a minimum of 12' in width.

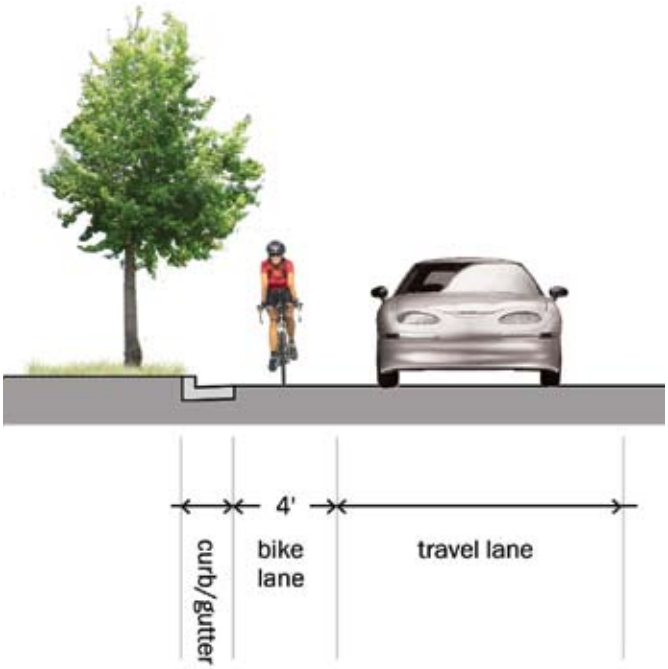
In addition to travelway facilities, bicycle amenities are beneficial for areas to support bicycle activity. Bicycle parking - racks or lockers - should be considered at certain destinations, such as commercial, employment, and transit centers. Provision of bicycle parking is another means to justify a reduction in vehicular parking where reasonable cycling access exists.

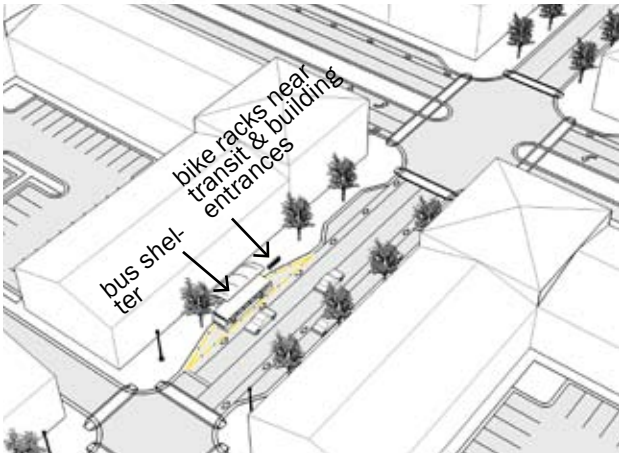
DISCOURAGED

DESIGN GUIDELINE:

- **Neighborhood streets with high bicycle volumes and/or located close to Downtown, Virginia Tech or other important destinations should include bicycle facilities consistent with Town standards.**
- **Bicycle parking located close to the building entrance should be provided in multi-family developments**

ENCOURAGED





street design | complete streets

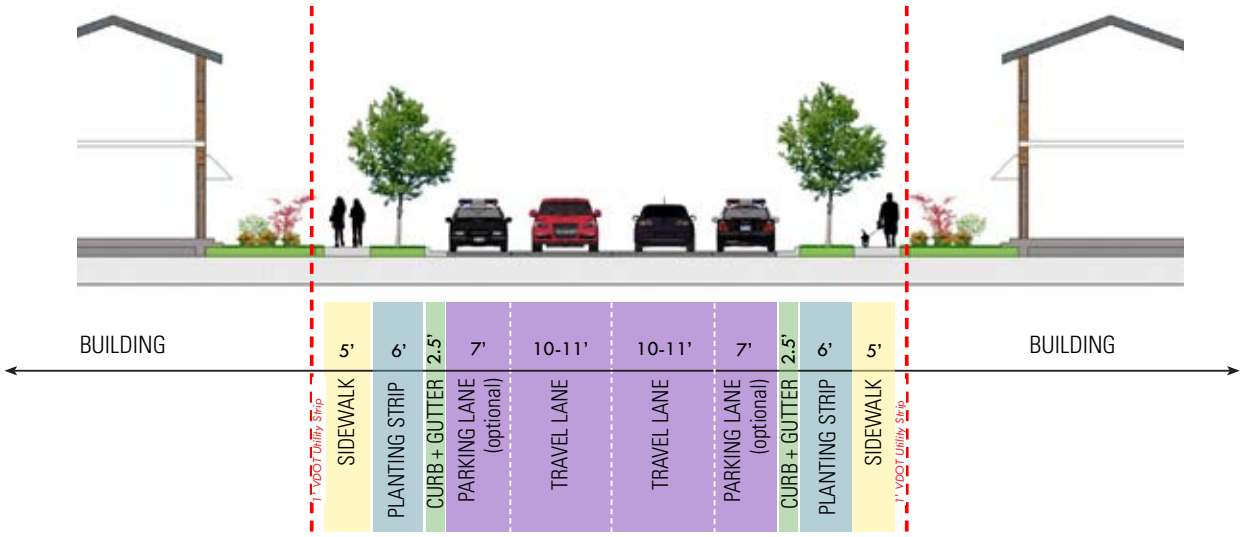
GENERAL DISCUSSION:

Complete streets should provide an efficient and interconnected network for bicyclists, pedestrians, autos, and transit users of all ages and abilities. There is no singular design for a Complete Street, as each one is unique and responds to its community context. A complete street may include: sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, roundabouts, and more. Designing streets in a constrained right-of-way requires prioritizing the design elements and emphasizing the elements that are deemed to be higher priority. Prioritization typically occurs within a larger visioning process involving project stakeholders and the affected community.

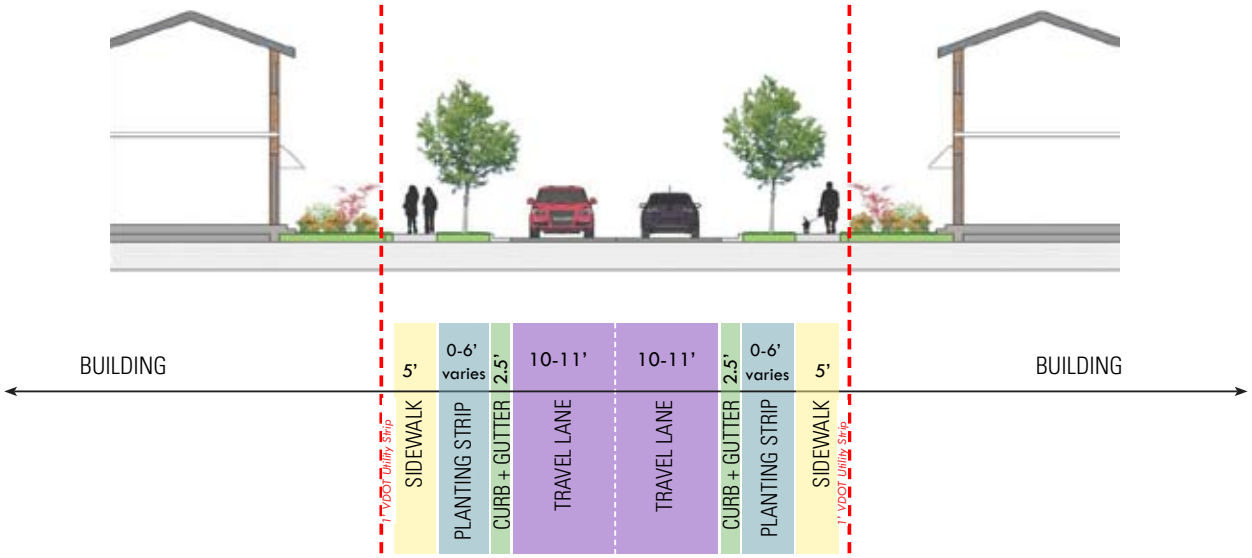
DESIGN GUIDELINE:

- **Lane widths should be scaled for traffic volume, speed and roadway function - for low volume, low speed residential streets, 10'-11' travel lanes are preferred.**
- **Sidewalks should be required on both sides of all streets, with a minimum width of 5 feet.**
- **On-street bike lanes should be a minimum of 4' in width or 5' in width when on-street parking is present.**
- **Where possible, provide additional separation between pedestrians and motor vehicles with planting strips or on-street parking.**
- **Bicycle lanes, shared facilities, and crossings should be clearly marked to ensure safety of bicyclists.**

EXAMPLE OF PROTOTYPE PEDESTRIAN-ORIENTED RESIDENTIAL STREET - 49-63' ROW



EXAMPLE OF CONSTRAINED PEDESTRIAN-ORIENTED RESIDENTIAL STREET - 35-47' ROW



infill development prototypes

infill development prototype

The following set of illustrations are intended to demonstrate context sensitive design principles for infill develpment within an existing mixed density neighborhood.

The drawings shown are conceptual only and do not represent a specific site condition within the Town of Blacksburg.

The following examples are included:

Small site infill:
1- Duplex (side-by-side)
2- Two family rental building (over/under)
3- Single family home with apartment unit above a detached garage

Medium site infill:
1- Mixture of 2-family and multi-family units organized as a single residential complex
2- Cottage Court consisting of higher density single family homes organized around a communal green.

Large site infill:
1- Higher density multi-family complex
2- Lower density single and multi-family complex

infill development prototype

EXISTING ZONING REQUIREMENTS

The following tables summarize the zoning standards for typical zoning districts in residential neighborhoods in Blacksburg. The R-5 district was assumed for the Small and Medium sized infill scenarios and the RM-27 district was assumed for the Large infill scenarios.

Zone: R5

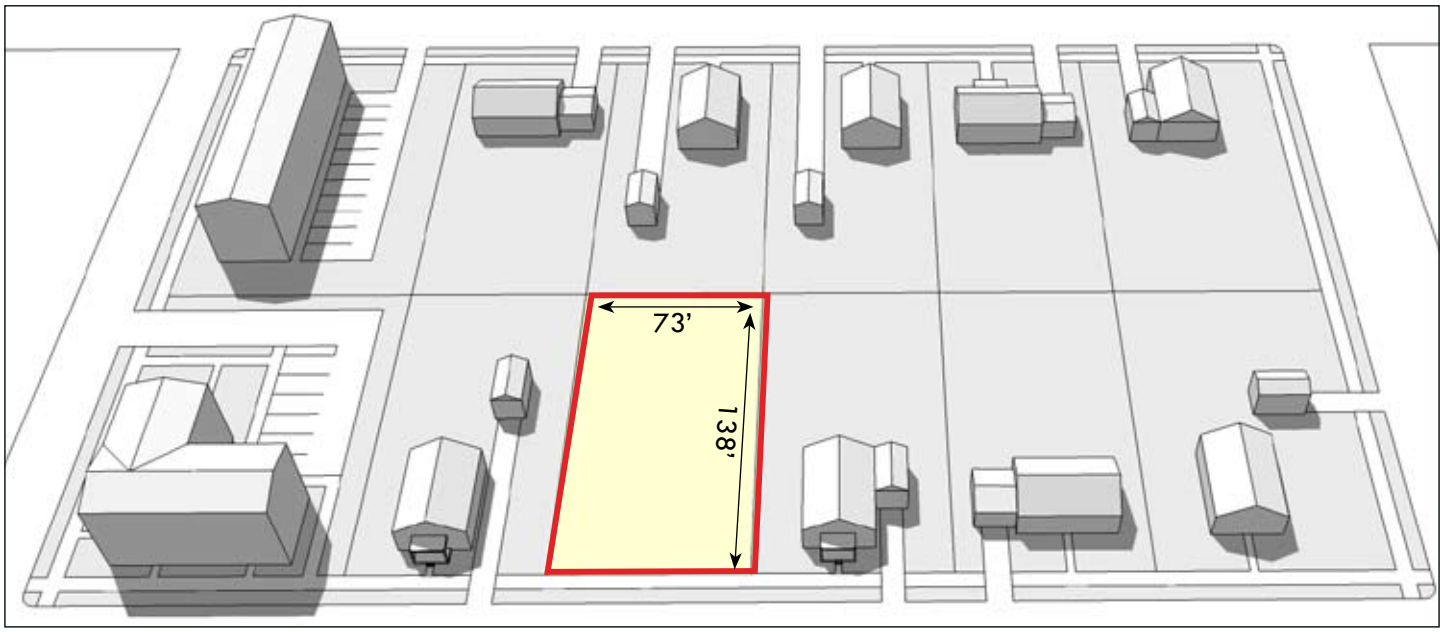
Maximum Allowed Density	20 Bedrooms/Acre
Minimum Lot Requirements	
Lot Area	8,500 SF
Lot Frontage	45 Feet
Minimum Building Setbacks	
Front	35 Feet
Side	10 Feet, except on corner lots
Rear	25 Feet
Building Height	
Max	35 Feet or 45 Feet with an additional 1 Foot set-back/1 Foot of additional height
Maximum Coverage	
Lot	55%
FAR	.35

Zone: RM-27

Maximum Allowed Density	27 Bedrooms/Acre
Minimum Lot Requirements	
Lot Area	8,500 SF
Lot Frontage	60 Feet
Minimum Building Setbacks	
Front	35 Feet
Side	10 Feet, except on corner lots
Rear	25 Feet
Building Height	
Max	35 Feet or 45 Feet with an additional 1 Foot set-back/1 Foot of additional height
Maximum Coverage	
Lot	60%
FAR	.40

infill development prototype | small site

Parcel Size:	1/4 Acre
Zoning:	R5 Transitional



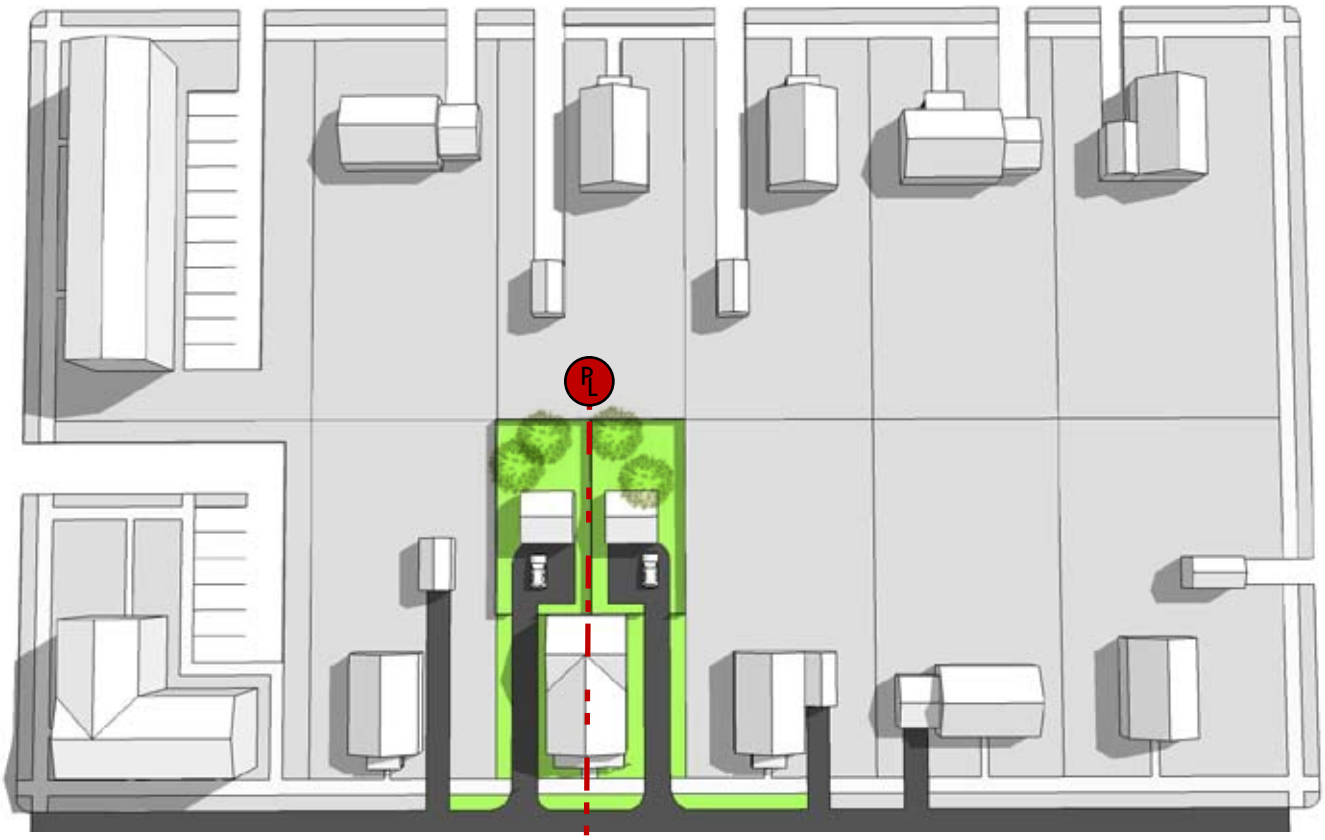
DESIGN CHARACTERISTICS OF EXISTING NEIGHBORHOOD

1. Existing neighborhood development is comprised of a mixture of single family and multi-family residences
2. FRONT SETBACKS are varied in the neighborhood - generally between 10 and 25'
3. PARKING is generally located in side or rear yards. A mixture of attached and detached garages are prevalent and located behind the front building setback line.
4. A single driveway provides PARKING ACCESS on both single and multi-family lots.
5. Building ORIENTATION is a mixture of parallel and perpendicular frontage. Front entrances are all ORIENTED towards the sidewalk.

infill development prototype | small site

DUPLEX HOUSING (SIDE-BY-SIDE UNIT): 2 DU or 5-6 Bedrooms

Total # of Dwelling Units: 2
Total # of Bedrooms: 5-6

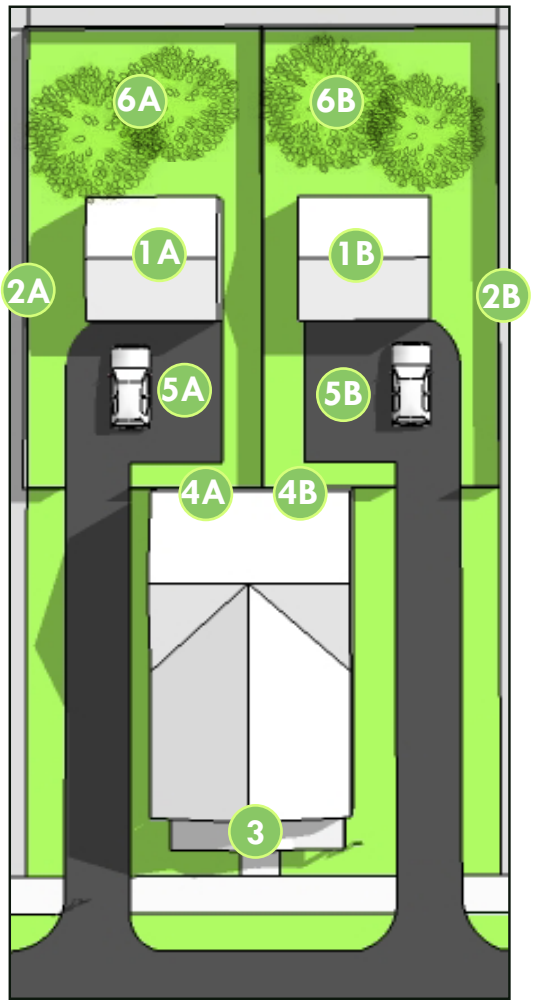


INFILL SITE SHOWN WITHIN A TYPICAL NEIGHBORHOOD BLOCK

VIEW FROM THE STREET

infill development prototype | small site

DUPLEX HOUSING (SIDE-BY-SIDE UNIT): 2 DU or 5-6 Bedrooms



CONCEPT DESIGN FEATURES

Note: Not in order of priority. Refer to general design guidelines for further discussion.

1. 2-car detached GARAGE located behind the primary residence
2. FENCE OR LOW WALL to help screen parking from neighboring properites
3. PRIMARY ENTRANCES to side-by-side units are located off a single front porch
4. REAR ENTRANCES - private entrances to individual units
5. ADDITIONAL SURFACE PARKING located at the rear of the property is screened from the street
6. Parking located at the rear of the property is SCREENED using a combination of fencing and landscaping
7. ARCHITECTURE: Massing, roof pitch, materials, porches, and proportions should be compatible with adjacent surrounding buildings. De-emphasize obvious features that reflect multi-family housing such as symmetrical doorways, wide driveways, multiple front walkways, etc.

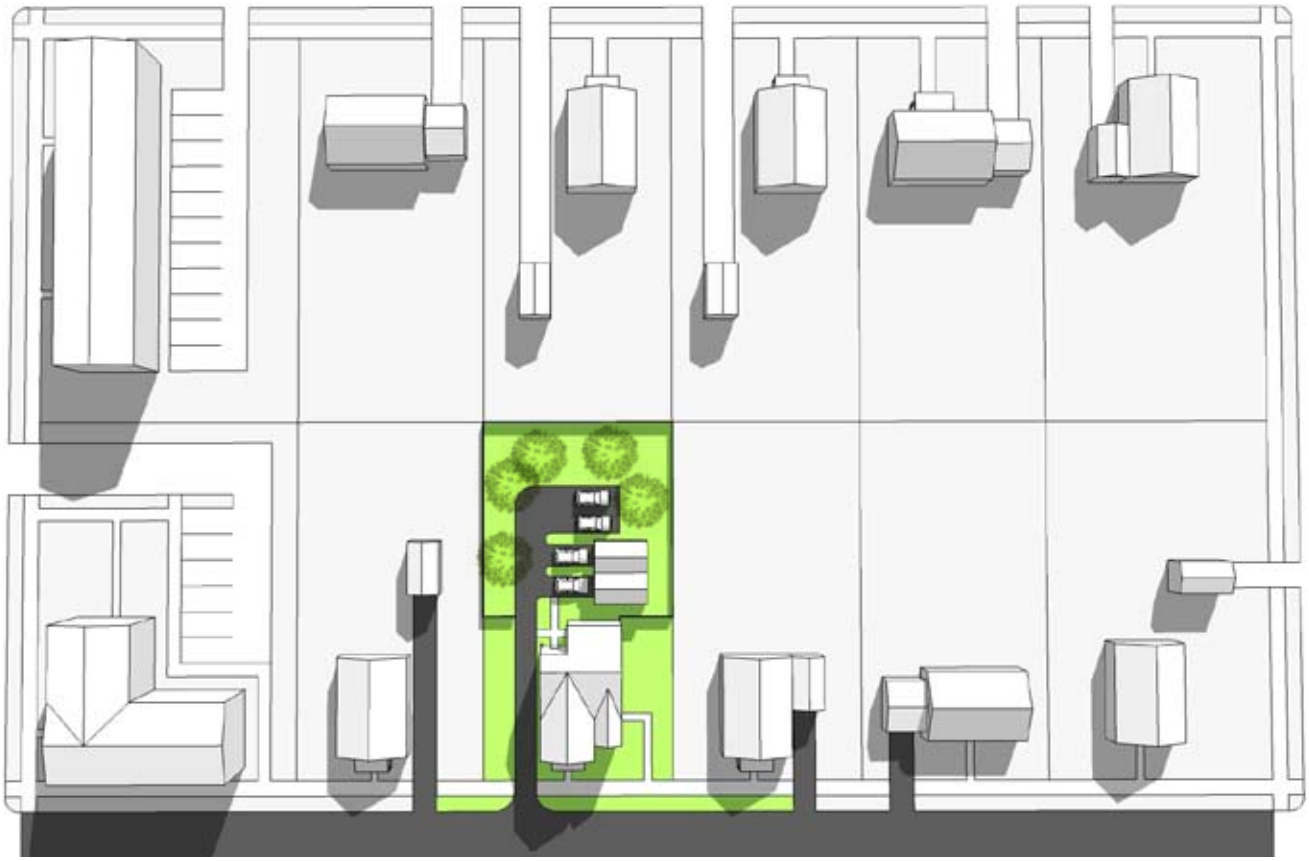
VIEW FROM STREET

BIRDS EYE VIEW

infill development prototype | small site

2-FAMILY RENTAL BUILDING (OVER/UNDER): up to 5-6 Bedrooms

Total # of Dwelling Units: 2
Total # of Bedrooms: 5-6

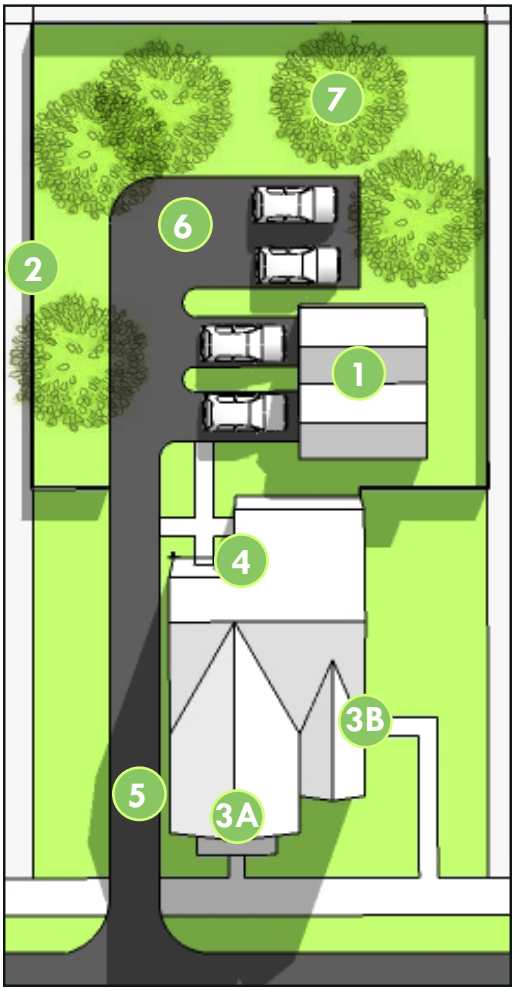


INFILL SITE SHOWN WITHIN A TYPICAL NEIGHBORHOOD BLOCK

VIEW FROM THE STREET

infill development prototype | small site

2-FAMILY RENTAL BUILDING (OVER/UNDER): up to 5-6 Bedrooms



CONCEPT DESIGN FEATURES

Note: Not in order of priority. Refer to general design guidelines for further discussion.

1. 2-car detached GARAGE located behind the primary residence
2. FENCE OR LOW WALL to help screen parking from neighboring properites
3. PRIMARY ENTRANCES to lower (3A) and upper (3B) apartment units
4. REAR ENTRANCES entrances to lower and upper apartment units
5. SINGLE DRIVEWAY provides consolidated access to parking
6. ADDITIONAL SURFACE PARKING located at the rear of the property
7. Parking located at the rear of the property is SCREENED using a combination of fencing and landscaping

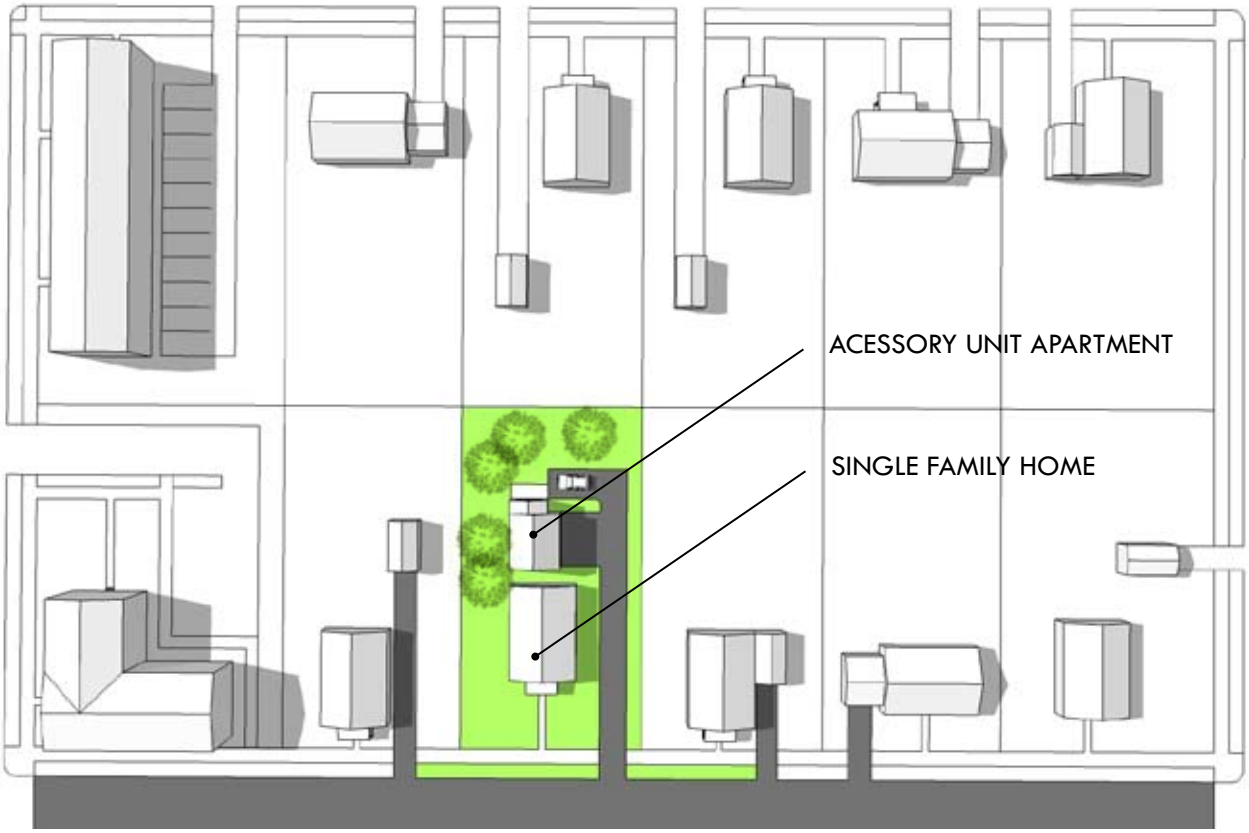
VIEW FROM STREET

BIRDS EYE VIEW

infill development prototype | small site

SINGLE FAMILY HOME WITH 2 DU AND 5-6 BEDROOMS (WHOLE SITE)

Total # of Dwelling Units: 2
Total # of Bedrooms: 5-6

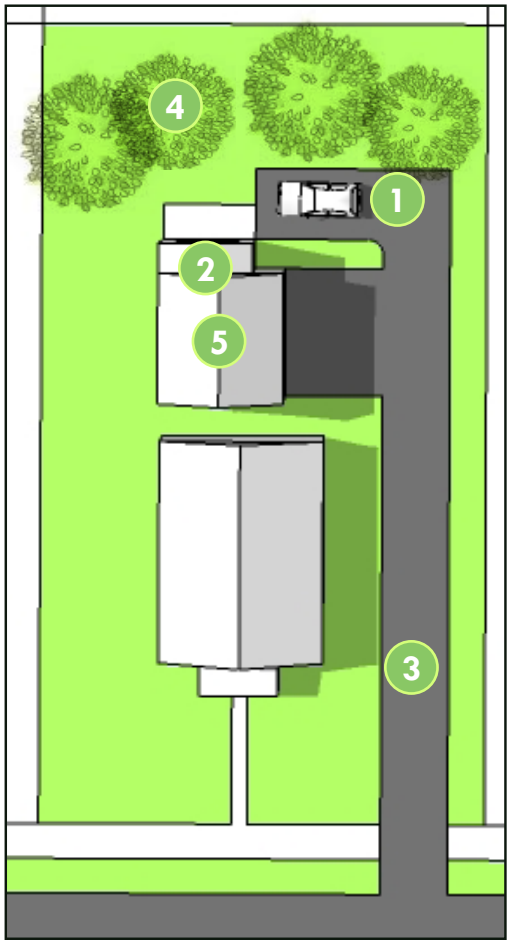


INFILL SITE SHOWN WITHIN A TYPCIAL NEIGHBORHOOD BLOCK

VIEW FROM THE STREET: Accessory unit is set back behind the principal residence; Its roof pitch and massing is compatible with principal residence.

infill development prototype | small site

SINGLE FAMILY HOME WITH 2 DU AND 5-6 BEDROOMS (WHOLE SITE)



CONCEPT DESIGN FEATURES

Note: Not in order of priority. Refer to general design guidelines for further discussion.

1. Surface PARKING located at the rear of the property. A separate space is provided for the accessory unit apartment.
2. ENTRANCE to accessory unit located at the rear of the garage in an enclosed stairwell.
3. ACCESS is provided from the existing driveway.
4. Parking located at the rear of the property is SCREENED with a combination of trees and shrubs
5. ARCHITECTURE: Massing, roof pitch, materials, porches, and proportions of accessory unit should be compatible with adjacent and surrounding buildings.

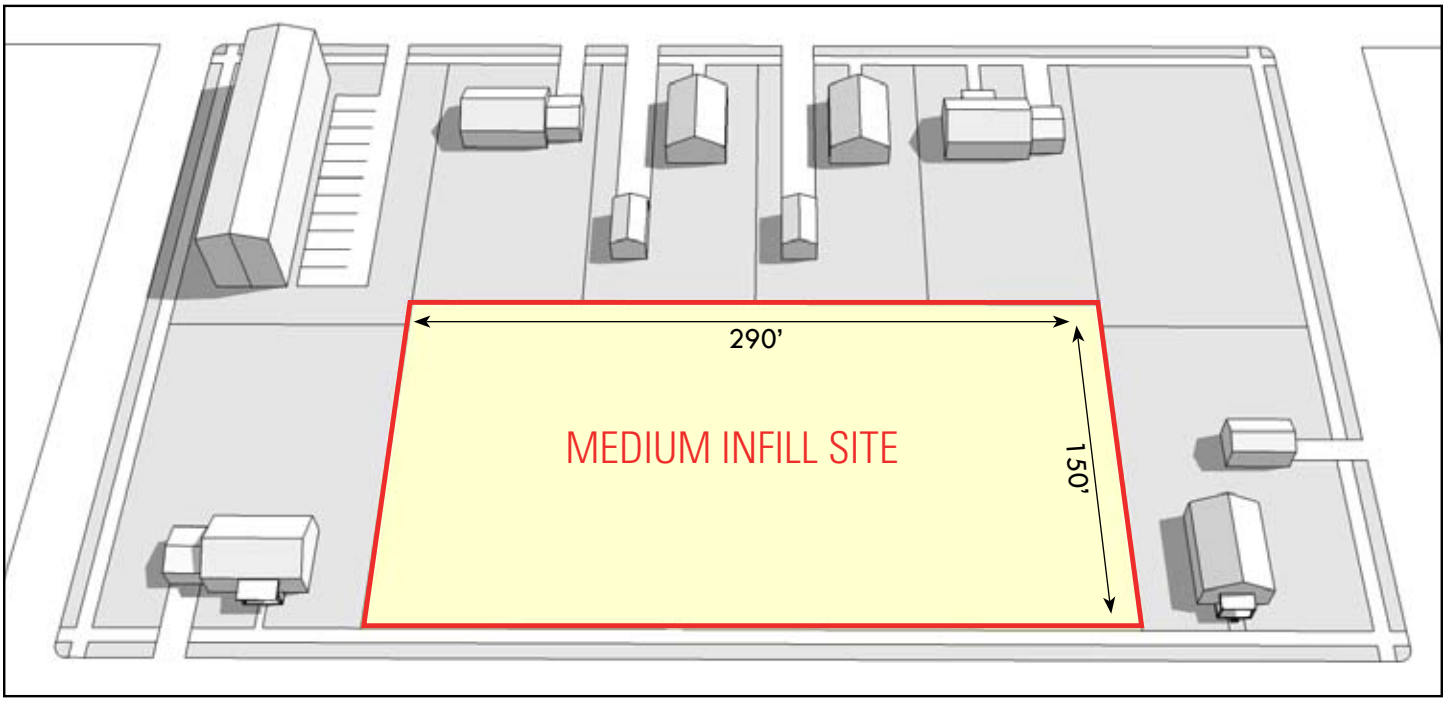
BIRDS EYE VIEW

VIEW FROM STREET

VIEW OF ACCESSORY UNIT

infill development prototype | medium site

Parcel Size:	1 Acre
Zoning:	R5 Transitional



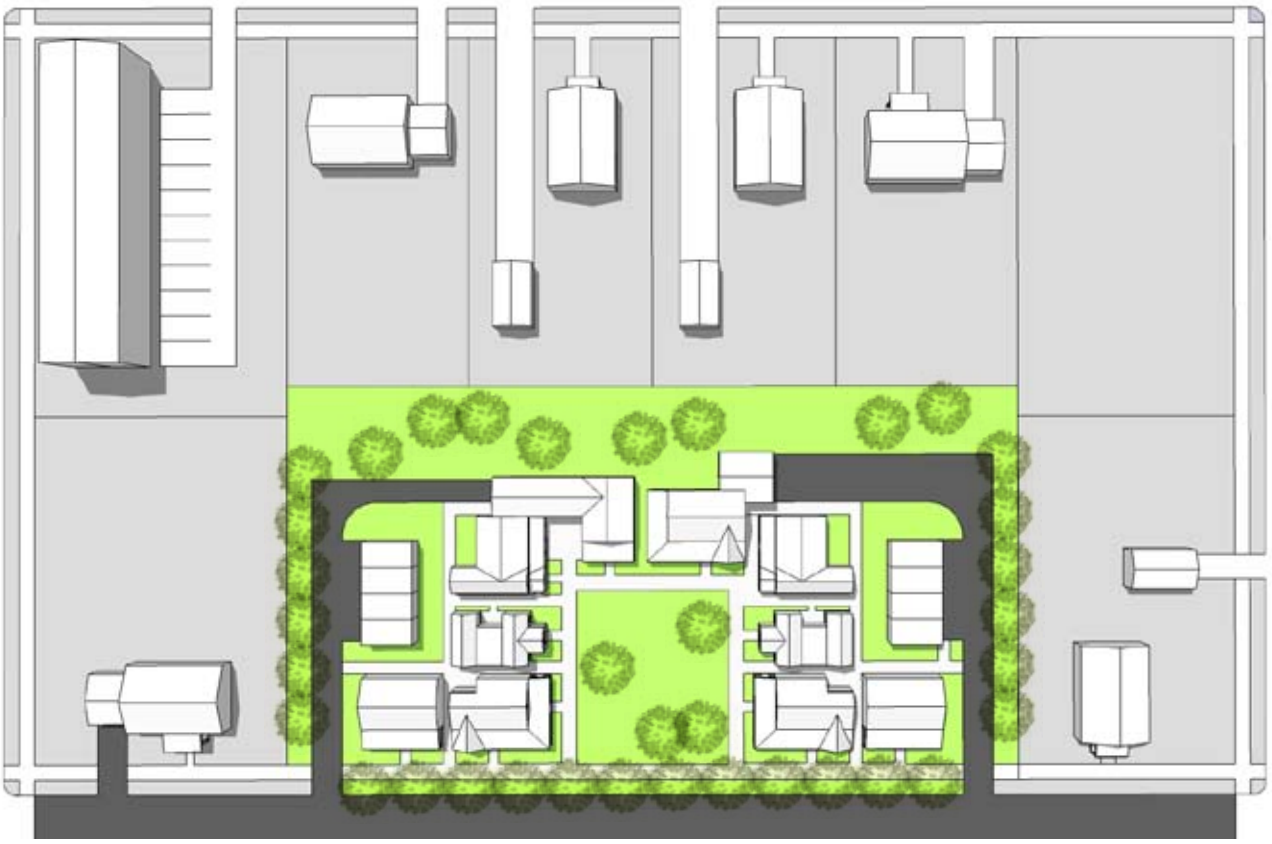
DESIGN CHARACTERISTICS OF EXISTING NEIGHBORHOOD

1. Existing neighborhood development is comprised of a mixture of single family and multi-family residences
2. FRONT SETBACKS are varied - generally between 10 and 25'
3. PARKING is provided on-site and generally located at the rear of the property. A mixture of attached and detached garages are prevalent and located behind the front building setback line.
4. A single driveway generally provides PARKING ACCESS on both single and multi-family lots.
5. Building ORIENTATION is a mixture of parallel and perpendicular frontage. Front entrances are all ORIENTED towards the sidewalk.
6. OPEN SPACE is generally located at the rear of properties providing both screening and recreation on a parcel level.

infill development prototype | medium site

COTTAGE COURT

Total # Dwelling Units: 10
Total # of Bedrooms: Approximately 20

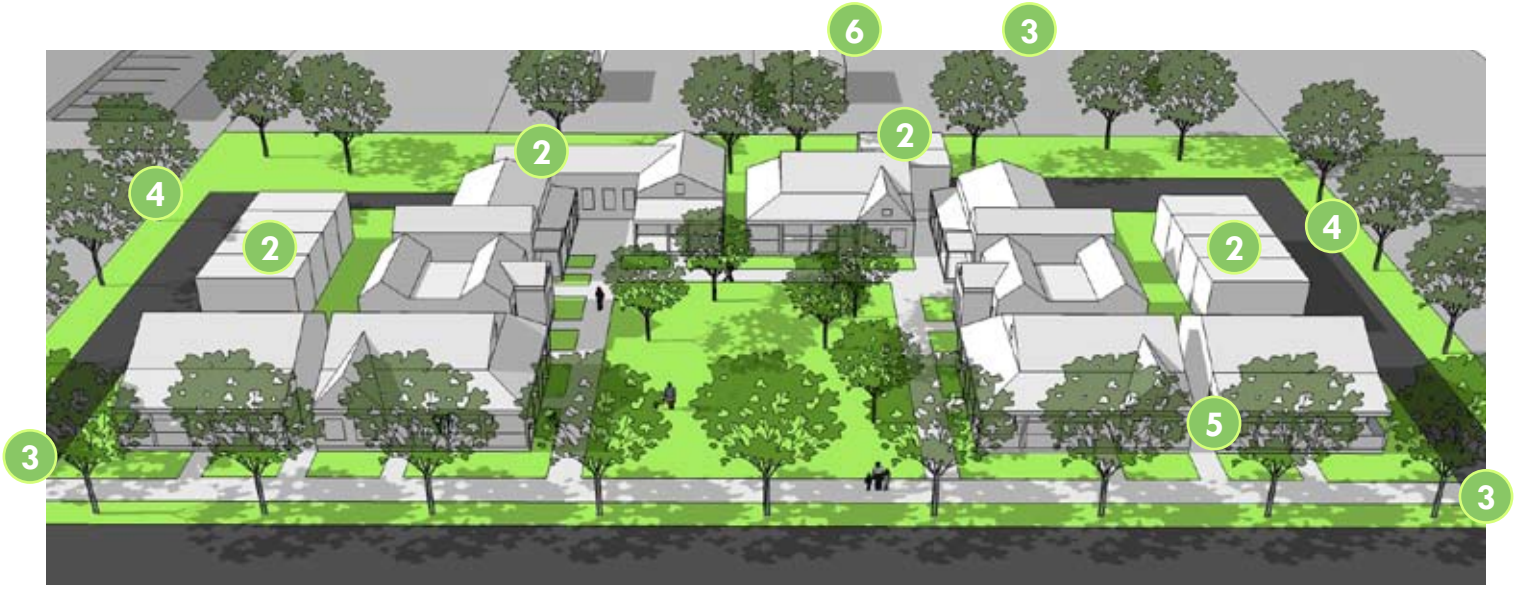


INFILL SITE SHOWN WITHIN A TYPICAL NEIGHBORHOOD BLOCK

VIEW FROM THE STREET: Single family detached cottage houses are clustered around a communal green. Parking is tucked behind the buildings, creating a pedestrian-oriented street. Porches and varied architectural features are compatible with existing buildings and contribute to the diverse character of the streetscape.

infill development prototype | medium site

MIXTURE OF DUPLEX AND MULTI-FAMILY UNITS



BIRDS EYE VIEW

VIEW OF COMMUNAL GREEN FROM SIDEWALK

VIEW OF COTTAGES FRONTING THE SIDEWALK

CONCEPT DESIGN FEATURES

Note: Not in order of priority. Refer to general design guidelines for further discussion.

1. FRONT ENTRANCES oriented towards the street and/or communal green.
2. PARKING garages and driveways are located to the rear of buildings.
3. PARKING ACCESS is off of a single driveway located on either side of the property.
4. SCREENING between adjacent properties and at edge of parking areas

OTHER DESIGN PRINCIPLES

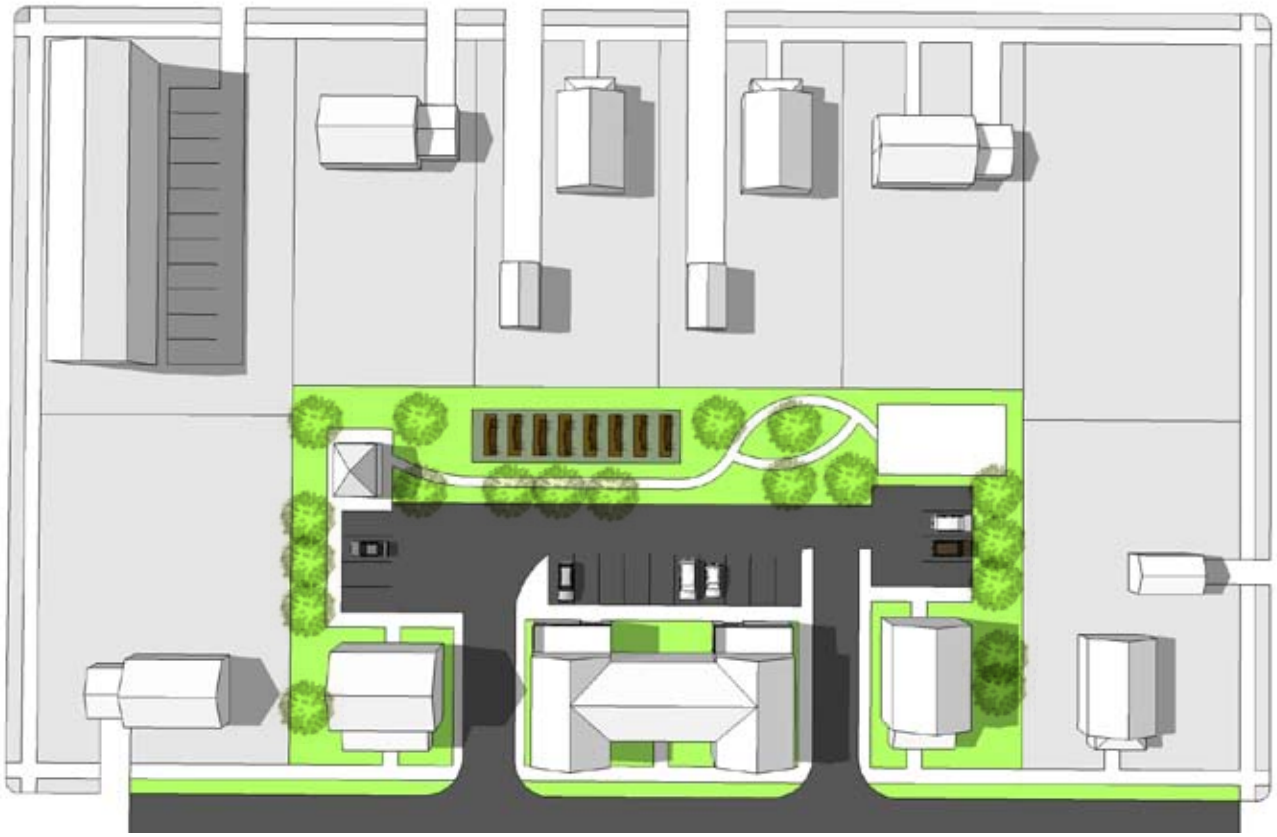
Clustered homes are connected by a series of pathways that lead to and from parking, community green space, sidewalk, and to front, rear, and side cottage entrances.

Porches provide an additional “private” space for cottage homes, where most of the outdoor space is provided for collective use.

infill development prototype | medium site

MIXTURE OF DUPLEX AND MULTI-FAMILY UNITS

Total # Dwelling Units: 10
Total # of Bedrooms: Approximately 20

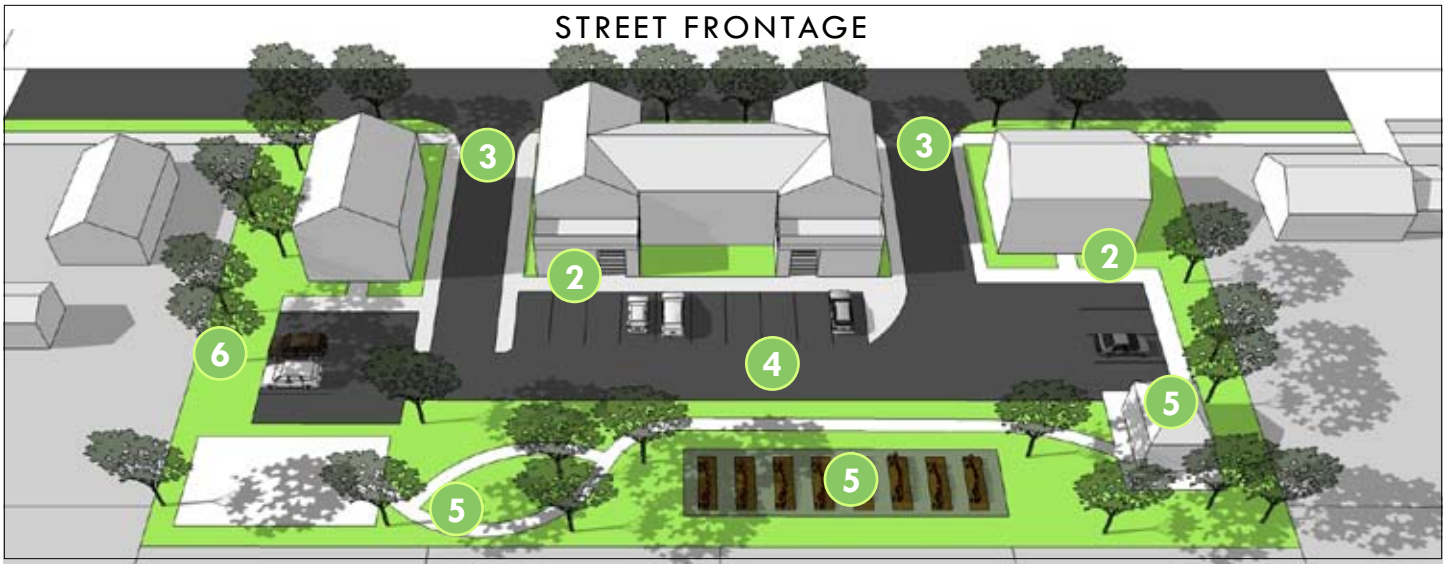


INFILL SITE SHOWN WITHIN A TYPICAL NEIGHBORHOOD BLOCK

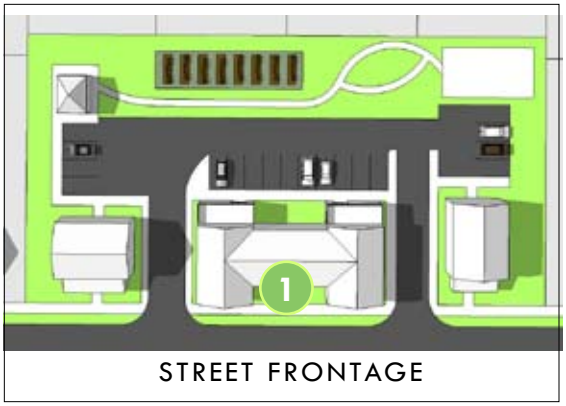
VIEW FROM THE STREET: Multi-family residential garden apartments flanked by duplexes; Duplexes are located directly adjacent to single family homes providing a transitional use to higher density units. *Massing and architecture should be compatible with existing buildings, incorporating porches, angled roofs, and local materials.*

infill development prototype | medium site

MIXTURE OF DUPLEX AND MULTI-FAMILY UNITS



REAR BIRDS EYE VIEW



PLAN VIEW

CONCEPT DESIGN FEATURES

Note: Not in order of priority. Refer to general design guidelines for further discussion.

1. FRONT ENTRANCES oriented towards the street
2. REAR ENTRANCES from the parking areas with access to upper and lower apartment units.
3. ACCESS to parking lot in rear
4. Surface PARKING lot located at the rear of the property
5. Walking PATH/TRAIL for recreation and access to shaded areas, community gardens, picnic pavilion, and/or playground
6. SCREENING between adjacent properties and at edge of parking areas

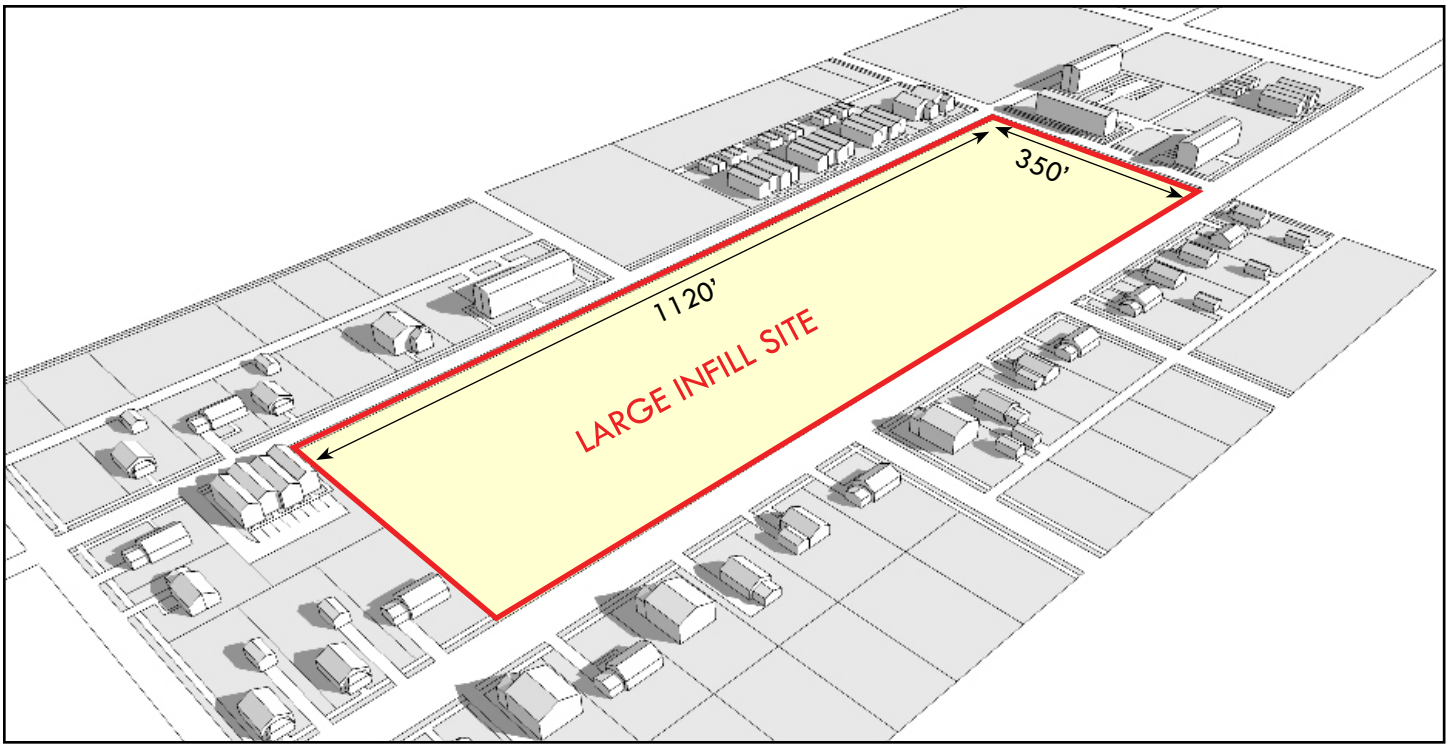
OTHER DESIGN PRINCIPLES

Allowable density is borken into smaller-scale buildings to maintain a neighborhood-style pattern of development.

Programmed or usable OPEN SPACE is be provided on site.

infill development prototype | large site

Parcel Size:	9 Acres
Zoning:	R-27



DESIGN CHARACTERISTICS OF EXISTING NEIGHBORHOOD

1. Average block lengths vary between 500-600' in length.
2. Existing neighborhood development is comprised of a mixture of single family and multi-family residences
3. FRONT SETBACKS are varied - generally between 10 and 35'
4. PARKING is provided on-site and located at the rear of properties . A mixture of attached and detached garages are prevalent and located behind the front building setback line.
5. Generally, a single driveway provides PARKING ACCESS on both single and multi-family lots. Where feasible, alleyways provide rear access to garages and parking.
6. Building ORIENTATION is a mixture of parallel and perpendicular frontage. Front entrances are all ORIENTED towards the sidewalk.
7. Open space is generally located on individual parcels. Community or neighborhood-scale open space is lacking.

infill development prototype | large site

HIGHER DENSITY MULTIFAMILY COMPLEX

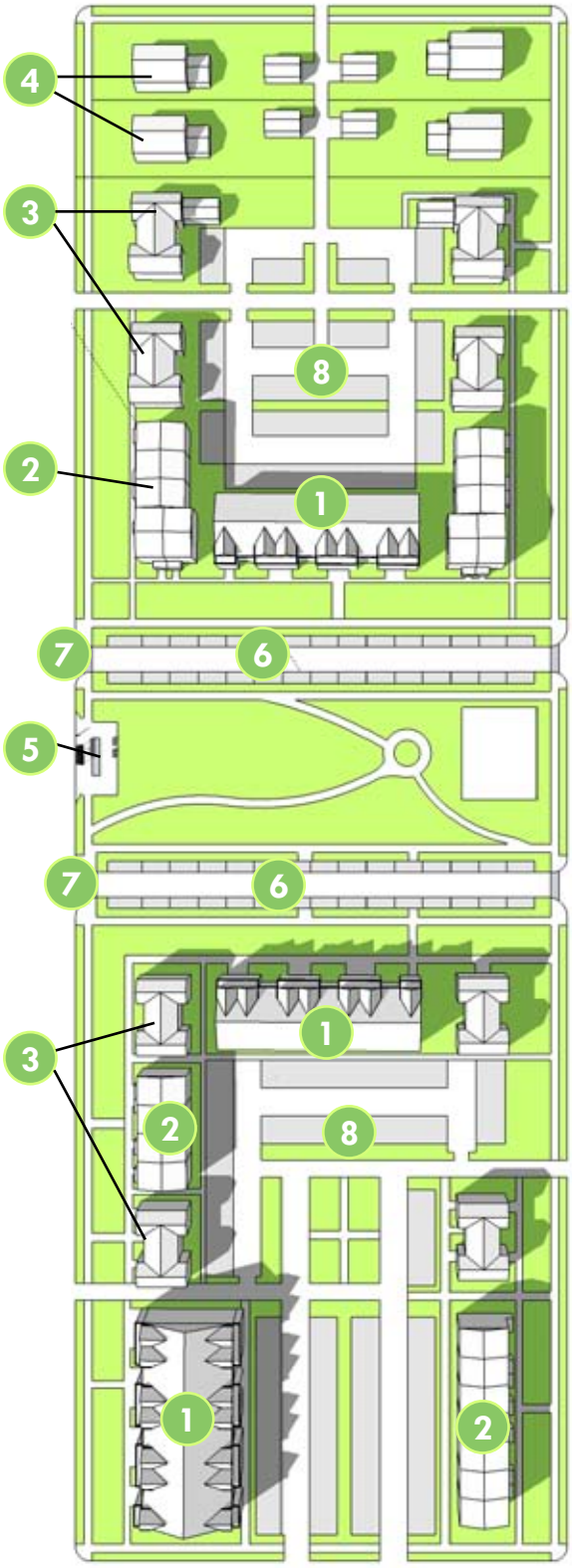
Total Dwelling Units shown: Approximately 129
Total # of Bedrooms: Approximately 235

BIRDS EYE VIEW OF INFILL SITE SHOWN WITHIN A TYPCIAL NEIGHBORHOOD

VIEW FROM THE STREET: New higher density garden apartments, townhomes, and existing single family homes front a new neighborhood-oriented park; Park spaces provide relief from higher density housing and provide a public amenity as a shared community asset.
Massing and architecture should be compatible with existing buildings, incorporating porches, angled roofs, and local materials.

infill development prototype | large site

HIGHER DENSITY MULTIFAMILY COMPLEX



CONCEPT PLAN

CONCEPT DESIGN FEATURES

Note: Not in order of priority. Refer to general design guidelines for further discussion.

1. Larger scale garden apartments
2. Townhomes
3. Smaller scale garden apartments provide transition between lower and higher density on the site
4. Single or 2-family houses with garage - located adjacent to existing single family homes to provide density transition
5. Neighborhood park with bus pull-off
6. On-street parking for guests and park visitors
7. New connecting streets continue the existing neighborhood block network
8. Parking located at the interior of the block and served by a new alleyway

OTHER DESIGN PRINCIPLES

Complete network of sidewalks along the roadway and on-site to provide connectivity between parking, building entrances and sidewalk.

Denser buildings located adjacent to other existing multifamily residences and fronting park.

Smaller scale residences adjacent to lower density and single family houses

Architecture, massing, materials, colors, and proportions designed to conform with existing neighborhood context

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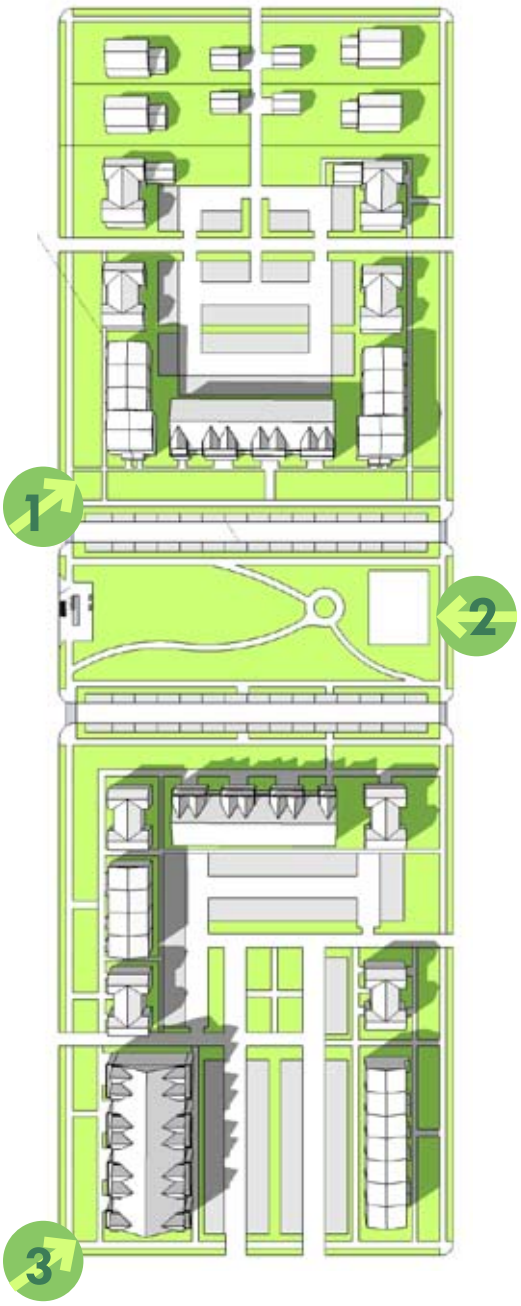
HIGHER DENSITY MULTIFAMILY COMPLEX



ADDITIONAL VIEWS OF HIGH DENSITY CONCEPT PLAN

Buildings transition from higher to lower in density

Higher density buildings front a neighborhood park; On-street parking provided along the edge of the park

Mixture of multi-family housing with parking interior to the block

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LOWER DENSITY SINGLE AND MULTI-FAMILY COMPLEX

Total Dwelling Units shown: Approximately 62
Total # of Bedrooms: Approximately 186

BIRDS EYE VIEW OF INFILL SITE SHOWN WITHIN A TYPCIAL NEIGHBORHOOD

VIEW FROM THE STREET: Townhome community fronting a shared open space. Park spaces provide relief from higher density housing and provide a public amenity as a shared community asset.

Massing and architecture should be compatible with existing buildings incorporating porches, angled roofs, and local materials.

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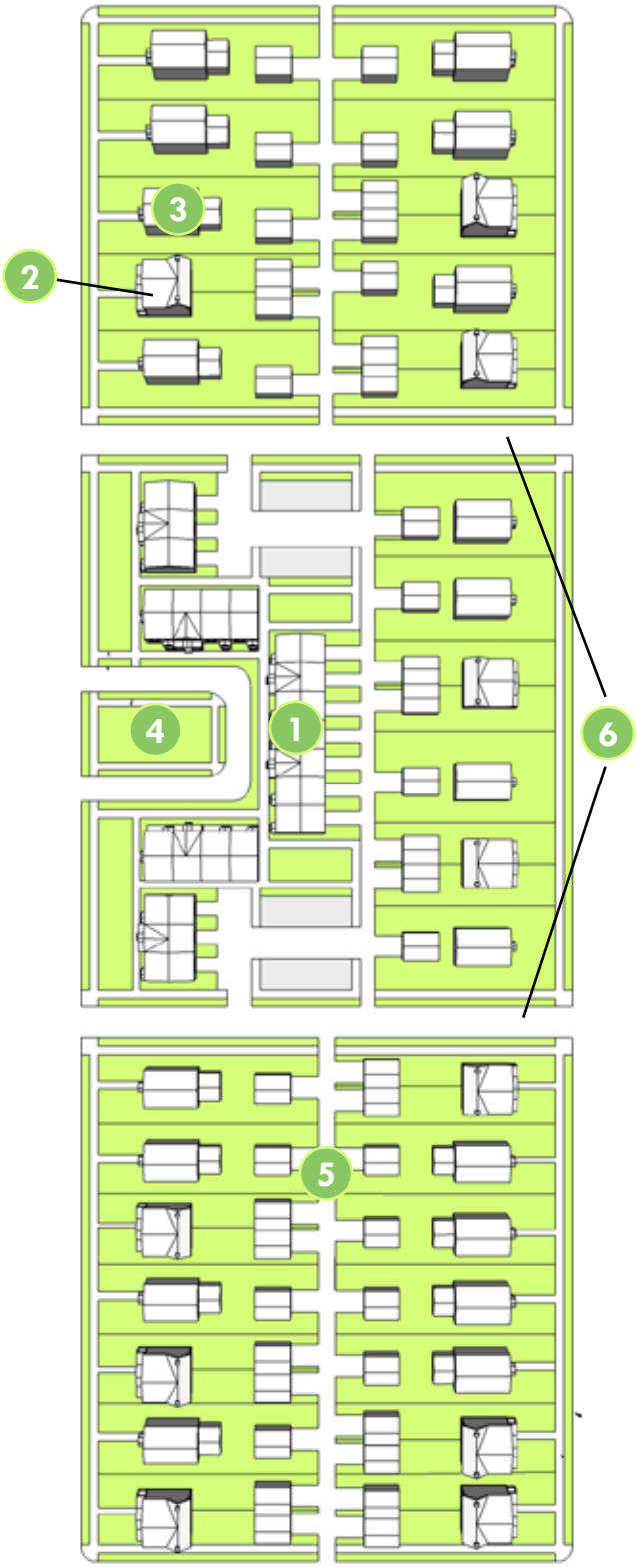
LOWER DENSITY SINGLE AND MULTI-FAMILY COMPLEX



INFILL SITE CONCEPT PLAN

FEATURES OF INFILL DEVELOPMENT

1. Townhomes
2. Duplex
3. Single Family home with garage
4. Park located to serve townhome community
5. Alley system with access to parking and individual garages
6. New connecting streets create a block network

OTHER DESIGN FEATURES

Network of sidewalks adjacent to the roadway and on-site to provide access to parking and building entrances.

Higher density residences front onto a collective open space.

Duplexes and single family homes are mixed; Duplexes are designed to blend in with single family homes, incorporating features such as a singular porch and parking accessed from the rear alleyway.

Architecture, massing, materials, colors, and proportions designed to maintain a neighborhood context with pedestrian-scaled elements

Townhome facade design varies between units, adding visual interest and diversity to the development. Side unit townhomes or corner units that front on two roadways of importance should incorporate primary facade details on two sides: windows, porches, awnings, and entrances with connections to the sidewalk.

infill development prototype | large site

LOWER DENSITY SINGLE AND MULTI-FAMILY COMPLEX

ADDITIONAL VIEWS OF LOWER DENSITY CONCEPT PLAN

Shared open space is an amenity to the townhouse community

Townhome community fronting a shared open space. Parking is located to the rear in both garages or surface lots accessed off of an alley or side street.

Duplex housing located adjacent to a single family home. A single front porch de-emphasizes the pair of doors leading to individual units.

Bealeton Area Plan

for the Route 17 Corridor

Summary Report

Prepared by Renaissance Planning Group
for Fauquier County, VA

July 2011

TABLE OF CONTENTS

INTRODUCTION

Background

The historic village of Bealeton grew up as a Depot of the former Orange & Alexandria Rail Road, since renamed Southern Rail Road, which was a major travel way in the Civil War era. With the decline of railroads as a primary mode of transportation, the village of Bealeton lost prominence. Today, the existing Bealeton community centers on the intersection of Routes 17 and 28, and recent regional transportation growth has once again made the community an important regional crossroad. The regional significance of Routes 17 and 28, and easy linkages to I-66, I-81 and I-95 in particular have made the Bealeton area increasingly congested from a transportation standpoint. Looking ahead, the high traffic volumes, the presence of heavy trucks, and the lack of ability to comfortably or safely cross roadways for pedestrians and bikes in the Bealeton area represent significant challenges that could intensify as development in the area increases over time. For these reasons, this plan was commissioned by Fauquier County, as part of a VDOT grant program to implement Urban Development Areas in 2010-2011, in order to provide additional policy and implementation direction within the Bealeton Service District Plan for the Routes 17 and 28 corridors in Bealeton.

Planning Context

In 2007, the Virginia General Assembly added Section 15.2-2223.1 to the Code of Virginia requiring high growth localities to designate Urban Development Areas in their comprehensive plans by June 30, 2011 (counties) and June 30 1, 2012 (cities and towns). Designated Urban Development Areas ("UDA") are to be areas of reasonably compact development that can accommodate 10 to 20 years of projected growth. In 2010, the legislation was amended to establish density and design criteria for UDAs and to improve the coordination between transportation and land use. Based on Fauquier County's population growth from 2000 to 2010, the County is required to amend their Comprehensive Plan to incorporate at least one Urban Development Area that will allow for development at a density of at least four single-family residences, six townhouses, or 12 apartments, condominium units, or cooperative units per developable acre, and a floor area ratio of at least 0.4 per acre for commercial development, or any proportional combination thereof.

In 2010, the Virginia Department of Transportation ("VDOT") created the Urban Development Area Local Government Assistance Program, to assist communities in revising their planning and policy frameworks to comply with the legislation. Fauquier County was awarded a Tier II grant within this program. As a participant in the program, the County is required to revise their comprehensive plan to

incorporate at least one urban development area and revise their zoning and subdivision ordinances to incorporate the principles of new urbanism and traditional neighborhood design. In addition, the County was required to create a small area plan for all or a portion of the UDA and analyze the specific traffic impacts of such plan. As part of the Urban Development Area legislation, the County has chosen to designate one of the Urban Development Areas within the existing Bealeton Service District.

Purpose of the Bealeton Area Plan for the Route 17 Corridor

The adopted Bealeton Service District Plan is the primary county policy document that guides development in the Bealeton Area. The purpose of this Area Plan for the Route 17 Corridor is not to create a new Service District Plan. Instead, the intent is plan is to build on the existing Bealeton Service District Plan by clarifying the preferred vision for the future of the Route 17 corridor, create a conceptual plan for its long-term physical development and provide further detail on transportation and community design along the corridor. However, the basic future land use and policy framework for the area will continue to be guided by the adopted Service District Plan.

Public Input Process

In the spring of 2011, Fauquier County and the citizens of Bealeton hosted a series of public meetings at Liberty High School to provide public input for the Bealeton Area Plan for the Route 17 Corridor. Consistent with past planning efforts, incorporating the perspectives and priorities of the people who live, work and do business along the corridor was a critical component in the development of this corridor plan for Route 17.

Staffed and facilitated by a team of professional planners and designers led by Renaissance Planning Group, the planning process included an on-line survey, a series of public workshops, and a property owner workshop, during which local residents, business owners and officials provided input to identify issues and opportunities and help develop a conceptual plan and future vision for the Route 17 Corridor.

A series of initial meetings were held on March 23, 2011. These meetings included a work session with invited property owners along the corridor, and a presentation/work session with the general public, VDOT staff, and elected officials. The overall goal of the meetings was to identify issues and opportunities for transportation and community design improvements along the Route 17 Corridor.

Following are a few key issues derived from the March work sessions - more detailed input summaries from

"Bealeton is a pedestrian community that is not pedestrian friendly."

Comment from workshop participant, March 2011

each session are included in the appendix to this report.

Key Issues & Opportunities Identified

- Slow down the traffic
- Too many trucks – how to limit?
- Bypass is needed but a long term prospect
- Needs to be walkable
- Solve problems at Station Dr. & at Schoolhouse Rd.
- Passenger & freight rail to reduce traffic
- Consider crosswalks, park n' ride, bus
- Consider roundabouts as "gateways" to town center
- Consider "Quadrant" intersection

In addition to identifying issues and opportunities, workshop participants were asked to provide input on two conceptual transportation alternatives for the corridor: Route 17 as a pedestrian-friendly "boulevard" and Route 17 as a multimodal "parkway." The overwhelming majority of participants favored the "boulevard" concept.

After the March 23 workshop, the consultant team and county staff compiled the input received and used it to develop a series of transportation and community design concepts that ultimately became the Draft Vision for the corridor. A second public workshop was held on May 5, 2011 at Liberty High School to present the Draft Vision to the public and property owners and obtain their input on the proposed Vision Concept. Partcicipants in this work session included property owners, developers, residents and business owners in Bealeton. They were asked to work in small groups and review the draft transportation and community design concepts that were presented and judge how well the proposed vision met their needs and aspirations for the Route 17 corridor. In general, there was overall positive input and affirmation of the Draft Vision. The summaries of both rounds of meetings are included in the appendix of this document. Public input played a major role in shaping the ideas and concepts that ultimately became the vision concepts embodied in the Route 17 Corridor Area Plan as summarized in this report.

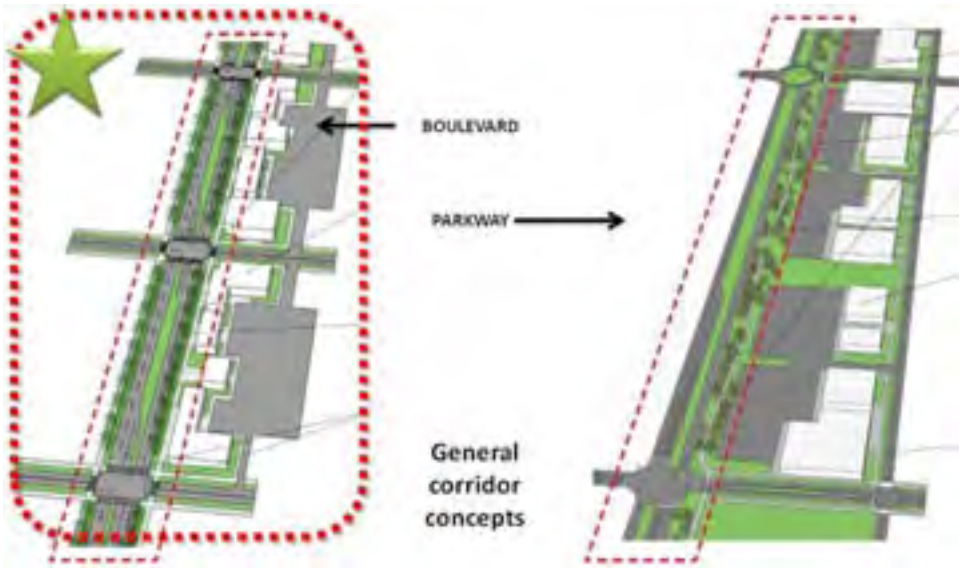


Figure 1. Boulevard and Parkway Concepts from the first public workshop

Existing Context

Prior to the workshops, the consultant team conducted a brief analysis of existing plans, regional trends and factors that could influence the future development and evolution of Bealeton and the Route 17 corridor. Some of the results of this analysis are summarized below.

Fauquier County Comprehensive Plan

A long-standing and important Fauquier County planning goal has been to concentrate and guide growth into Service Districts. Service Districts are the areas planned for relatively more intensive use and density and are intended provide adequate public facilities and infrastructure to support this type of development. The County has six Service Districts and three Village Service Districts. The Service District concept was first introduced in the original Comprehensive Plan of 1967, and while it was successful at concentrating growth in designated areas, it did not take into account the traditional pattern of development of historic villages, such as Bealeton. As a result, the pattern of growth that is seen in the Bealeton community today is a result of the suburban planning model of the time: conventional cul-de-sac subdivisions connected by high speed arterial roadways, and limited pedestrian linkage between neighborhoods, parks, open spaces, and community facilities

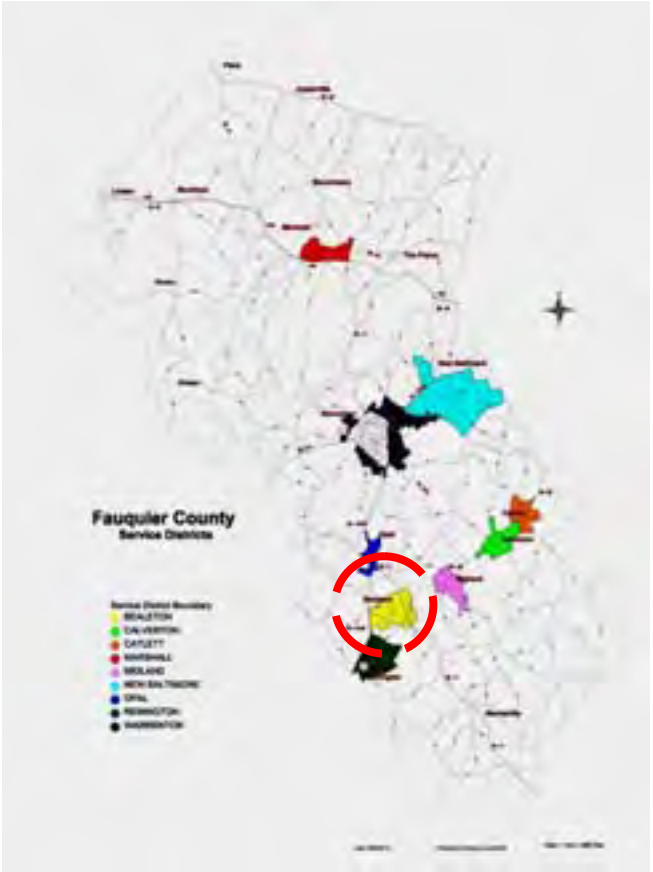


Figure 2. Location of Bealeton, Opal and Remington Service District Plan

In 2000, the citizens of Bealeton, Opal and Remington completed a Service District Plan as part of Fauquier County's overall Comprehensive Plan. The Service District Plan for Bealeton, Opal and Remington represents the third update since the original Countywide Comprehensive Plan of 1967 and was

completed through an innovative approach, involving local citizens from its inception, including citizen review of the assumptions which founded that 1967 Plan. The two-year planning process that followed included many Citizen Committee meetings and community information sessions, which resulted in some fundamental changes to the existing plan.

The principal physical change in plan direction and preference is that new development, within the specified service districts, should incorporate design characteristics of older, traditional patterns of community design. In the Bealeton, Opal, and Remington Service District Plan, the desired future for the village of Bealeton is described in a vision statement and outlined in the following planning principles:

- Pedestrian orientation;
- Rectilinear pattern of blocks;
- Interconnected streets and alleys;
- Multiple focal points (civic buildings, parks, squares);
- Mainly multi-story, mixed use buildings;
- Human scale streetscapes
- Landscaping - street trees, crosswalks, pocket parks;
- Parking behind buildings, and on-street parking.

Figure 3. Community Design Plan from the Current Service District Plan

Transportation Issues

1. *Significant and growing local and regional traffic volumes on Routes 17 and 28 make these roads very unfriendly to pedestrians and bicyclists. The community is now a "non-event" to most through travelers on Routes 17 and 28.*
2. *Current traffic conditions on the corridor and the Virginia Department of Transportation's expansion plans for Routes 17 and 28 (such as widening sections of Route 17 and 28) will further divide the community and prevent the formation and relevancy of an effective center.*
3. *The cul-de-sac design of existing subdivisions in Bealeton limits pedestrian, bike and vehicular movement between subdivisions and within the community, and creates very poor traffic conditions along Routes 17 and 28.*

Employment

The map at the right shows the existing employment density in Fauquier County according to the US Census (2008). While the vast majority of jobs are concentrated in the Town of Warrenton, Culpeper and Manassas, the Bealeton Service District contains significant employment density in the County.

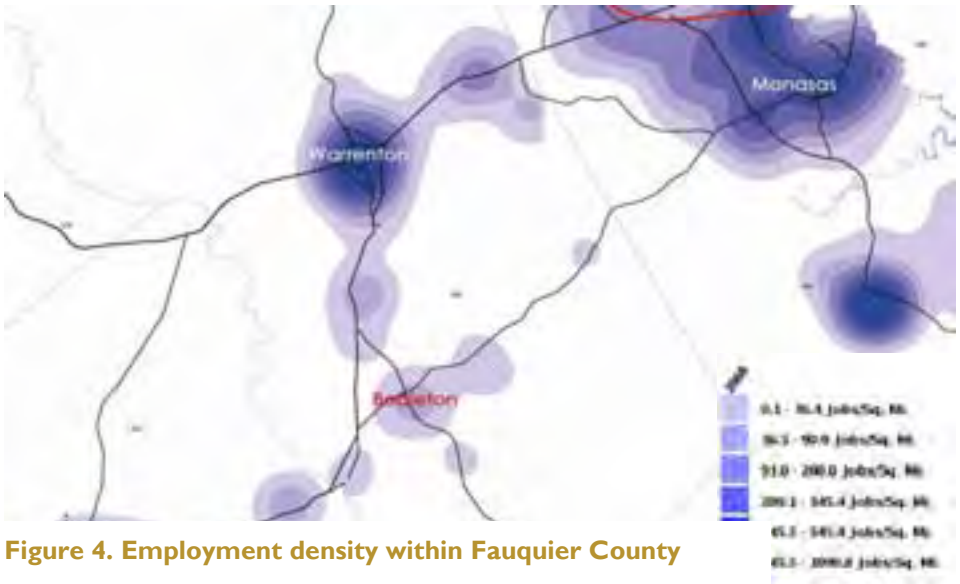


Figure 4. Employment density within Fauquier County

Walkability

Walkable neighborhoods offer many benefits to the environment, health, finances, and communities including:

Health: Walkable neighborhoods create more freedom of choice for residents and studies have shown that they contribute to the overall physical health of residents.

Social: Traditional neighborhoods with walkable access to community facilities and amenities create more opportunity for social interaction for all age groups and can decrease the hours spent commuting to work and activities

Financial: Studies have shown that homes located in walkable neighborhoods can be more valuable than those that are not. Controlling for all other values, a study found that in a typical metropolitan area, each 1 point increase in "Walkscore" was associated with a $700 - $3,000 increase in home values. Walkscore is an online tool that was developed to help identify and measure walkable places. It computes the "walkability" of any place using distance to destinations such as restaurants, libraries, schools, etc.

As shown in the following maps generated by Walkscore, Bealeton has a Walkscore of 55, ranking it as "somewhat walkable" as compared to a ranking of 88 for a community like the Town of Warrenton.

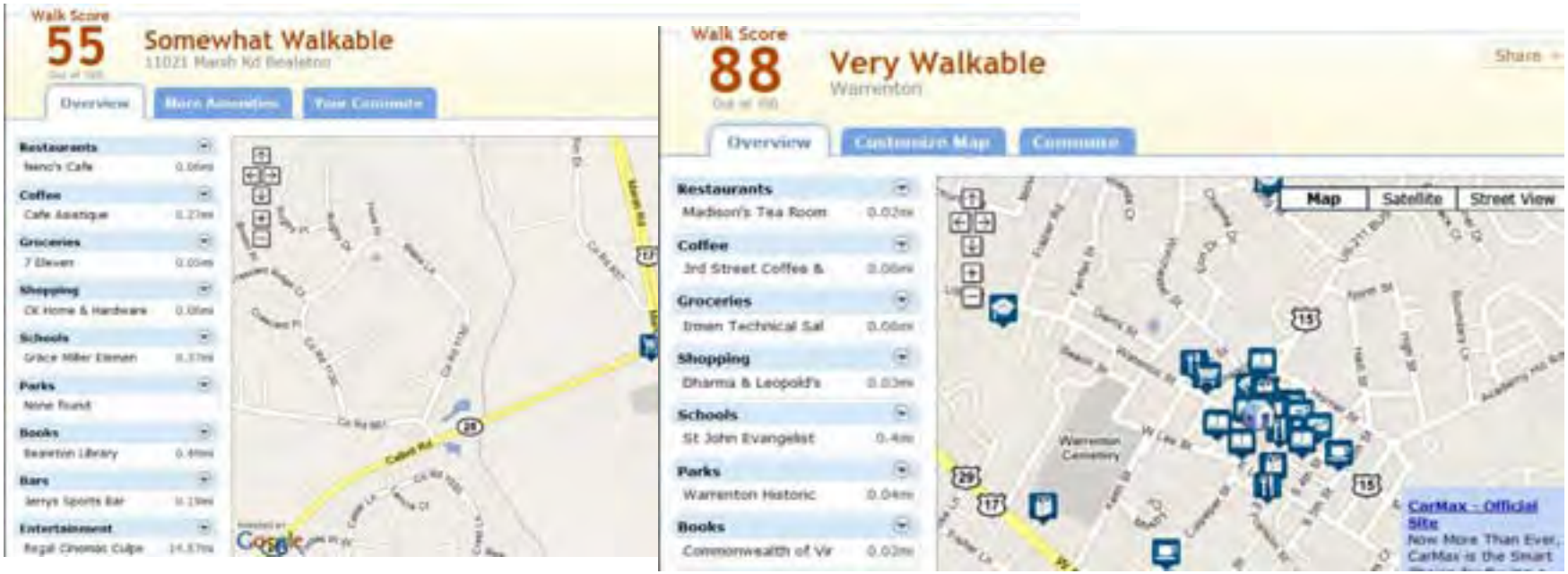


Figure 5. Walkscore values for Bealeton and Warrenton

TRANSPORTATION PLANNING

Transportation Planning

A key aspect of this planning process was addressing the transportation infrastructure needs of the Route 17 corridor in Bealeton and the larger region. The transportation planning process included identification of issues and opportunities, testing of alternatives, and evaluating the alternatives with the community through input meetings. Through this process, strategies for a phased approach to accommodating the variety of travel and mobility needs have been developed consistent with meeting the overall vision for the service district.

The Route 17 Corridor through this portion of Fauquier County has been designated by VDOT to be one of "statewide significance". This designation has been given to key corridors across the Commonwealth that are of primary importance for serving intra-state traffic and providing mobility needed for commerce and the movement of freight. The Route 17 corridor, by virtue of its location within the state, provides an increasingly popular long distance connection between I-95 and both I-66 and I-81. As a result, many long distance truckers and interstate travelers choose to use this corridor as the most direct route for regional travel. Furthermore, upcoming improvements planned for the Norfolk International (port) Terminal will significantly increase the volume of freight being shipped through the port, which will put more pressure on corridors such as Route 17 through Bealeton.

Figure 6. Regional travel patterns

The key challenges for the transportation network in the Route 17 corridor revolve around the increasing traffic volumes, presence of heavy trucks, and lack of overall multi-modal accommodation in the corridor and surrounding area.

Current Transportation Plans

Recent County transportation studies and independent analysis conducted as part of this effort indicate that the Route 17/28 intersections in the future will be highly congested unless additional turn lanes and through lanes are considered. In particular, the Route 28 intersection with Route 17 is and will remain the worst performing intersection along this portion of the corridor. This is primarily due to the high volumes of through traffic that have to be accommodated along with significant turning movements. In years past a grade separated interchange was considered for this location however it was rejected due to community impacts.

Currently, both County and VDOT plans for the area show a southerly bypass for Route 17 and 28, but as of yet this solution to the traffic congestion has proven to be cost prohibitive under the current funding environment. The bypass could provide major relief of traffic and truck volumes through the community.

Other potential new roads that have been discussed that would further alleviate traffic congestion include a Route 28 bypass to the east to connect Route 17 to the airport area and a new East/West Connector across the top of the study area providing additional east-west mobility.

For planning purposes, this study examines short, mid, and long term solutions that allow for a flexible and phased implementation process. The suggested strategies can be implemented in large part with future development, and can work with or without the proposed new bypass facilities.

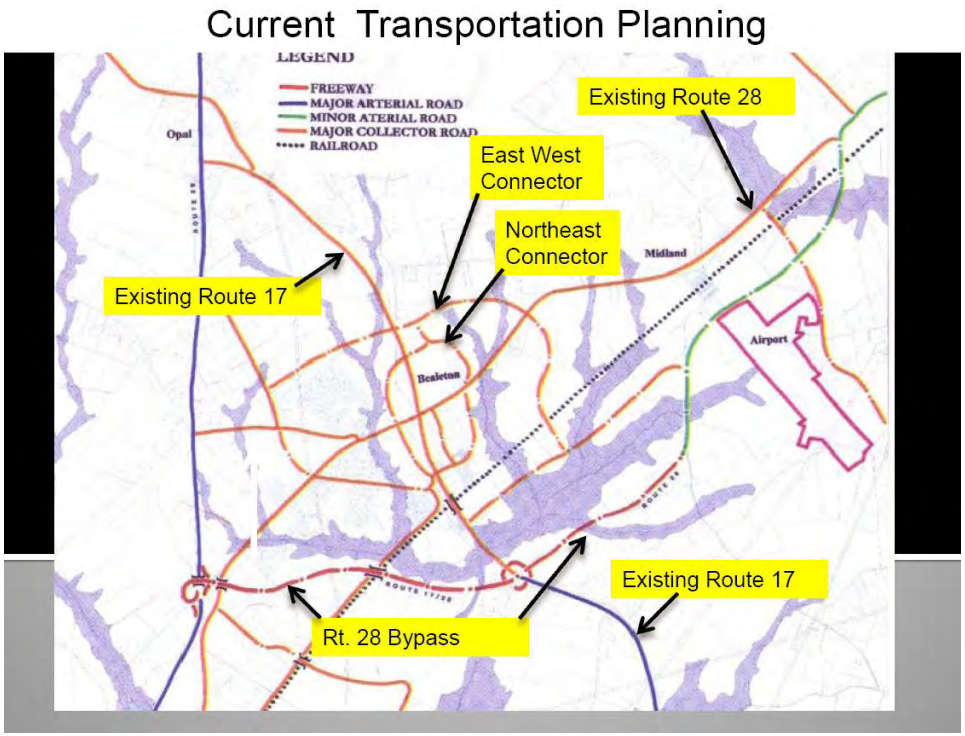


Figure 7. Transportation improvements recommended in the Service District Plan

Corridor Growth and Future Traffic

As a primary growth area and as a key arterial corridor for the region and state, the traffic volumes along Route 17 are expected to increase substantially in the coming years. Growth in traffic volumes will be the result of several factors, including new development that will occur along the corridor, growth in commuting traffic to Northern Virginia, regional growth in adjacent jurisdictions and increased truck traffic associated with Port expansion. The graphic to the right shows and overall summary of the projected traffic increases on various corridor legs in the study area.

Figure 8. Proposed development in the study area

Figure 9. Projected traffic volumes in the Route 17 and 28 corridors

Intersections and Roundabouts – Issues and Opportunities

Throughout the transportation analysis process, one of the key issues arising from the input process was the desire to not increase Route 17 to a six lane (three lanes each way) roadway. The study team examined a wide range of potential intersection configurations to address the challenges of the heavy through volumes that are projected at the Route 28 / Route 17 intersection. Various intersection treatments were considered including several innovative configurations that involve restricting the intersection to two phases of signalization, i.e. only allowing for through movements so as to maximize the through movement capacity and minimize the intersection footprint.

Figure 10. Signal phase analysis from NC State University

A configuration referred to as a quadrant intersection emerged as the most feasible of the innovative intersection designs. This intersection configuration was compared to the conventional intersection configuration that would require dual left turn lanes, two through lanes on each approach, and exclusive right turn lanes which would result in a very large intersection in the heart of the service district.

This quadrant intersection configuration requires the left turns to occur at adjacent intersections rather than at the primary intersection. This facilitates the through movement volumes by decreasing delay and queuing, but does require a more circuitous route for those motorists desiring to make a left turn. This concept results in a smaller intersection for Route 28 at Route 17, but an increased footprint at the two adjacent intersections over what would have otherwise been required. It should be noted that the

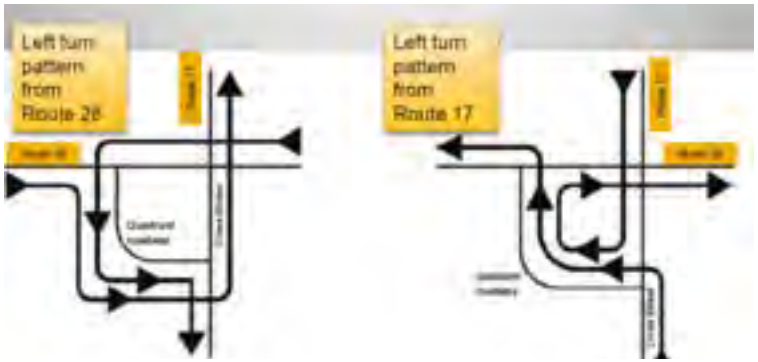


Figure 11. Pattern of left turns for potential quadrant intersection

Quadrant Interchange

Pros:

- *Smaller Intersection Footprint at Route 17/28 Interchange*
- *More efficient traffic flow on Route 17*
- *Adaptable back to standard intersection if bypass(es) are constructed in future*

Cons:

- *Some left turns have more travel time, distance, stops.*
- *Right of way for connector road*
- *Larger intersection where the quadrant ties back into Route 17 and Route 28*

quadrant intersection configuration could be converted back to a conventional intersection in the future should the proposed bypass facility(s) be constructed. Public input throughout the workshop process indicated that advancing the bypass projects to the near term was ultimately preferable to the quadrant intersection configuration. Some concerns noted were about the complexity of the left turns and the concern over having two additional signalized intersections in exchange for a reduced primary intersection at Route 17/28. Furthermore, there was some concern regarding the difficulty in accessing the parcel that would be in the infield of the quadrant roadway. However, overall public input in the workshops indicated preference for a quadrant intersection over a "big" Route17/28 intersection as shown in the analysis.

Figure 12. Analysis of conventional intersection alternative

Figure 13. Analysis of quadrant intersection alternative

The quadrant concept could be implemented with construction of the new interconnected street grid in the southwest quadrant. In fact, a key element of the overall transportation concept plan is that a well interconnected grid system is constructed as new development and redevelopment occurs in each of the study area quadrants. This new grid will also create opportunities to serve the abutting development with access other than a direct connection onto Route 17 or Route 28. This will become increasingly important given the new VDOT access management requirements. Interestingly, it was noted that some of the new connector roads, as envisioned in previous planning efforts, are already in place.

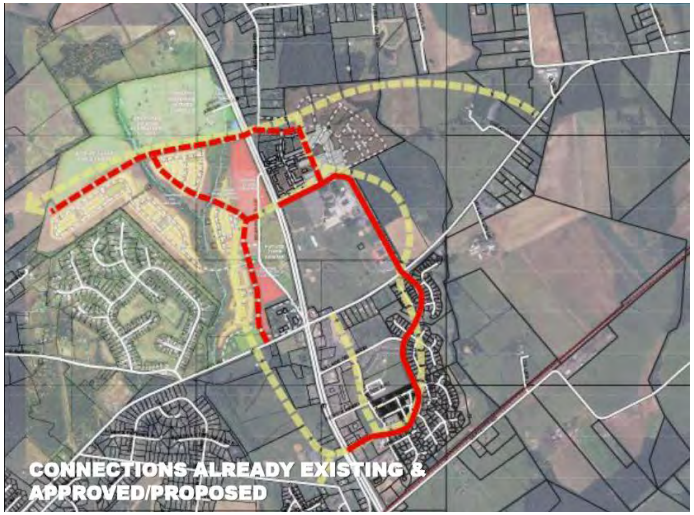


Figure 14. Street connections proposed in Service District Plan (yellow) and already constructed or approved (red)

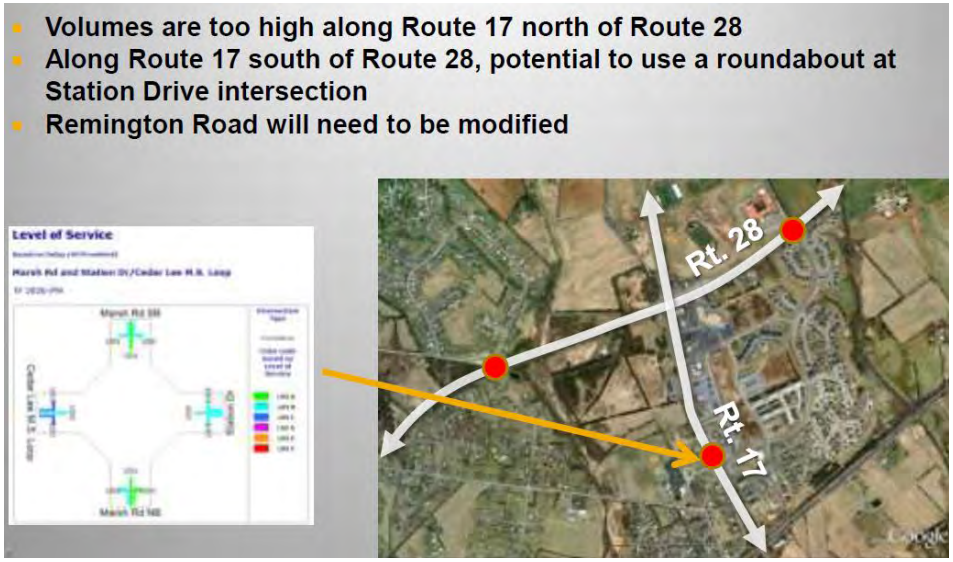
Roundabouts

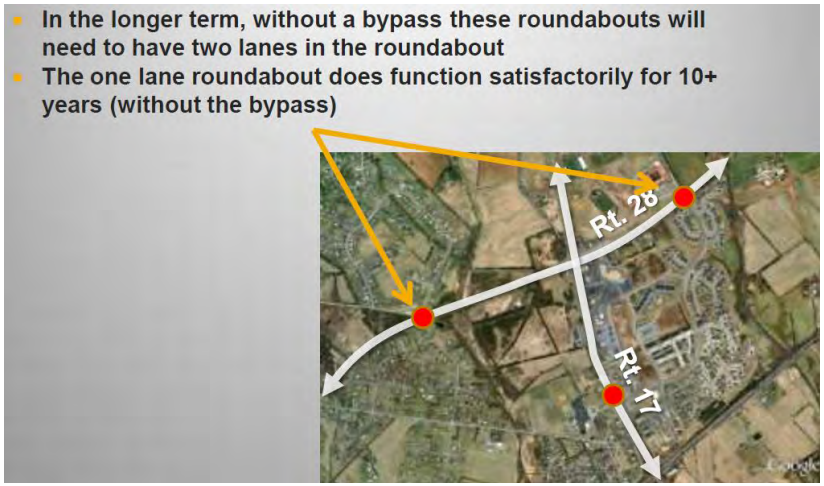
Roundabouts are becoming a much more common intersection configuration in the United States. Since 1990, there have been approximately 2500 modern roundabouts constructed with much success in reducing crash severity over conventional signalized intersections, while providing a context sensitive intersection solution. As part of this study effort, the feasibility of roundabouts along both Route 17 and Route 28 was explored. Roundabouts can provide a visual cue to motorists that they are entering into a different (town center type) environment. This is often employed as a strategy to alert motorists that they are entering an area where lower speed and pedestrians are more the norm than the exception.

Under the scenario that the Rt. 28 bypass is not constructed in the next 30 years, the projected traffic volumes on the north end of Route 17 are projected to be at or above 40,000 vehicles per day. At this volume a roundabout would likely not provide adequate capacity at the newly proposed development entrance roads. However, at the southern end of the service district at Station Drive, the projected lower traffic volumes could potentially allow for a roundabout type intersection. This would require re-alignment of Remington Road due to its awkward intersection with the school access road.

Along Route 28, roundabouts could potentially be implemented at Oak Shade Drive on the west and also

at Station Drive on the east. Both of these intersections currently experience high side street delay and could benefit from the new roundabout configuration in the short to mid-term. In the long term, both of these roundabouts may need to have two circulating lanes, depending on whether or not the bypass facilities are constructed. Roundabouts at these two locations would provide the added benefit of signaling to drivers that they are entering a more heavily developed area with more pedestrians and local traffic than other portion of the corridor. In addition, attractive landscape treatments of the roundabouts could serve as effective "gateways" at the east and west ends of Bealeton.





Figures 15 and 16. Location of three potentially feasible roundabouts in the study area

Analysis of Proposed Strategy

In evaluating the potential future traffic operational levels of service that may occur at key intersections within the service district in the future, various data sources from prior and ongoing study efforts were considered. These included traffic projections from recent traffic studies for both White Marsh and Mintbrook. These studies were prepared within the last year and reflect current ideas and commitments for future development in the service district. Consideration was also given to a traffic impact study for the service district commissioned by the County in 2010 that includes examination of volume diversions that could result if the Rt. 28 bypass (Route 17 over to Route 19/15) were to be constructed in the future. Planning level data sets were developed from consideration of these prior studies and then analyzed using the traffic operations software Synchro for the corridor and intersections, and also Sidra for potential roundabout locations. In evaluating future traffic conditions, the existing conditions were first measured such that we could have a baseline condition for comparison of the future conditions. The analysis included consideration of mitigation strategies that involve changing intersection configurations with the goal of adding new capacity needed to accommodate the projected traffic volumes at acceptable levels of service. For the purposes of this analysis, an acceptable level of service was deemed to be a level of service D or better.

Figure 17. Typical Level of Service sample images

Level of Service is a concept used when examining traffic operations that reflects the amount of congestion and delay that motorists might expect to experience at an intersection, or more specifically at a given approach to an intersection. A letter grade is used from A to F. LOS A would be characterized as

having very little delay and no congestion, and LOS F would be characterized as having extensive congestion and queuing which would cause substantial delays at an intersection. When measuring traffic operational performance, each of the individual movements are given a level of service (LOS) rating and then these are averaged to arrive at an overall intersection LOS rating.

Existing Conditions

At present, the primary source of congestion within the study area is the Route 28 / Route 17 intersection. At peak hours of the delay the queuing and delay becomes excessive. The other intersections in the study area function reasonably well. The main reason for the congestion at Route 28 / Route 17 is that there are heavy through volumes on all four of the approaches, and these movements require a significant percent of the green time in each signal cycle in order to not queue to excessive lengths. However, since there are left turn movements that require a portion of the signal cycle, the through movements must wait for the left turn phases to be completed prior to being able to resume travel. A signal cycle is defined as one complete rotation of the allocation of the green signal indications, or phases. For existing conditions, the Route 28 / Route 17 intersection functions at an overall LOS D in the AM and LOS E in the PM peak periods of the weekday. During each of these time periods there are individual approaches that have movements with failing levels of service. In the morning peak period the queues extend back over 600 feet for the eastbound direction at time and in the evening peak period the queues are sometimes in excess of 900 feet for the westbound direction.

The Route 17 intersection with Station Drive experiences an overall LOS of C, which isn't excessive in general. However, the side streets do experience long delays that rate in the LOS E and F range. This is due largely to the split phasing of the signal, i.e. the eastbound and westbound do not move concurrently. The split phasing is largely due to the way Remington Road intersects the entrance to the school on the west side of Route 17.

Future Conditions

As previously described, over the coming 20 years it is anticipated that the volumes along both Route 17 and Route 28 will continue to increase due to general regional growth and also growth in the service district. These increased volumes will result in a substantial increase in congestion in the service district unless additional roadway capacity is constructed. This capacity could come in the form of additional turn lanes at intersections, the quadrant intersection concept, and - in the longer term - the Rt. 28 bypass road.

An analysis of future conditions was performed for a variety of strategies as described above. It was found that if the Route 28/Route 17 intersection was increased in size to include two left turn lanes on each

approach, an exclusive right turn lane, and an additional through lane for eastbound Route 28 (total of two through lanes), then given the future volume projections, the overall LOS is projected as F in the evening peak hour with the majority of movements functioning at LOS F. In the AM peak hour the overall LOS is projected to be D with a few of the movements functioning at LOS F. The queuing in the evening peak hour will exceed 700 feet on three of the four approaches at times, while in the AM, the queuing is mostly less than 300 feet except for the northbound approach which will exceed 400 feet.

With a bypass constructed and assuming the same laneage as described, the overall LOS is projected as C in the morning peak hour and all movements function at LOS D or better except for the eastbound left turn lane. In the evening peak hour the overall LOS improves to LOS D with all movements at LOS E or better except the southbound left and westbound left. In both the AM and PM peak periods the queuing would be reduced significantly to generally acceptable levels. Depending on the volume projections when a more detailed study is prepared in the future for the bypass project, the overall intersection size may be able to be reduced further. This may be especially true if the proposed network of connector roads is constructed such that the local traffic has alternative routes other than using Routes 28 and Route 17 for local trips.

Quadrant Intersection

The quadrant intersection as discussed in the previous section offers an opportunity to improve the overall Route 17/Route 28 intersection LOS, though does result in larger intersections to the west and south where the quadrant road meets Route 28 and Route 17 respectively. With the quadrant intersection, the overall LOS is projected as C, with each of the movements operating at LOS C or better except for the westbound approach in the PM which would operate at LOS D. The queuing is significantly decreased on all approaches. At Village Drive and Route 17, the new intersection would function at LOS C with all movements and at LOS D or better in the peak periods. This would require that the westbound approach be right in / right out only to minimize the signal phases needed at the intersection. At the western end of the quadrant road, the overall LOS would be C with all movements functioning at LOS D or better with the exception of the westbound and eastbound movements in the PM peak period. The queuing for the westbound direction would be in excess of 700 feet at certain periods within the PM peak hour of the day.

Roundabouts

Roundabouts were examined for key intersections throughout the study area. When examining the performance of roundabouts, delay (i.e. time waiting to enter the roundabout) and queuing are examined. It was found that the intersections of Oak Shade at

Route 28 and also Station Drive at Route 28 could function at an acceptable LOS in the peak hours of the day and queuing would not be excessive. Depending on when the roundabouts might be constructed, a one lane roundabout might be sufficient, though in the longer term the roundabouts will likely need to be two lanes. Along Route 17 a roundabout was evaluated on the north end at a potential new intersection associated with the Mintbrook and White Marsh developments. Due to the heavy volumes on Route 17, it was found that the roundabout would not function above LOS F in the mid to longer terms. However, on the south end, the potential exists for a roundabout at Station Drive and Route 17 since the Route 17 volumes are not expected to be as high as in the northern section of the service district.

Conclusions of the Analyses

The major findings from the transportation analyses efforts are as summarized below:

1. The Route 28 bypass is paramount in importance for reducing the overall through volumes on Route 17 in the future. This will allow for the potential for roundabouts on Route 17 and also a smaller overall intersection footprint at Route 17 and Route 28 than would otherwise be required.

2. Subtractions for the overall volumes on Route 17 and Route 28 were not made based on the construction of the future roadway grid and connector roads in the service district. However, it can be expected that a connected local roadway grid will provide much needed additional capacity for vehicular and multimodal mobility in the service district. As the grid network is further enhanced, additional studies can be conducted to validate their positive affect and to re-examine the overall traffic projections in the service district.

3. The potential quadrant intersection would provide a relief to the traffic on Route 17 and the through movements on Route 28. However, left turn volumes may experience an increase in overall travel time due to the required circuitous travel patterns necessary.

4. Roundabouts are feasible along Route 28 on the eastern and western ends of the service district. However, along Route 17 they are not feasible until the Rt. 28 bypass is constructed. Although the level of service was found to be satisfactory at Station Drive and Route 17, the Remington Road connection at the school entrance would have to be relocated and given the heavy truck volumes, VDOT would likely be resistant to implementing this intersection type without a bypass route completed.

5. The connected grid system should be constructed as soon as possible. This added capacity may help to extend the overall life of the existing Route 28 / Route 17 intersection. However, piecemeal modifications and lane additions will likely be necessary as traffic grows in the near future.

6. As noted in the general transportation section, if a quadrant intersection is utilized in the future, it could be possible to implement partial turn restrictions in the interim. In the long term once the bypass is constructed the quadrant system could revert back to a conventional intersection.

Figure 18. May 5, 2011 Public workshop

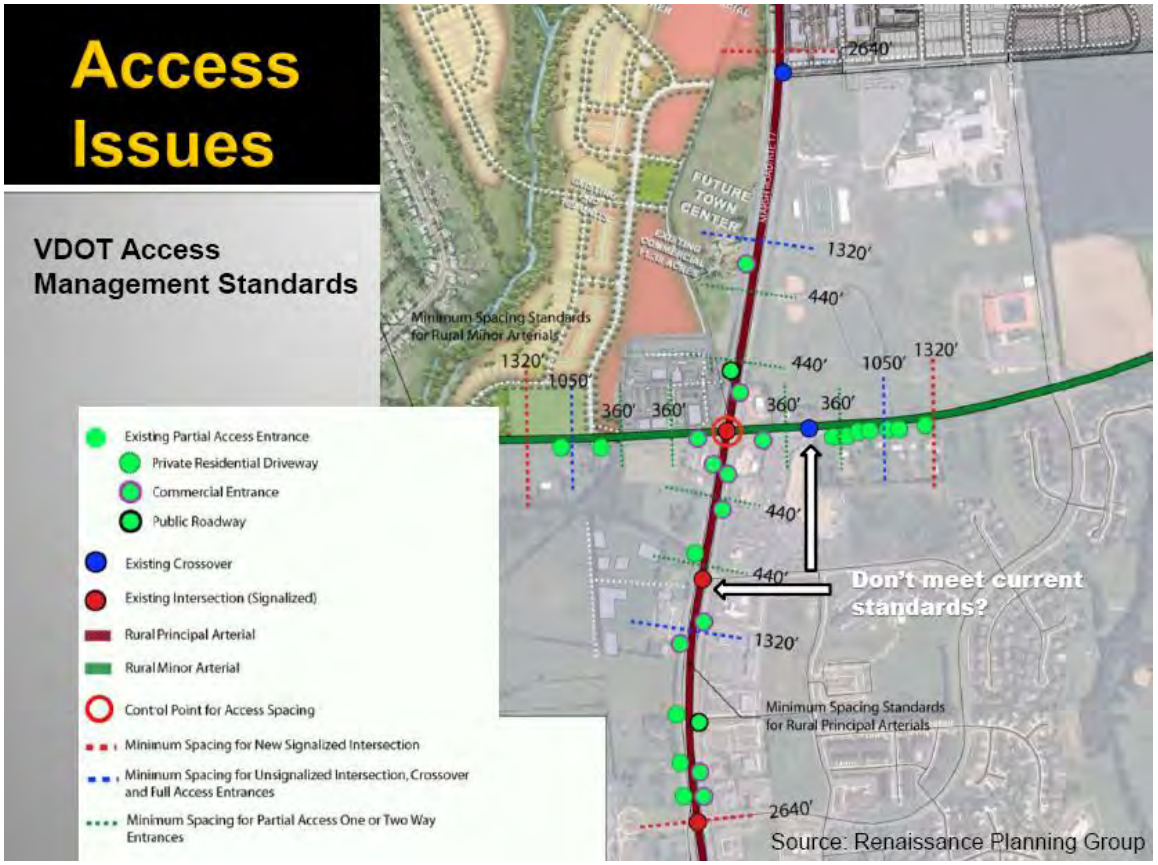


Figure 19. Access Management analysis for the Route 17/28 intersection

VISION CONCEPT

Proposed Vision Concept

The Vision Plan resulting from the work sessions was based on all of the input that was received from various agency staff, property owners and community stakeholders, both in the initial kickoff meetings in March, and in the follow up work sessions and public meeting in May. The graphic to the right shows a diagram of the overall design concept for future development in the Rt. 17 Corridor.

The overall vision for the corridor is a 4 lane, divided boulevard-type facility with supporting context-sensitive infrastructure, such as wide sidewalks, tree lawns and cross walks that create a safer, pedestrian-friendly experience along both Route 17 and Route 28. In addition, the design character of the corridor includes mixed use/commercial buildings oriented toward the roadways to further enhance the pedestrian experience. Developments off the corridor are generally connected to one another via parallel roadways and bicycle and pedestrian-friendly local roads. The intent is that a mix of uses develop through a series of planned commercial and residential developments that complement the overall vision of a vibrant walkable town center over time.

Figure 20. Illustrative Vision Plan

The visualizations to the right show how Route 17 could evolve with new development, local connector roads, and landscaping to create an attractive mixed use and multimodal boulevard throughout Bealeton in the future.

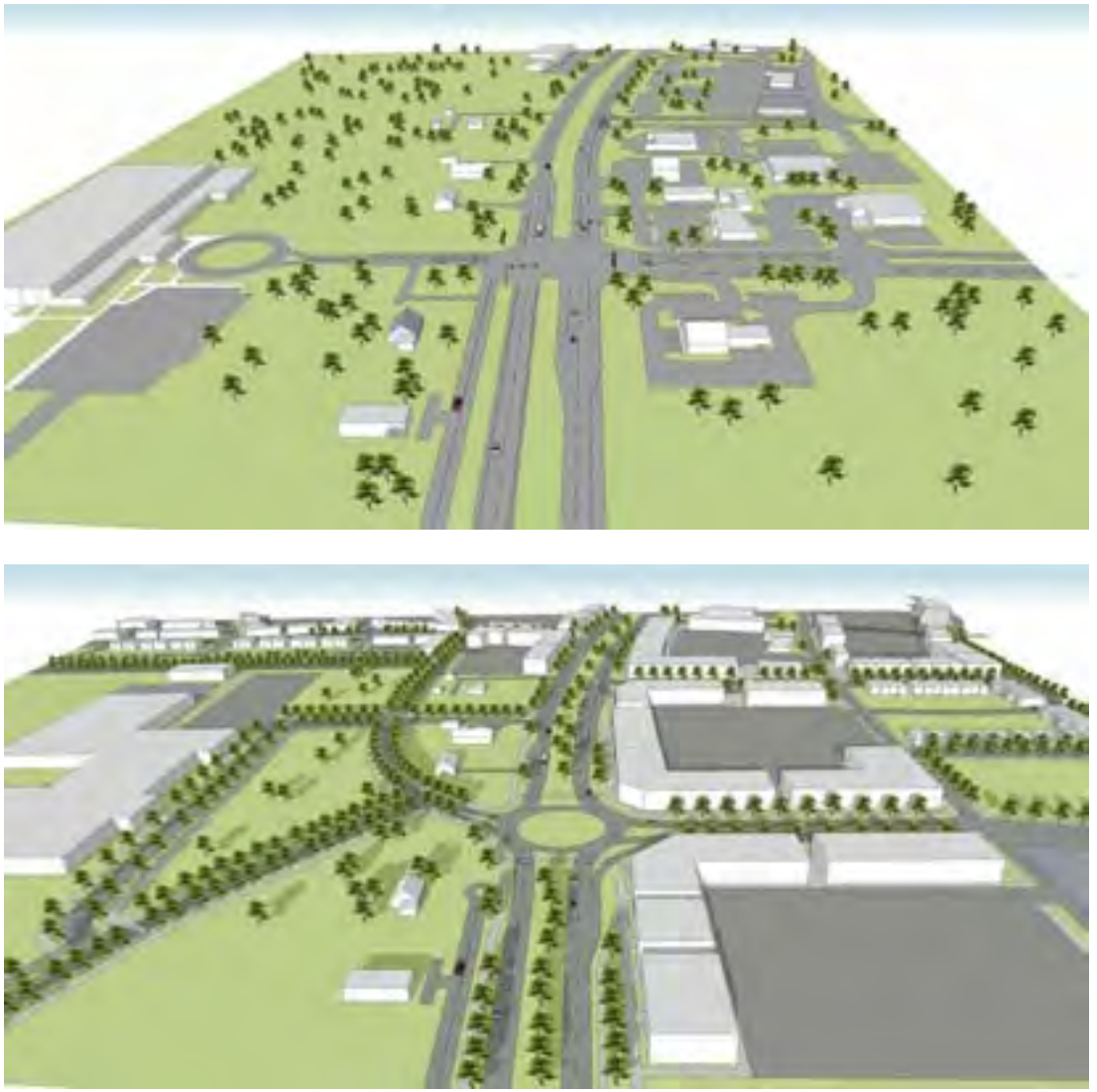


Figure 21 & 22. Existing and potential future views of the Route 17 corridor at Station Drive looking north

Local Street Grid Concept

A critical part of the overall transportation strategy is the creation of a grid of local streets and parallel roads. It is envisioned that future development will provide significant opportunities to connect adjacent neighborhoods and construct new connections throughout the service district area. Creating a parallel and interconnected network of local streets does several things for mobility and access along Route 17. First, by creating smaller block lengths on parallel roads over time through redevelopment, it reduces walking distances and brings the potential for future transit service closer to people's destinations, in an environment that is safer than trying to dodge traffic along a busy regional highway. Second, by distributing traffic better across multiple roadways, it reduces traffic volume that would otherwise be concentrating at one or two critical intersections. Traffic is more balanced and the signals can be better timed to move through traffic along Route 17. Also, multiuse paths and sidewalks can be constructed adjacent to key roads to provide improved pedestrian and bicycle opportunities.

The diagram to the right shows the basic intent of creating an integrated grid of circulation that retains the basic structure and scale consistent with a more traditional street grid in the town center.

Figure 23. Potential future street network

Livable Streets Concepts

For much of the twentieth century, major arterial streets, such as Route 17, were designed to ensure traffic flow and neglected the many social and recreational functions which are severely impaired by fast car traffic. The livable streets concept is an attempt to design for all the functions of streets: a space designed to be shared by pedestrians, bicyclists, and buses, as well as cars and trucks.

The following typical roadway cross sections provide recommendations for how the streets in Bealeton could be reconstructed in the future to create more livable streets. The typical cross sections incorporate key principles from the public input process, including the goals of providing:

- A pedestrian-friendly environment with slower traffic, street trees and lighting
- Ample capacity for truck and vehicular volumes
- Greater safety through the service district by providing visual cues to motorists that they are entering a more developed area with bicycle and pedestrian traffic

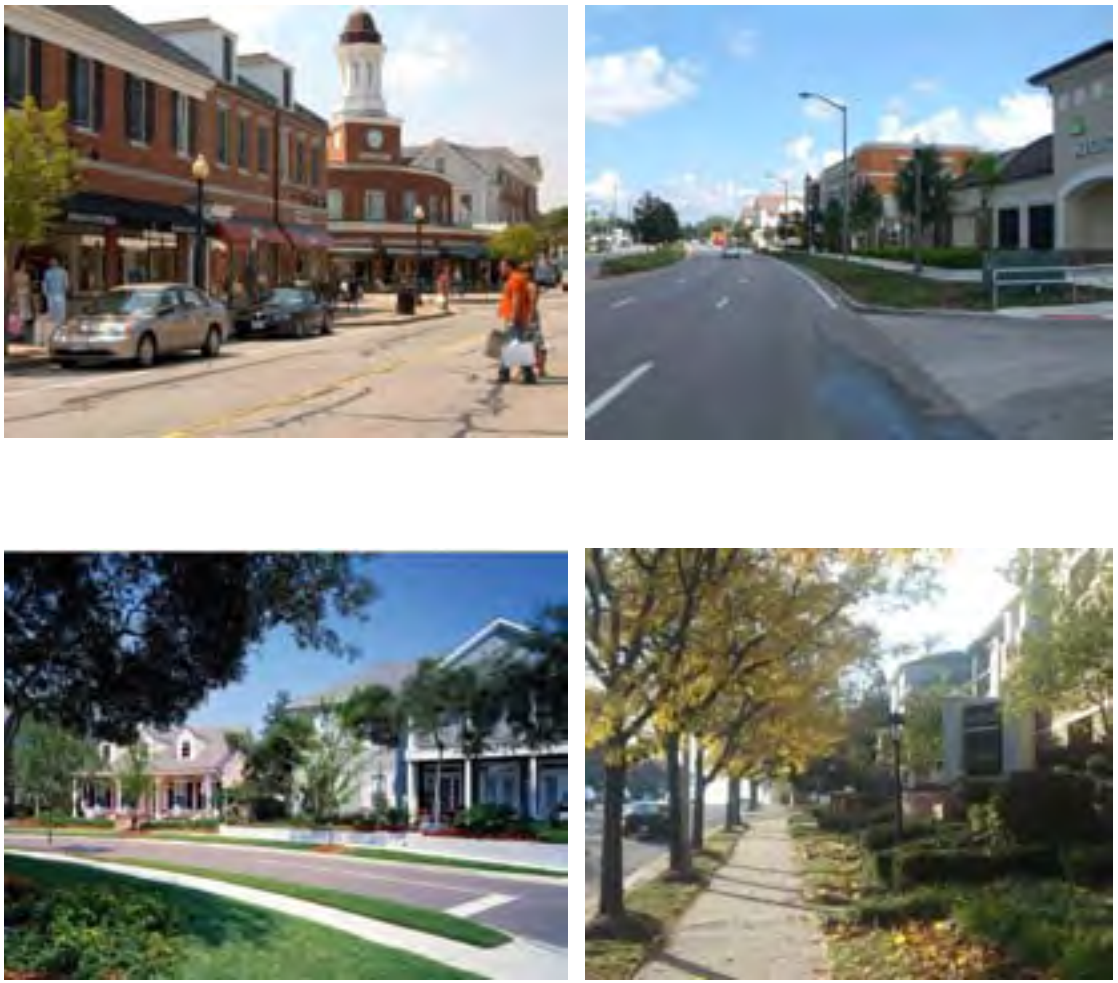


Figure 24. Views of livable streets. Clockwise from top left: Mashpee, MA; Maitland, FL; Celebration, FL: Columbia Pike, Arlington, VA

Figure 25. Conceptual Cross Sections: Regional Boulevards (Routes 17/28)

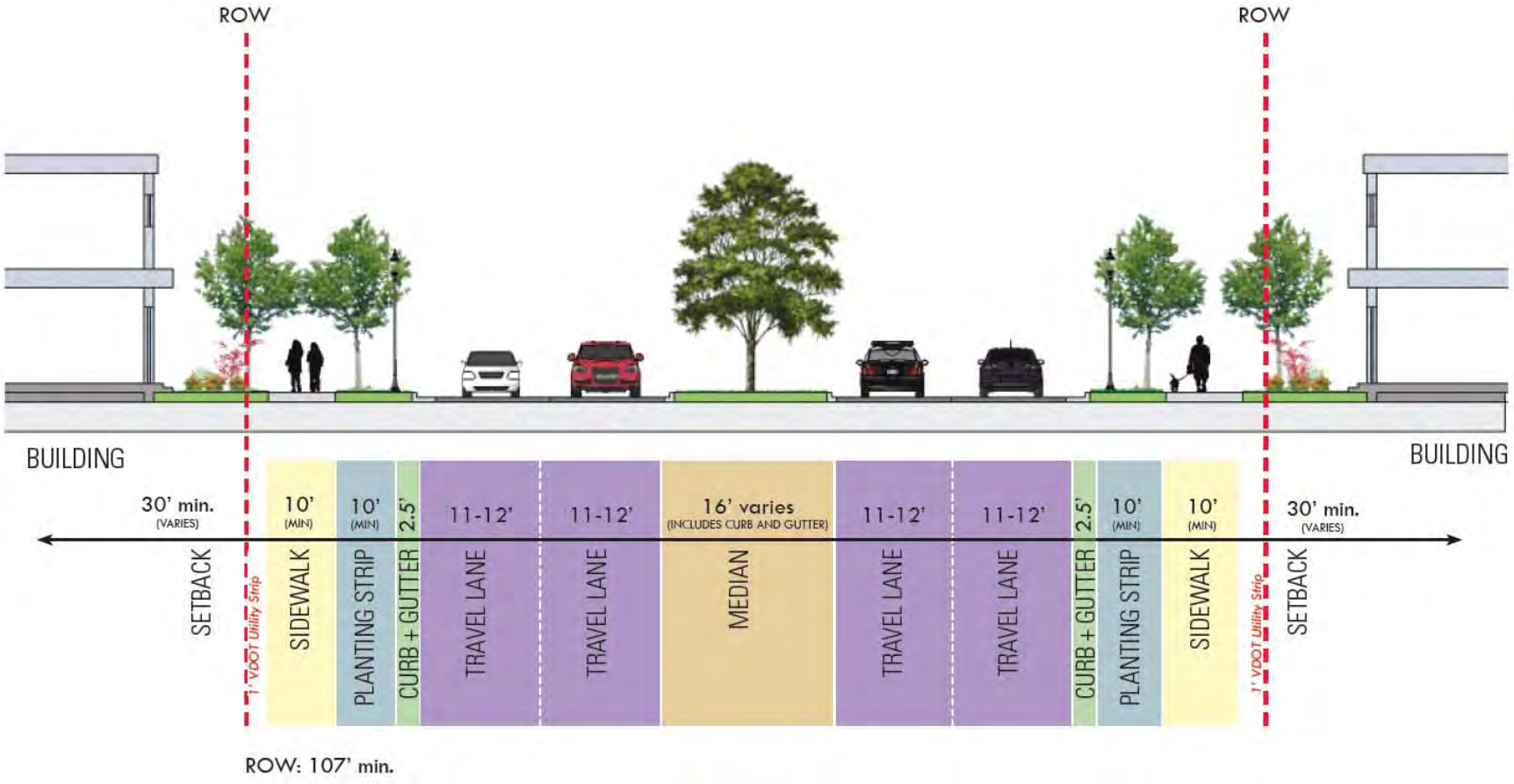


Figure 26. Conceptual Cross Section: Local Mixed Use Boulevard (e.g. Station Drive)

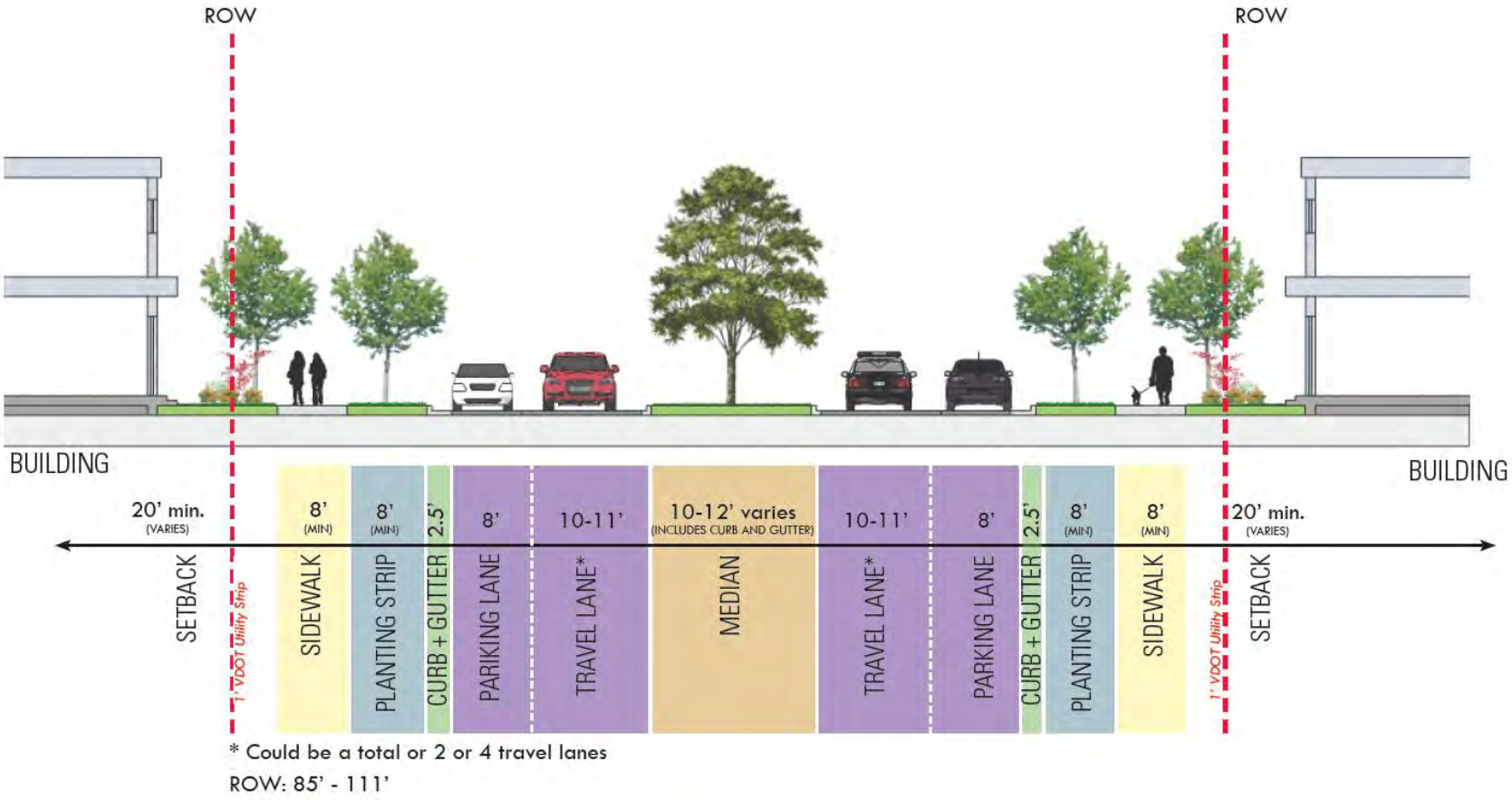
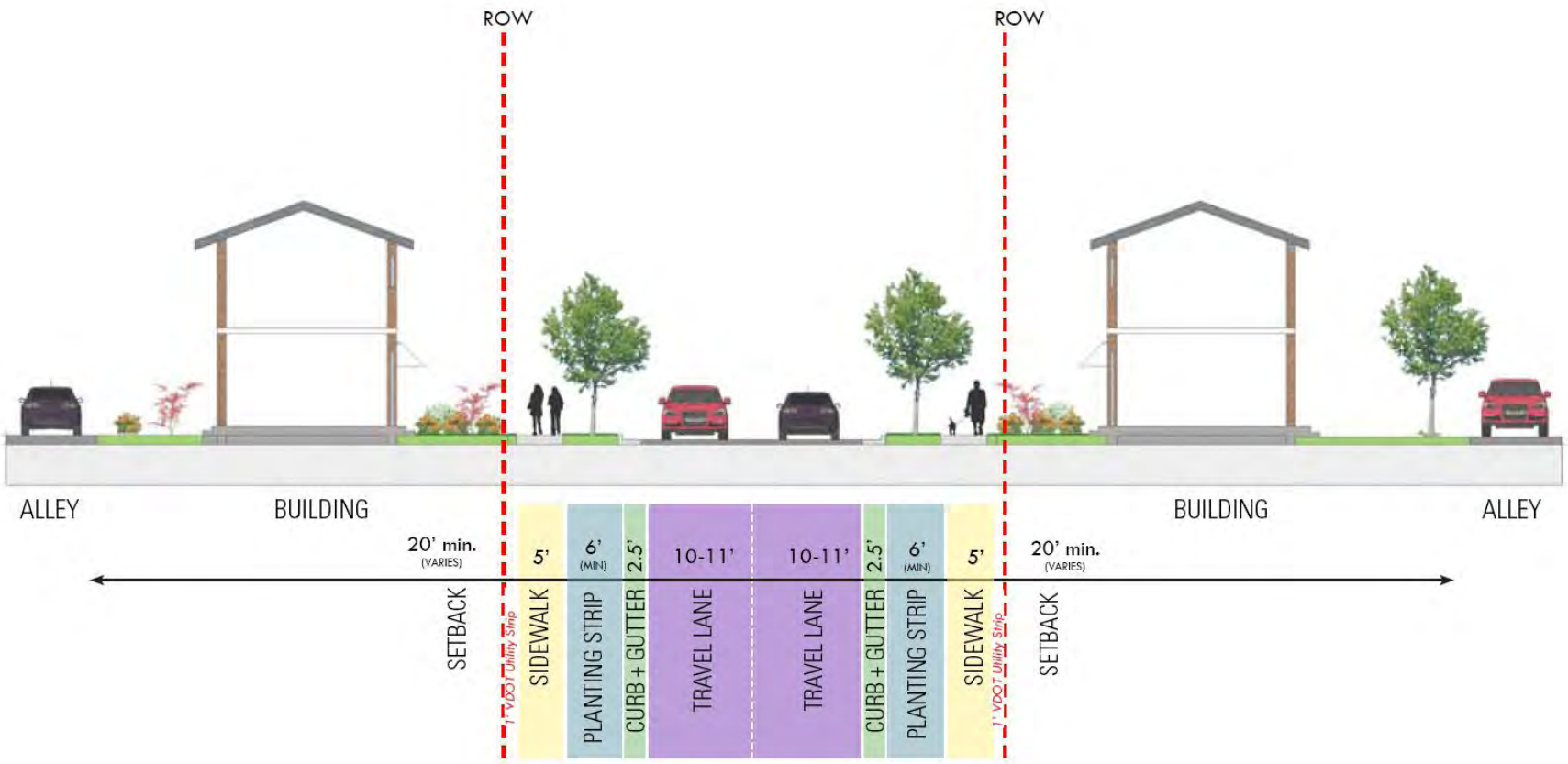
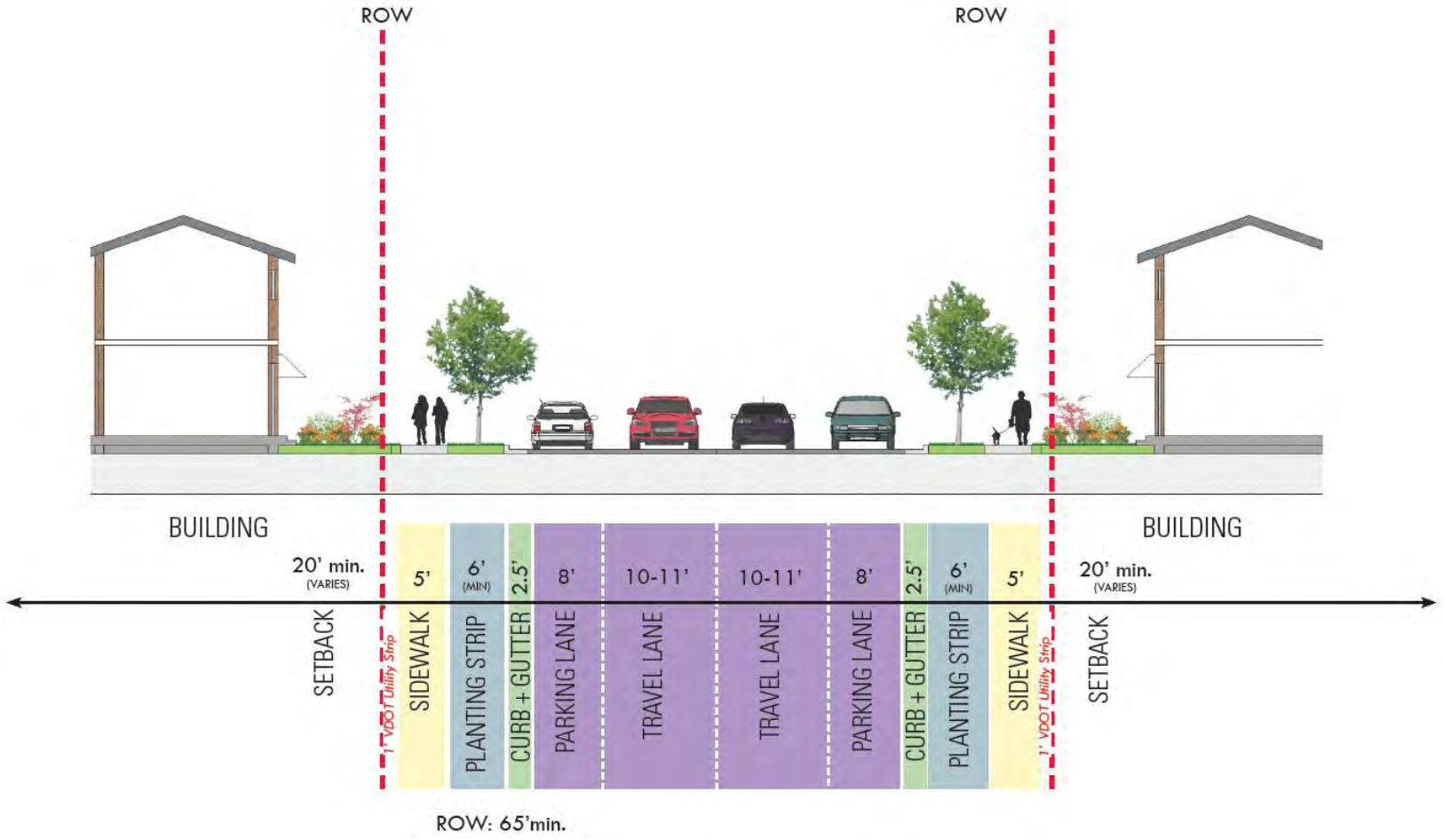


Figure 27. Conceptual Cross Sections: Residential Street without on-street parking.



NOTE: On-street parking should be provided if no alleys are present.
ROW: 49'min.

Figure 28. Conceptual Cross Sections: Residential Street with on-street parking.



Design Concepts by District:

Southern Area

The basic design concept for the southern portion of the corridor is to improve the functionality and safety of the Route 17/Station Drive/Remington Road intersection by adding a roundabout in the long term (only after the Rt. 28 bypass is constructed) and reconfiguring access to Remington Road, as shown in the detail plan to the right. In addition, the plan shows a long range potential for reconfiguring the Middle School site and entrance road to create a parallel system of local roads for future neighborhoods so that local traffic does not have to use Route 17. Finally, the Vision Plan suggests a potential alternative location for a future passenger rail station, showing it along Remington Road, adjacent to existing high density housing and across from future potential transit oriented development along redeveloped industrial land.

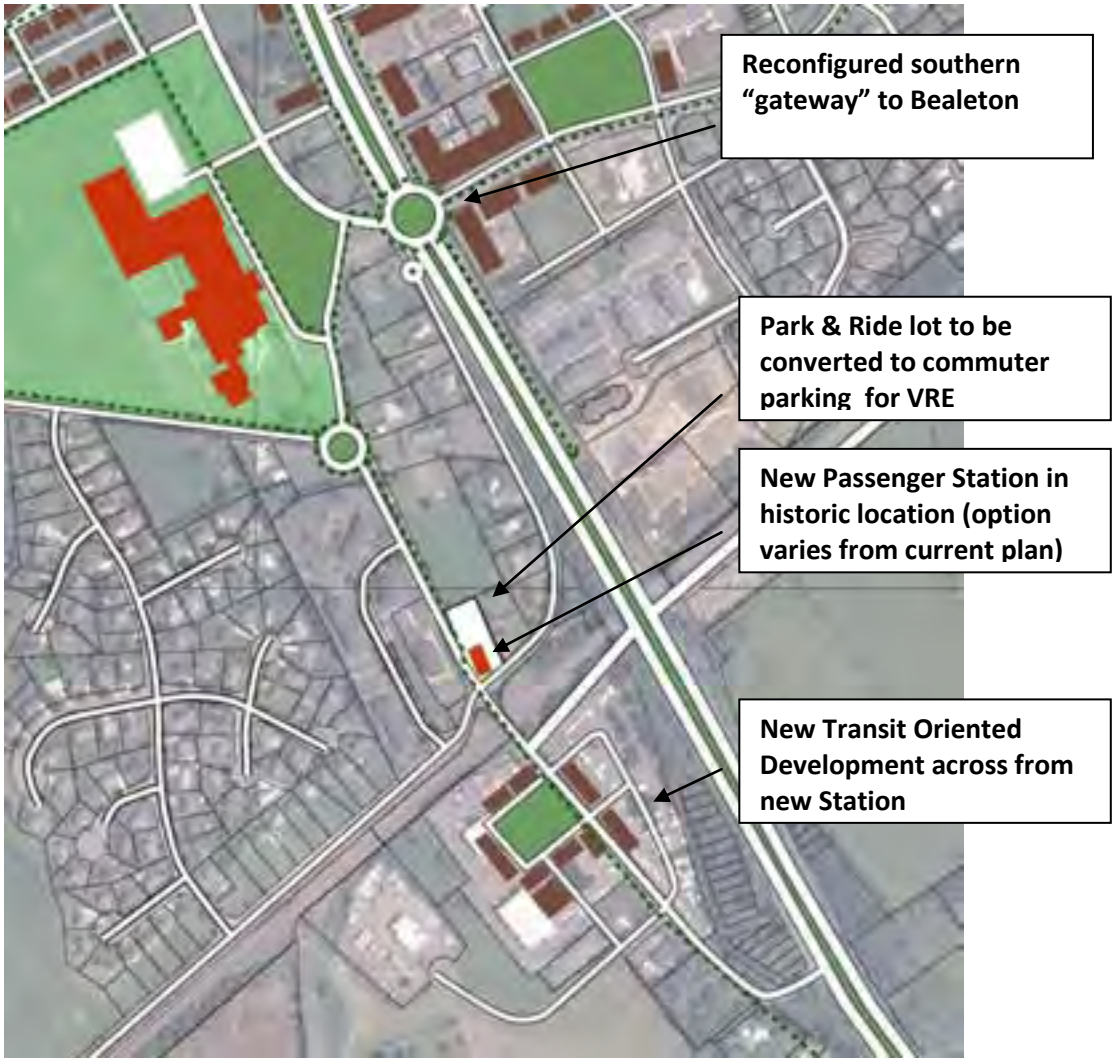


Figure 29. Southern Area detail

Central Area

The design concept envisioned for the Central Area is to preserve Route 17 as a 4 lane, divided "boulevard" type roadway, but improve safety and add pedestrian-scaled amenities, such as sidewalks, street trees and traditionally designed lighting. A key design concept in this section is the use of the quadrant intersection. As shown in the detail of the Vision Plan, the land use and urban design concept includes compatible commercial and mixed use buildings fronting on Route 17. The Vision Plan also shows the long-term future potential for reconfiguring some of the exiting uses gradually as they redevelop over time. For example, it envisions reconfiguring the existing commercial and service uses so that the building fronts the street and the service area and parking is to the rear. Further, it envisions adding street connections over the long term to reinforce roadway connectivity and a traditional block pattern.

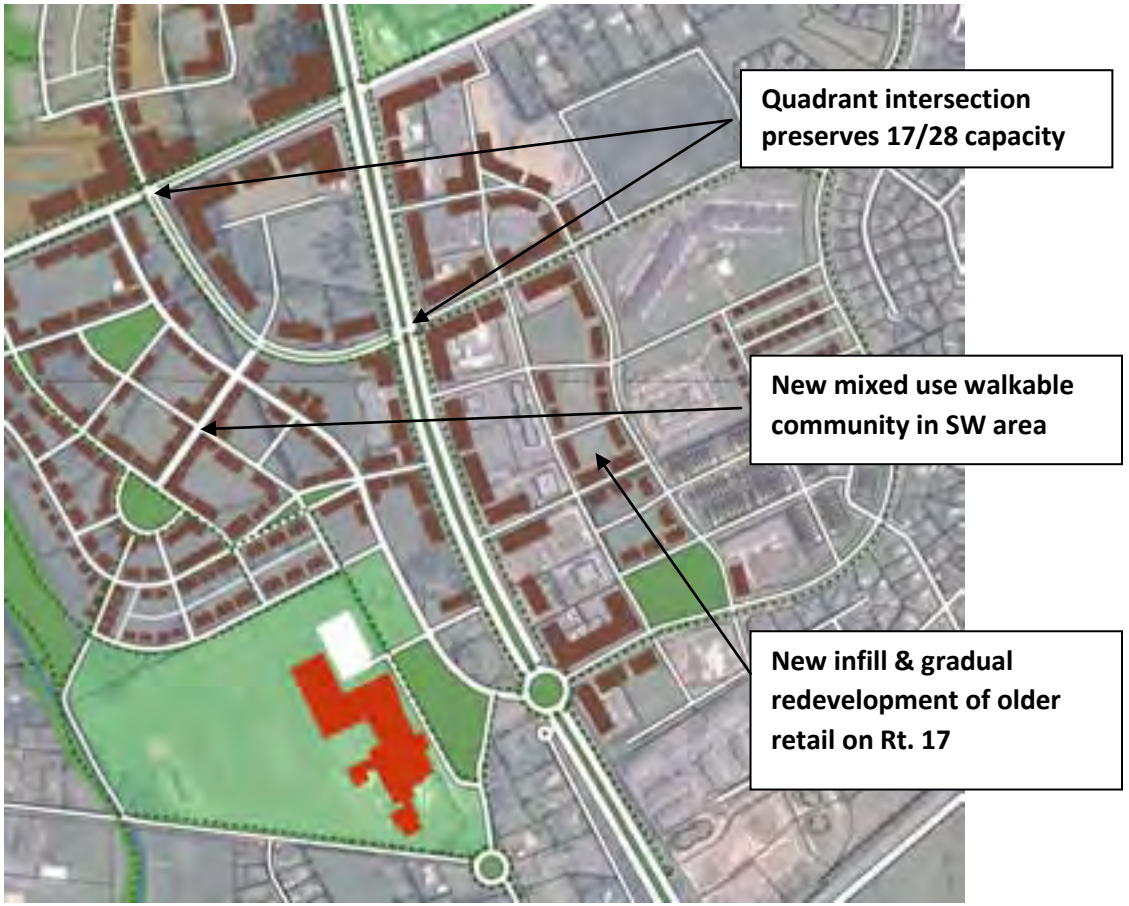


Figure 30. Central Area detail

North Area

The North Area design concept reinforces a traditional street grid and block system within the White Marsh and Mintbrook developments. It also shows a recommendation for buildings fronting streets with parking behind them, consistent with the general preference for the "Boulevard" concept from the public meetings. The Vision Plan shows a potential alternative arrangement of uses and design for the Mintbrook project as well as an integrated plan that incorporates the Starr Mawyer and Lim properties with the Mintbrook project into a cohesive community. It is recommended that the County work with the existing property owners/developers for these projects to explore options for reconfiguring the properties according to the Vision Plan, without decreasing the anticipated density and yield for the property.

The open space concept shows a greenway that parallels the creek bed, and includes small pocket parks throughout the Mintbrook development that can act as focal points for individual neighborhoods within the community.

Design Guidelines and Details

One of the ways that the County will be able to preserve livability, safety and future corridor capacity is by carefully managing the quality of future growth so that development supports and expands transportation choices for residents and businesses. To make all modes of travel truly safe, convenient, and desirable, attention must be paid not only to providing the appropriate mix of land uses and supporting transportation infrastructure, but also to the quality of the built environment. Desirable community elements include: the presence of mixed-use activity centers, connectivity of streets and land uses, transit- friendly design features, and accessibility to alternative modes of transportation. For destinations to be truly pedestrian and transit friendly, attention also must be paid to design features such as parking arrangement, building setbacks, streetscaping, and the provision of open/civic space.

The following illustrative design guidelines are intended to provide design standards to be considered in guiding public and private improvements along the Route 17 corridor in the future. They are not prescriptive rules, regulations or law, but rather intended to provide guidance for the form, character, and quality of future development. Public and private sector initiative over time will be needed to make these ideas a reality.

Figure 32. Existing corridor view

Mixed Use Development

Creating a compact, walkable environment typically includes providing a careful balance of land uses, jobs, housing, restaurants and shopping within a compact area. To be successful, mixed use development must utilize both vertical (multiple floors) and horizontal (adjacent buildings) mixed use; include an interconnected street network that enhances mobility for pedestrians and cyclists, and allows users to park once and walk between several uses; and provide a balance between activities that occur between the daytime, evening, and weekend hours, fostering a busier, safer, and more exciting environment 24 hours a day.

Regulations can be developed that require mixed use development for individual parcels or promote single land uses that provide land use diversity within a ¼-mile range of a community or town center, and prohibit developments, such as drive-through businesses, that discourage pedestrian activity. In all cases, a specific definition of mixed use is needed that establishes a threshold by which the mix of uses is measured.

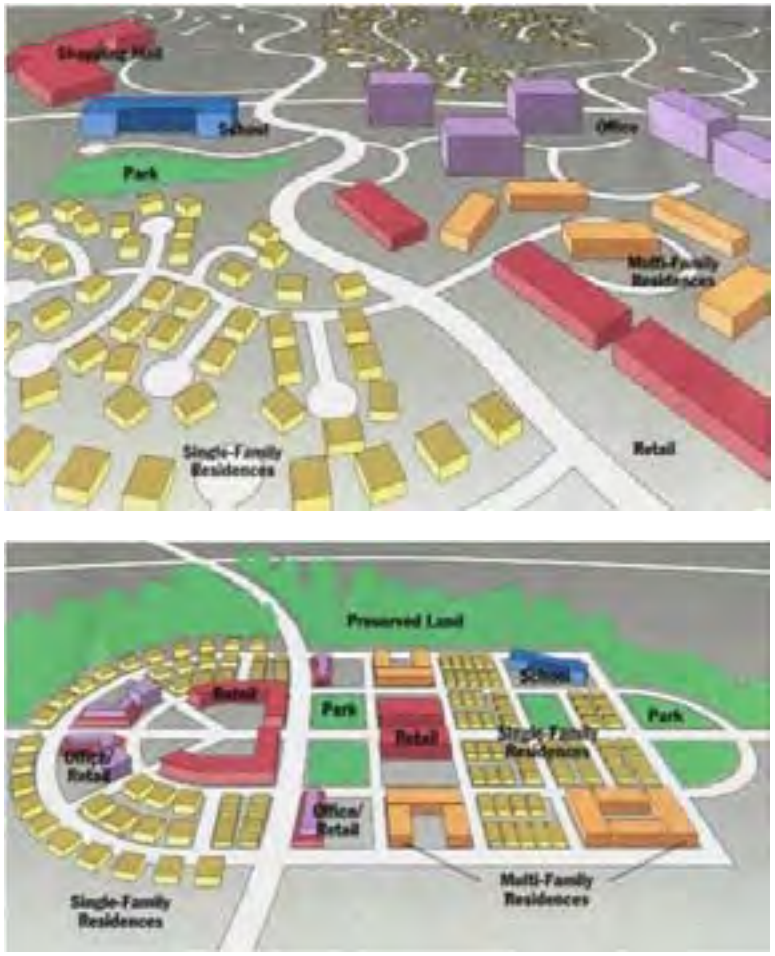
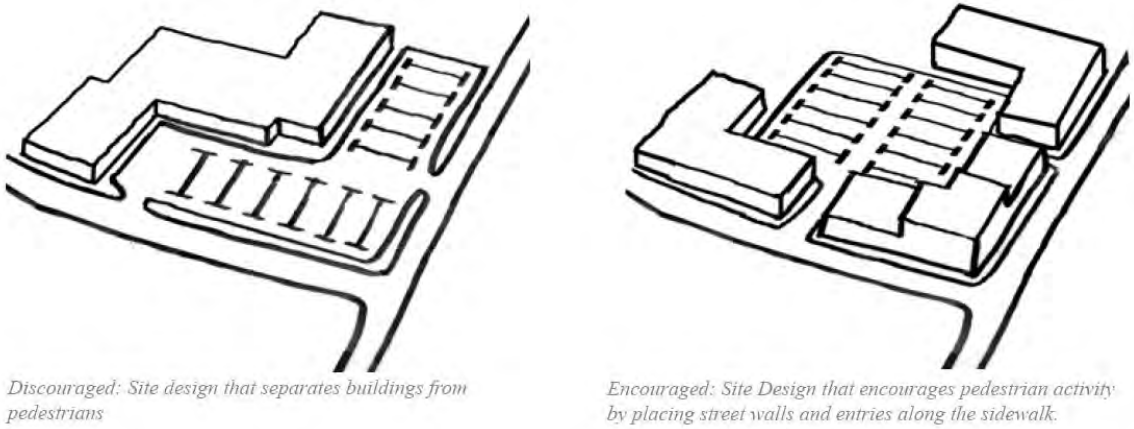


Figure 33. Comparison of single use and mixed use development patterns

Building Setback

Successful site design balances automobile and pedestrian accessibility and creates a presence that is welcoming to all users. A key factor is the organization of buildings and parking relative to adjacent streets. Frequently, buildings are set too far back from the road, leaving a large, open expanse of parking visible to visitors from the roadway , and a wide, often uninviting, expanse of asphalt to be crossed by pedestrians. A more desirable alternative reverses this placement, drawing the building to the street edge and moving parking to the rear, in turn providing a more intimate pedestrian-friendly frontage along the roadway. In this way, buildings frame the street - enhancing and enlivening - the pedestrian environment with storefronts and entrances along the sidewalk. It is also important to note that standard parking requirements can lead to an oversupply of parking spaces and open expanses of asphalt.



Discouraged: Site design that separates buildings from pedestrians

Encouraged: Site Design that encourages pedestrian activity by placing street walls and entries along the sidewalk.

Figure 34. Comparison of building setbacks

Building Orientation

Successful site design depends on proper building orientation to create a presence that is welcoming to pedestrians. By simply reconfiguring a site, building placement can reduce walking distances for customers and make streets more useful for pedestrians, transit users, and bicyclists. Building entries should border main streets and public thoroughfares to foster a vibrant, walkable environment. The primary building entrance should be oriented toward the principal pedestrian accessway, typically the public sidewalk or an interior sidewalk where the majority of pedestrian traffic is expected to be coming from within the site. Additional entrances may be encouraged that are oriented towards on-site parking.

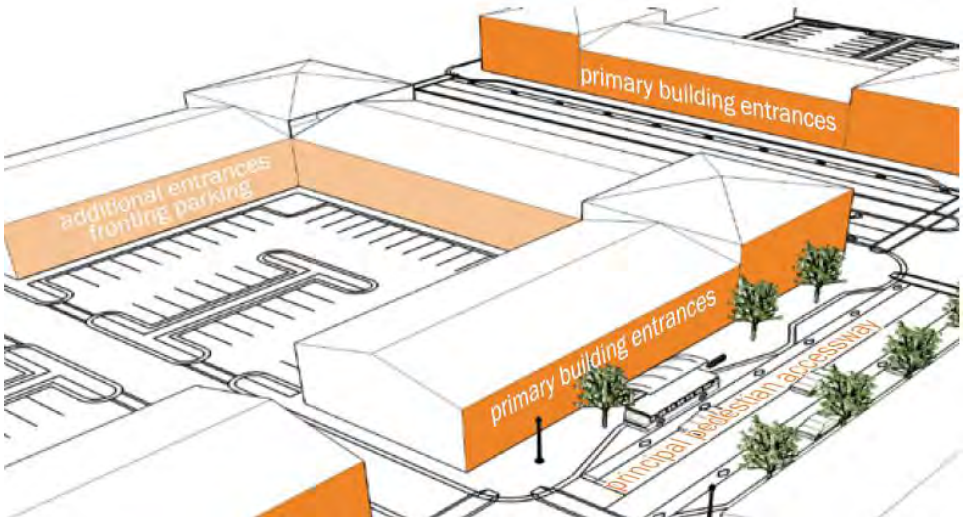


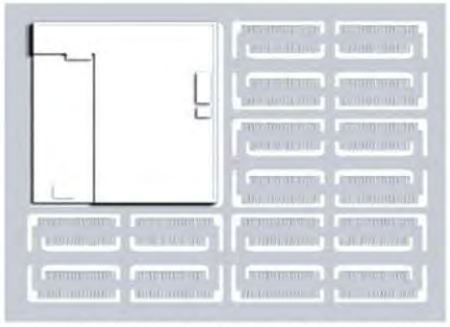
Figure 35. Diagram of preferred building orientation

Parking

Parking policy and design can be a major factor in the walkability of a place. Providing an overabundance of free parking encourages driving, while onsite parking can serve as a barrier to pedestrian access to destinations. On-site parking reductions should be encouraged through reduction of parking minimums, use of parking maximums, shared-parking agreements, in-lieu agreements to shift parking to community parking facilities, or similar strategies.

On-site parking located between the sidewalk and buildings creates an inconvenient and potentially unsafe barrier to pedestrian activity. Parking should be located to the rear of the building wherever possible. Any offstreet parking adjacent to the public right-of-way should be screened with landscaping or fencing in such a way that it does not create a barrier to adjacent sites or blocks. Long aisles of parking bays should be broken up with landscaped islands. Pedestrian access should be designed around the perimeter of on-site parking and between parking aisles.

On-street parking is an important part of the urban fabric. It provides convenient front door parking opportunities along urban roadways, contributes to the street environment, and creates a protective buffer between pedestrian and vehicular traffic. Further, on-street parking acts as a visual cue that tells motorists they are in a more urbanized, lower speed area. On-street parking should be considered along all roadways in urban areas and along pedestrian-friendly local streets within major developments, as it can reduce on-site parking needs by providing parking spaces within the thoroughfare right-of-way. On street parking is not recommended along arterials in rural and suburban contexts. NOTE: The recommendations on this page relate to the adjacent and connecting secondary roadways in the vicinity of the corridor, rather than to Rt. 17 specifically.



Discouraged: auto-oriented, parking dominated development

Encouraged: shared or public parking in mixed use, walkable development pattern - interior, rear or on-street parking.

Figure 36. Comparison of surface and structured parking

Pedestrian Facilities

Sidewalks and walkways are an important element in pedestrian-oriented design. In commercial and industrial areas, and along arterials, sidewalks should be required on both sides of all streets, with a minimum width of 5 feet. In low-density areas, sidewalks should be installed whenever the roadway changes from open swales to curb and gutter. Wider sidewalks of 10 foot width or greater should be required in commercial areas to encourage pedestrian activity, provide comfortable space for high pedestrian volumes, and provide space for outdoor dining or other pedestrian-supportive uses. The presence of buffers, comprised of landscaping in suburban areas, and street furniture, street trees and street lights in urban areas, is important to the comfort and perceived safety of pedestrians. The widest buffers - at 6' to over 8' or more - are recommended on arterials with high speeds.

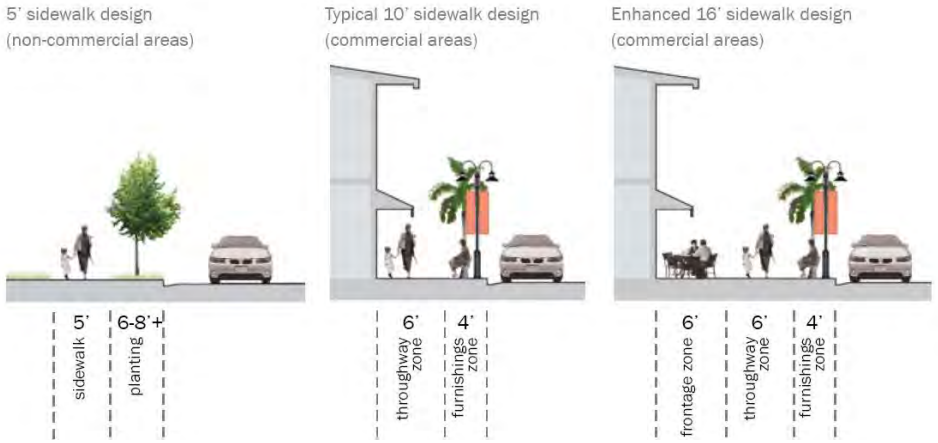


Figure 37. Preferred sidewalk widths

Streetscape

The effective design of the space between the edge of the curb and the front of a building is essential for encouraging pedestrian activity and promoting safety and security. In addition to providing a spatial buffer between vehicles and pedestrians, the streetscape should consist of trees for shade and softening the urban environment, pedestrian-scaled lighting for security and aesthetics, and benches, drinking fountains, newspaper boxes, or other pedestrian-oriented amenities. For high-pedestrian use sidewalks, six feet of sidewalk width should always be maintained as an obstacle-free throughway zone with the trees, lighting, and other amenities located either in the furnishings zone between the street and sidewalk or in the frontage zone next to the buildings. Additionals landscape amenities such as window boxes and planters within the public realm might be encouraged within appropriate areas to increase the level of visual interest.

Figure 38. Comparison of pedestrian and auto-oriented streetscapes

Connectivity

Well-connected neighborhoods promote pedestrian and bicycle activity by making connections between destinations accessible and convenient. An interconnected street network also provides the framework for mixed-use development with smaller block sizes and a greater diversity of building types within close proximity. Increased street connectivity also disperses traffic flows, subsequently helping to transform the street into a comfortable space for pedestrians. Interconnected transportation networks can provide advantages such as enhanced vehicular and pedestrian access, reduced traffic congestion, as well as enabling emergency vehicles to respond in a timelier manner. Well-connected areas also promote pedestrian activity and encourage walking in place of driving for local trips.

Figure 39. Comparison of well connected and poorly connected development

IMPLEMENTATION

Transportation

The transportation system concept and community vision for the corridor can evolve over time as private development occurs and opportunities arise. The opportunities could come from new development projects that would construct critical pieces of the network, or redevelopment of parcels that allow for reconfiguring of the site according to the suggested urban design principles, as well as redevelopment plans that could include pieces of the road network while providing new connections. In addition, publicly funded improvements can be implemented as grants or other transportation project funds become available in the future, and can be guided by the Vision Plan. Relative to new development and redevelopment, it will be important for the proposed plans to consider the vision for the service district and the necessary transportation elements including roadway and sidewalk connections. These are the key to achieving the vision for the service district.

Each piece of the new transportation system could be tied to near, medium, and long term implementation strategies as follows:

Near Term (0-10 years)

Given the current transportation funding environment, NEAR TERM (10 years) opportunities will most likely occur concurrent with new development application plans and associated initial infrastructure construction.

These near term opportunities could include a variety of developer constructed improvements and also publicly funded intersection safety improvements. The developer-sponsored improvements could include creating pedestrian connections via road frontage improvements associated with White Marsh, Mintbrook, and the Bealeton Gateway projects (for example). As elements of these projects begin to come online trails, sidewalks, and intersection crossing treatments could be constructed.

Other improvements might include construction of new road connections such as the spine road in the northwest quadrant of the service district (Mintbrook property) and construction of new connections in the northeast quadrant of the service district in the area of the White Marsh development

Intersections such as Oak Shade/Route 28 and Station Drive/Route 28 could be improved to add roundabout configurations through the use of VDOT funding as available. These intersections will continue to degrade in terms of side street delay as the through volumes on Route 28 increase. Constructing roundabouts at these locations could help to alleviate the delay while providing attractive gateway treatments at each end of the service district along Route 28. Further study would need to be initiated as

the funding opportunities arise to discern the required laneage and roundabout sizing.

The retiming and implementation of a coordinated signal system along Route 17 could also help to alleviate some of the existing congestion. Signal system communication equipment and signal timing optimization could occur when funding is available from VDOT, or as part of developer proffers.

Intersection safety improvements using VDOT funding could be accomplished over time, while the county continues to encourage the long term vision of constructing the bypass facility. Additional study and right-of-way acquisition could occur throughout the short and midterm time frames to help ensure that the bypass is eventually constructed once funds are available.

Medium Term (10-20 years)

In the MEDIUM TERM (10 to 20 years), with the initial new roadway connections, minor intersection capacity, and pedestrian improvements completed as near term improvements, the Route 17 and Route 28 corridors could begin to be transitioned to the Boulevard Concept as shown in the Vision Plan. This may be possible using proffered development funds or other publicly garnered funds from VDOT. At this point, many of the frontage improvements should be in place which will begin to change the overall character of the corridor. Additional median and edge treatment could be utilized to further evolve the context of the corridor such that the speed limit along Routes 28 and 17 could be lowered from the existing 45 mph to a more context sensitive speed of perhaps 35 mph.

During this time frame, with new connections and network in the southwest quadrant of the servicedistrict coming online, consideration could be given to utilizing the quadrant intersection concept in full or in part to provide the additional travel capacity at the critically important Route 28 and 17 intersection. A partial implementation of this concept could be to restrict left turns on just one of the major roads and use the quadrant road for those left turns. This in itself would help to relieve the increased congestion at this critically important intersection. As the road network in the southwest quadrant continues to develop, there may be opportunities to provide alternative access to Remington Road versus the awkward intersection at its terminus at the school entrance. This would allow for the signal phasing at Route 17/Station Drive to be changed to a more efficient pattern that utilizes concurrent left turns instead of the split phasing that is currently utilized at that intersection.

Also during the medium term, the plan could be further advanced as the commercial development that is existing today begins to redevelop into more modern structures and “improved” site plans. As the re-development plans are produced, driveway consolidation and improved cross parcel accesses could begin to emerge. In addition, new building

locations could be shifted to create an environment that is more inviting to pedestrians. The urban form would continue to shift from the more auto-oriented development pattern to one that is more balanced and walkable. Furthermore, through this time period there should be continued coordination with VDOT to garner funds for corridor improvements such as additional streetscaping and sidewalks. The funding campaign for the bypass would continue with the goal of having substantial funding accrued for this critically important element of the transportation plan by the long term.

Long Term (20+ Years)

With success in implementing improvements as described as the medium term, the Long Term (20 years plus) goals could begin to be accomplished. The key goal by this point in time will be to finalize funding for the Rt. 28 bypass over to Route 15/29. While this is occurring, it may likely be necessary to utilize the quadrant roadway system to implement the full left turn diversion treatment, though once the bypass is constructed and opened, the 17/28 intersection could revert back to the conventional configuration and operation. Once the bypass is constructed, Route 17 could be downgraded from a major arterial facility to a low speed main street type facility. The volumes should drop substantially on both Route 17 and along Route 28 west of Route 17. At this point the, roundabouts could be introduced, if desired, in place of signalized intersections throughout the service district. With completion of the connected grid in the four quadrants, the Rt. 28 bypass, and decreased speed limits – the transportation vision will be largely achieved.

The Town of Orange
Comprehensive Plan Amendment

Report #1:

Population and Employment Projections

Estimates of Developable Acreage

prepared by:

The Cox Company

Charlottesville, Virginia

UDA Planning and Zoning Ordinance Study

Urban Development Area Projections
Estimates of Land Use Demand & UDA Developable Acreage

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The Cox Company • The Town of Orange Planning Team

POPULATION AND EMPLOYMENT DEMAND PROJECTIONS & UDA LAND AREA REQUIREMENTS

Introduction

A series of fundamental projections and assumptions related to future trends in housing and employment will guide the selection of one or more locations in the Town to be designated for the Urban Development Area. This chapter introduces the analysis process that serves as the basis for the key outputs of the UDA Comprehensive Plan Amendment which include:

(a) *the projections for future population and employment growth to be accommodated within the Urban Development Areas;*

(b) *the overall developable acreage for each UDA-defined land use to be designated by the Town;*

(c) *the size of the specific UDA areas that are to be designated to individual UDA residential and commercial land uses; and*

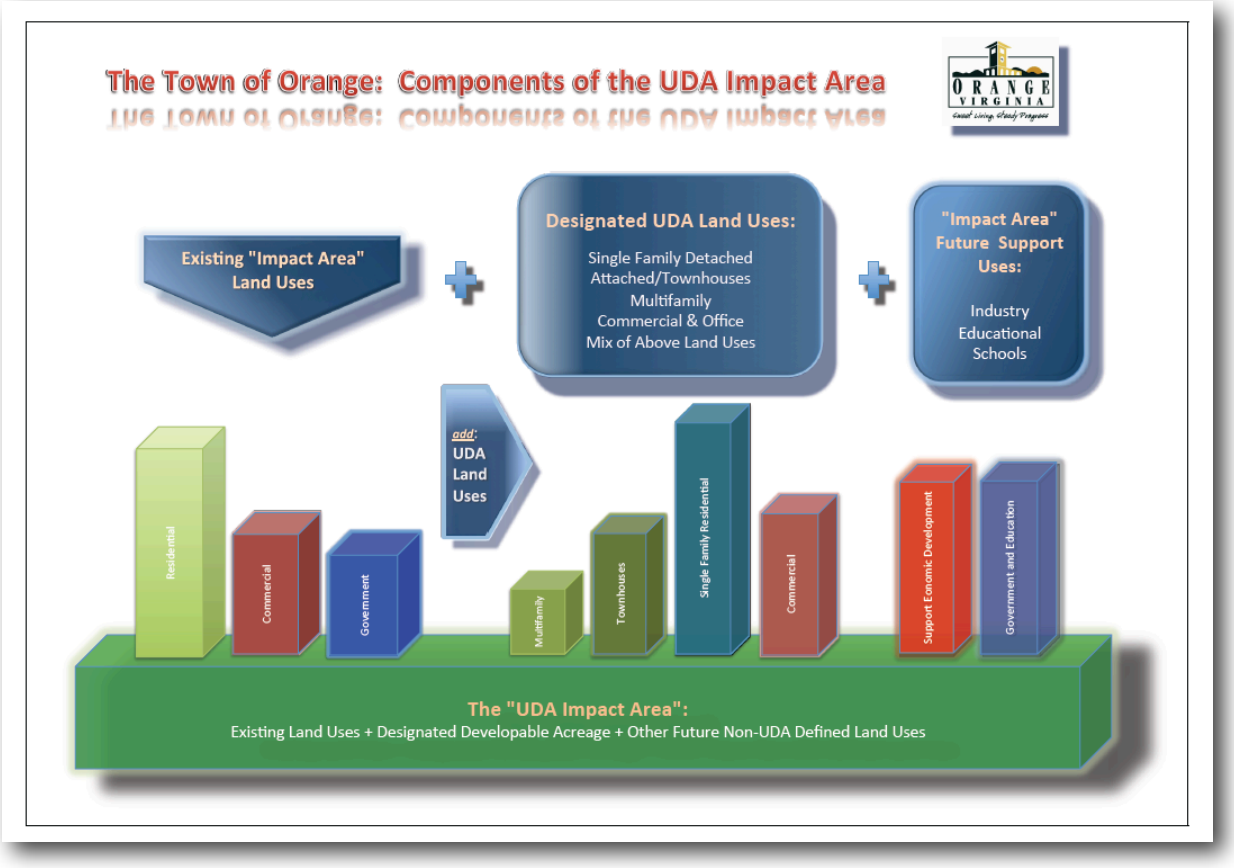
(d) *the probable size of the overall "UDA Impact Areas" that contains: (1) the UDA Developable Acreage, (2) existing urban land uses, (3) future employment uses that are not specifically identified by the UDA legislation, and (4) future land uses that complement and support the designated UDA areas.*

The following section provides supplementary information pertaining to the legislative requirements, as well as the techniques employed by the Consultant, that have been employed to develop the statistical models for land use in the Urban Development Areas. These models will be employed to set the allocation of land areas and land uses, and to predict the overall size of the UDAs.

Objective and Definitions

Orange's UDA Comprehensive Plan will establish locations for its Urban Development Areas that must be sized and configured to accommodate compact development. The major statistical objective of the legislation is to demonstrate that 100% of the Town's anticipated population and employment growth can be accommodated within the designated UDAs. The UDA legislation provides for one or more UDAs to be designated in the Town. The approach to determining the boundaries and acreage of the UDAs must adhere to the specific land uses as identified in the definitions of Section 15.2-2223.1 of the Code of Virginia. Conversely, the legislation does not address or establish similar requirements for land uses that are frequently located within areas of compact development.

The Virginia planning legislation states that UDA densities are to be applied to the calculation of *UDA Developable Acreage*. The UDA-defined land uses include residential, commercial, and offices at higher density levels that are associated with Traditional Neighborhood Development (TND) forms of land use. TND Residential uses are divided into detached single-family, attached residential units (such as duplexes and townhouses), and multifamily residential dwellings (such as apartments and condominiums). UDA commercial uses include retail, office and service uses typically located in villages, downtown centers, professional office parks, or shopping centers. Employment uses such as in manufacturing, education, government, and wholesale are not included the UDA-defined commercial land use category. Also excluded from the *UDA Developable Acreage* calculation are the areas that may be consumed by existing land uses, parks and recreation, road and street rights-of-way, railroads, sensitive environmental areas, and major public facilities and infrastructure. These are considered *Non-Qualifying Uses*. From a comprehensive planning standpoint, it is essential to project and analyze the combination of both UDA-defined uses and non-qualifying uses. For the purpose of this study, the combined land areas are defined and referred to as the *UDA Impact Area*. This vernacular corresponds to planning area boundaries that may be referred to in local jurisdictions as their designated *development service districts*, *community development areas*, *or core growth areas*, etc. The diagram on the following page represents the components of the UDA land uses within the context of a larger *UDA Impact Area*.



Guidelines for Demographic Projections

The UDA statute stipulates that the growth projections – for both residential population and employment – must be based on those prepared by the Virginia Employment Commission or other "reliable" source. However, reliable sources are hard to come by: The US Census does not perform population projections for Virginia's counties and incorporated cities. Local governments and Planning District Commissions are generally not equipped to conduct these studies. While proprietary (fee-based) services provide targeted demographic projections at both the local and census tract level, this source is not typically embraced for public sector use. Other complications arise in undertaking projections for incorporated and unincorporated towns. The VEC does not prepare population projections for Virginia's individual incorporated towns; only for counties and cities.

Lacking the series of the mandated VEC 2020 and 2030 projections for the Town, an alternative approach must be applied. For Orange, the most reliable demographic projection methodology is to closely examine the VEC projections for Orange County, the other communities located within the Planning District, and other "peer" locales that currently have or have had similar growth trends to the Town. In addition, secondary sources are important to consider, including estimates prepared by Neilson and Claritas. Based on this firm's research, it is recommended that the Town's population projections for use in the UDA study be based on a pro-ration of future County population. VEC projects Orange County's 2010-2020 population to grow by 23.1%, with a 20.7% growth rate over the following ten-year period. In 2000, the Town of Orange's population made up 15.9% of the County's total, with it absorbing approximately 14.5% in 2010. The Town's share of the County's future population growth is anticipated to increase to 15% in 2020 and 17% in 2030. With details in the Appendix, the following table summarizes these projections for the Town.

TOWN OF ORANGE POPULATION PROJECTIONS: *2010-2020-2030*

	Orange County	The Town of Orange
2010	**34,127**	**4948**
2020	**42,021**	**6303**
2030	**50,732**	**8624**

The legislation requires that the combination of designated UDAs in the Town shall be sufficiently sized to accommodate the projected population growth in the locality for at least the next ten years, but not more than the next twenty years. The future residential population and commercial employment sectors that are to be contained within the UDAs are bounded by the limits of the next two decennial demographic projection periods. In summary, (a) the UDAs can be sized no less than the land area necessary "to hold" the anticipated Town population growth for the current decade *(2010 to 2020)*, and (b) they can be no smaller than what is required "to hold" the anticipated population growth for the next two decades (*2010 to 2030)*. These population projections will then be translated into estimated demands for residential dwelling units as well as retail and office demands (per the UDA definition for "commercial"). These figures will be employed to create the Projection Framework and the Land Use Model that will serve as the basis for Town leaders to determine the breadth and boundaries of its Urban Development Area(s).

Development Densities

Section 15.2-2223.1 establishes threshold densities for basic land uses within UDAs. These densities are based on more compact density levels that are appropriate for application to Traditional Neighborhood Development. Thus, the *UDA Developable Acreage* allocated to the primary land use categories shall be calculated based on the prescribed residential densities (as expressed in *"dwelling units/Acre"*) and commercial and non-residential uses in terms of *"Floor Area Ratio (FAR)"*. *(Floor Area Ratio is the ratio of the building floor area to the size of the property on which it is located)*. The following densities are to be applied to the individual uses proposed for the Town's UDA.

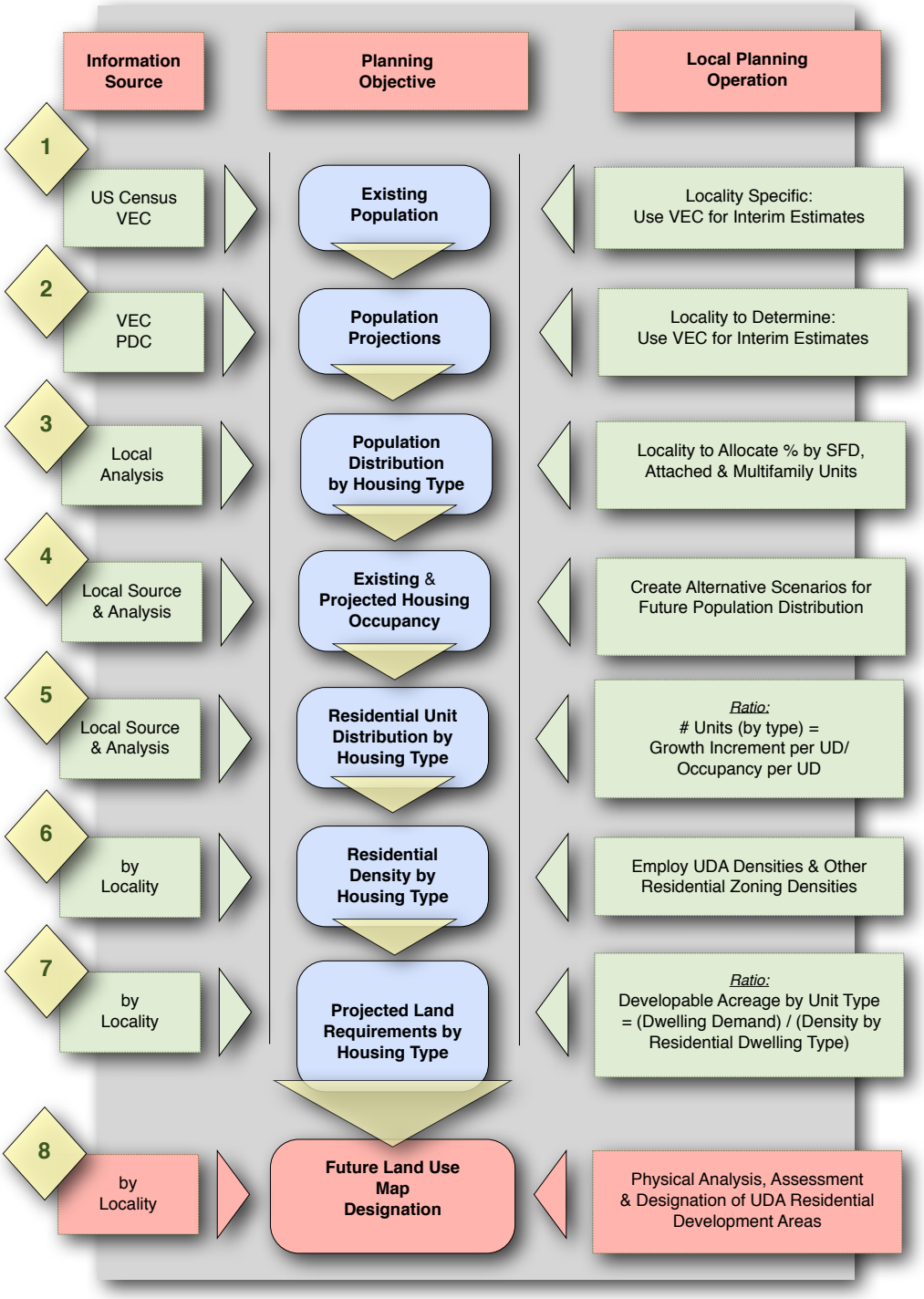
URBAN DEVELOPMENT AREA LAND USE CATEGORIES

UDA Single Family Detached Residential:	**4 units/acre**
UDA Attached Residential:	**6 units/acre**
UDA Multifamily Residential:	**12 units/acre**
UDA Commercial and Office Employment:	**0.40 FAR**

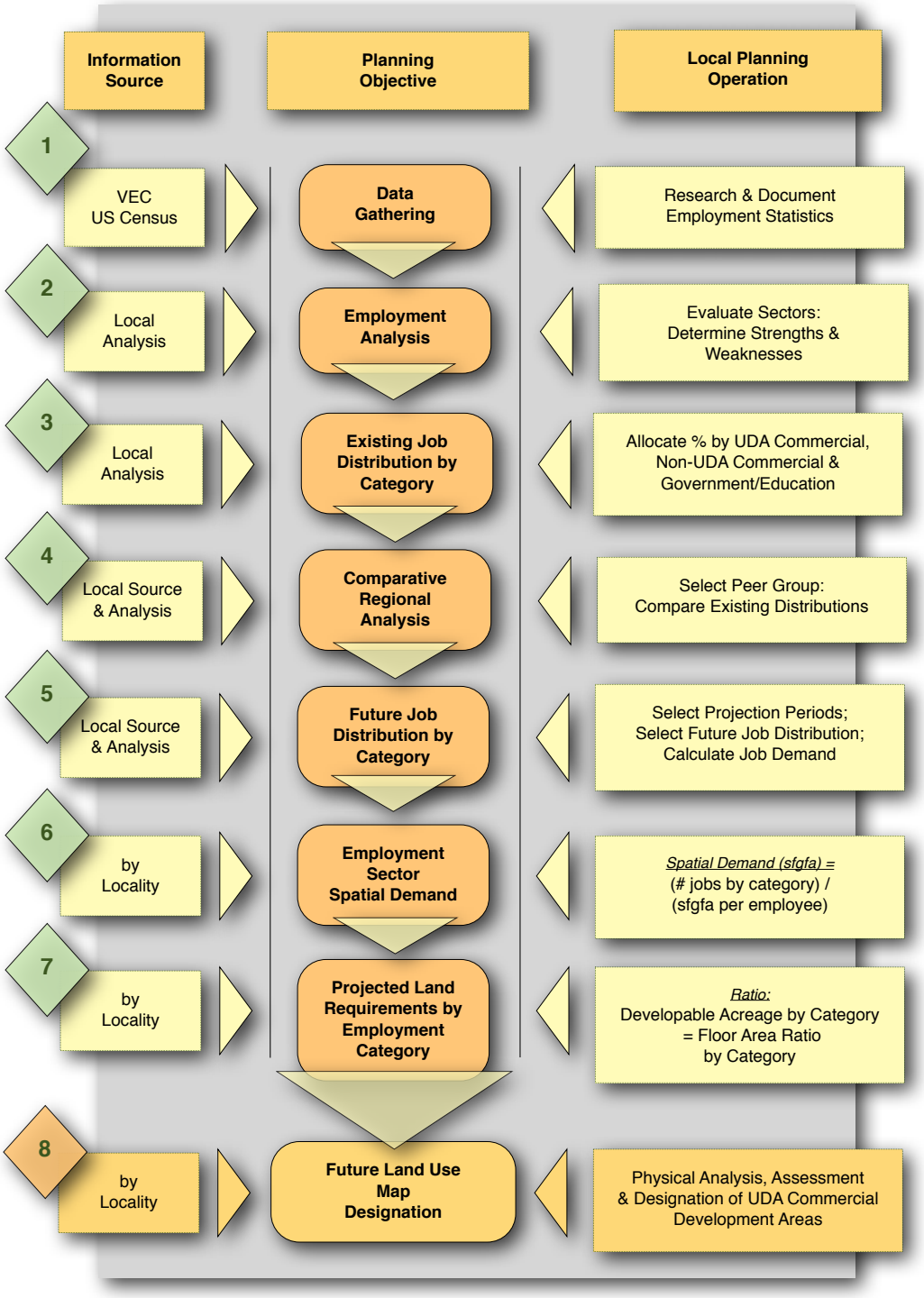
A proportional mix of the above densities and intensity of use.

While the UDA statute provides a general definition to guide the sizing of the UDA, it does not address a specific technique and process for arriving at the acreage requirements that will be eventually absorbed the UDA land uses. In order to provide a detailed projection of UDA land use needs, the Consultant has developed a land use model that translates population and employment demand levels into acreage requirements for residential and non-residential uses. This model generates "developable acreage" calculations based on the UDA density thresholds as well as other assumed densities and area requirements for the non-qualifying land uses within the "UDA Impact Area". The diagrams below summarize this process:

Paradigm for Determining Residential Developable Acreage



Paradigm for Determining Commercial Developable Acreage

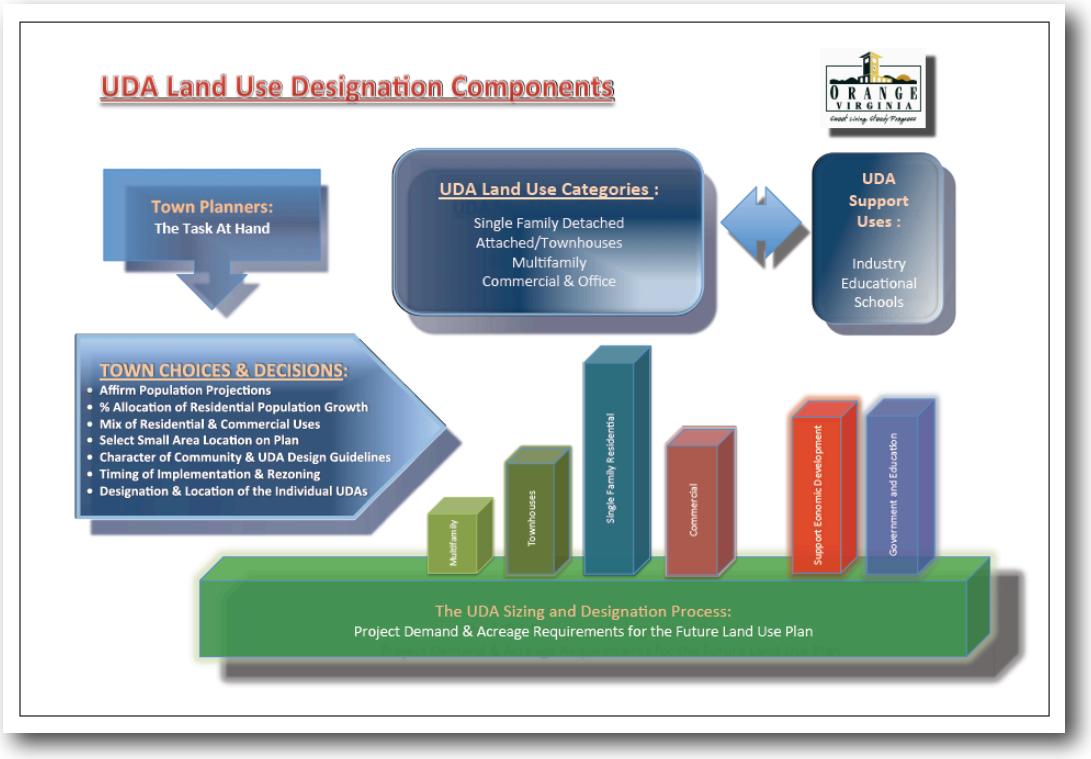


Residential Demand: Distribution by Housing Type

The following section describes the methods and assumptions adopted by this report to establish the total land area that is sufficient to meet the legislative sizing parameters for the *UDA Developable Acreage*, the overall yield of the uses contained within the UDA boundaries, and the estimated size of the overall "impact area" that embraces the UDAs, existing uses, and other supporting uses. Upon completion of the population projections, the next step is to distribute future residential growth by housing type.

Past housing trends are noteworthy, but in many communities, these trends are not a true indication of future residential demands. While the UDA is intended to offer future residents the choice to live in higher density neighborhoods, high density residential growth in Orange has not been the trend in past decades. Due to the small percentage of townhouses and multifamily dwellings in Orange, the existing housing mix should cannot be correlated to the potential demand preferences for future dwelling types. The projected distribution of population over the next 10-20 year period requires a certain amount of guesswork: Future population demands for particular residential types could vary broadly based on national building conditions, local housing preferences, housing affordability, bank lending patterns, age and income levels of new residents, proximity to jobs, employment security in the marketplace, changes in Town housing policies, and other factors.

The Land Use Model has examined three different scenarios for the distribution of population by housing type. These scenarios range from growth being accommodated in mostly single family homes to an option that places a heavy reliance on town homes and multifamily development. Since the ideal UDA is intended to embrace a mix of housing types, the third assumes that there will be a proportional balance among Detached Single-Family Residential, Town Home and Attached Residential, and Multifamily Residential. The most important planning consideration is to accept the potential variability in the relationship by and between (a) the population projections, (b) the type of dwellings the Town's future population may desire, and, ultimately, (c) the amount of land *(UDA Developable Acreage)* necessary to absorb this population during the years ahead. While Town may elect to adopt a preferred distribution of dwelling unit types to be assigned to the UDA, ultimately the marketplace will decide. TND land use policies will allow the Town to more flexibility address changes in market demands within the housing sector.



Residential Mix Scenarios

For the purpose of "testing" the amount of required *UDA Developable Acreage,* the three scenarios examine differing distributions of Orange's projected population among the three UDA housing types: The first scenario distributed future population among the three residential dwelling categories based on the *"status quo"* in the Town's mix of housing types over past two decades, with single family detached dwellings being the predominant housing type. The second scenario tests a ratio of 50%/25%/25%; this mix being the likely distribution of future housing based singly on probable population, age, income composition, and housing preference considerations in and around Orange. The third scenario is based on an even distribution of the population among the three housing types, with the 33%/33%/33% ratio corresponding to what some TND planers consider to be the "ideal" *(or balanced)* residential allocation for a TND project.

DISTRIBUTION OF RESIDENTIAL POPULATION GROWTH

Population Distribution	Single Family	Townhouses	Multifamily
Scenario 1:	*80%*	*10%*	*10%*
Scenario 2:	*50%*	*25%*	*25%*
Scenario 3:	*33%*	*33%*	*33%*

Estimates of Residential Dwelling Occupancy

The US Census provides data only for average dwelling occupancy. Where accurate data is available, housing occupancy levels should be based on information provided by the locality. However, the Town does not keep statistics on this data. In the absence of reliable housing occupancy data, occupancy rates need to be prepared on a synthetic basis, employing *"residents/unit"* factors from a range of demographic sources that are estimated to best resemble the occupancy ratios of the subject jurisdiction. Based on national and regional trends towards lower housing occupancy as well as decreasing overall housing size, the *"residents/unit"* occupancy factors are predicted to decrease at a moderate rate for each of the three principal housing types over the course of the two decennial projection periods.

At present, the average dwelling occupancy rate for Virginia is approximately 2.5 residents/household, with the single family detached dwelling being the most prevalent. In the future as housing demands increase for other residential dwelling types, the state-wide figure will decrease. At the local level, rates in the Town will be demand-based and correlated to the anticipated mix of detached, attached and multifamily housing. Also, the effect of an aging population must be introduction into the equation, recognizing increasing demands for age-restricted and retirement housing projects. The unit occupancy scenarios employed for the Town include varying (and gradually decreasing) occupancy rates for the 2010-2020 and 2020-2030 projection periods.

Dwelling Unit Projections

The residential dwelling demand is calculated by applying the projected population to be distributed within each of the three housing categories to the corresponding density for the housing types. As indicated above, these densities are fixed based on those stipulated by the UDA statute. Keep in mind that the total future dwelling demand is a function of the distribution of projected dwelling types as well as the projected housing occupancy rates by dwelling type. For example, if 100% of future Town residents seek to live in higher occupancy single family detached residences, there will be fewer dwelling units that if 100% of the residents lived in smaller (low occupancy) multifamily units.

To establish a more refined estimate for projected housing requirements, the resulting *"net residential dwelling demand"* should be adjusted to anticipate a nominal vacancy level within each housing type, incrementally adding to the probable dwelling unit demand for each of the 2010-2020 and 2020-2030 projection periods. Also, the impact of replacement dwellings should account for an aging housing stock in the Town. In the Land Use Model, a low and high range figure is used to acknowledge the probable range in vacancy and replacement rates to be realized over the two ten-year projection cycles.

Employment Projections

The Land Use Model provides estimates for existing employment and future job growth sectors in the Town and County. These sectors are incorporated into three primary employment categories, including: (a) UDA Commercial and Office, (b) Non-Qualifying Employment Uses (ie. job generating uses not included in the UDA definitions), and (c) Government and Education Uses (also, not included in the UDA definitions.)

The projected future distribution of the employment categories is arrived at by comparison to selected Peer Group jurisdictions. For the purpose of this study, the Peer Groups consisted of ten other counties, cities and towns that received UDA planning grants. The statistical distribution and projections for employment within each of the three categories are unique to each locality. Appendix B *(The Town of Orange Employment Distribution Analysis)* provides a delineation among the individual sectors that create the employment marketplace. The job growth projection is derived by comparing the established VEC population growth projections to the percentage of Town residents employed within the Town and the County. As indicated in Appendix A, the model projects that the *employment/resident population* ratio will increase moderately in the future as UDA development works to stem out-commuting among Town residents.

UDA Commercial and Office Demand

Recognizing a mix of both residential and commercial uses within the UDAs, the Land Use Model provides estimates for future office, retail, and other commercial land uses as well as justification for the calculation of the land area areas that they require. Employing commonly accepted factors, the model applies estimated *spatial utilization ratios* in terms of *gross building floor area (sfgfa) per employee*. Consistent with the projections of employment growth, the spatial utilization calculations are divided into three job categories: UDA Commercial, Other Non-Qualifying Commercial, and Government and Education.

These three categories allow for recognition of the differing building space and occupancy demands over the two decennial projection periods. "UDA Commercial" uses are generally defined by the legislation as retail, lodging, restaurants, professional offices, and service-related uses. As with the model's residential calculations, a vacancy and replacement rate is assumed in order to arrive at adjusted estimates that better reflect commercial space needs within the UDA(s).

UDA Developable Acreage

UDA Developable Acreage represents land area necessary to accommodate the projected population demands at the legislatively prescribed density thresholds. The UDA acreage can be assigned to one or more locations in the Town by either individual UDA use categories or a combination of categories to represent a proportional mix of uses. *UDA Developable Acreage* need not be limited to "green fields", but can be assigned to both redevelopment and revitalization areas that the Town may been suitable for the absorption of the projected levels of qualifying residential, commercial or mixed uses. The equation for the determination of the total UDA land area to be designated by the Town is expressed by the following:

UDA Developable Acreage =
UDA Single Family Detached + UDA Attached Residential +
UDA Multifamily Residential + UDA Commercial

Since the *UDA Developable Acreage* for these uses is collared to absorb the growth for the 2010-2020 and the 2010-2030 periods, minimum and maximum area is calculated for the absorption of future development or redevelopment. The land absorption range is derived by applying the *units/acre* divisor for the residential category *(as established by the statute)* to the corresponding category's *residential unit dwelling demand* quotient. Since floodplains, wetlands, water features and steep topography are generally not conducive for intense development, the *UDA Developable Acreage* for residential uses is assumed to exclude unbuildable terrain characteristics.

As an example, if the anticipated demand for single family housing is determined to be 200 units, the *UDA Developable Acreage* for this category of residential use is 50 net acres (*200 units/4 dwelling units per acre*). Accordingly, if only detached housing were to be included in the UDA, then the UDA land use map designation would assign a minimum of 50 "developable acres" for this use. However, since the intent of the UDA is provide the opportunity for a mix of uses, the net acreage must be determined for each of the land use categories included in the comprehensive plan, employing the range of residential density and commercial FAR factors prescribed by the legislation.

Interestingly, variations in the mix of uses do not significantly affect the calculation of total *UDA Developable Acreage*. The Land Use Model findings reveal very little difference in required land area absorption when comparing the total required land area for the three residential mix scenarios: In order to accommodate the minimum level of projected residential growth (1356 residents during the 2010-2020 decade) and the maximum of 3677 residents (over the 20-year period, 2120-2030), the range in required *UDA Developable Acreage* for Scenario #1 is 115-334 acres; for Scenario #2, 112-329 acres, and for Scenario #3, 110-327 acres. From a comprehensive planning perspective, the modest land absorption variations point to the fact that well conceived TND projects, in fact, can represent a flexible approach to address the inevitable, yet unpredictable, movements in future housing preferences.

While variations in mix among the three categories does not greatly influence the required land area to be designated per the new statutes, the average residential density varies noticeably based on the assumed unit mix, with Scenario #1 yielding 4.8 units per acre; Scenario #2 yielding 6.1 units per acre, and Scenario #3 yielding 6.8 units per acre.

The UDA Impact Area

Because Traditional Neighborhood Development as envisioned for UDA land use activities does not, and cannot, exist in a vacuum, the Land Use Model recognizes and incorporates the categories of *UDA Support Areas* and *Non-Qualifying Employment Areas* to its estimates of land areas. These areas are contained within the larger *UDA Impact Areas* that comprise the zone of "urban influence" for the UDAs. The *UDA Support Areas* are meant to quantify the land use categories that evolve in response to the future residential population and employment demands predicted for UDA-defined land uses.

The support and non-qualifying areas should be sized for incremental growth in all aspects of future land use: *Non-Qualifying Employment Areas* accommodate industrial and manufacturing uses not commonly associated with TND retail, office and service uses. *UDA Support Areas* include civic uses, parks and recreational facilities, open spaces, recreation uses, transportation infrastructure, utility easements, and environmental protection areas. In addition, the estimates include areas that provide support for non-income generating employment growth – public education and governmental support – and other uses that are not specifically identified or defined in the UDA legislation. To more accurately estimate these supplemental impact area requirements, the ratios that are applied to each of the UDA uses vary based on perceived and assumed future needs.

Supporting Land Uses in the UDA Impact Area =

(future support uses generated by demands attributable to Qualifying UDA Acres)

Government and Civic Uses + Public Education Uses + Utility Infrastructure Uses + Parks and Recreation Uses + Open Space Uses

Other Non-Qualifying Employment Land Uses in the UDA Impact Area =

(future employment-related urban uses not recognized by the legislation)

Manufacturing Uses + Warehousing Uses + Assembly Uses + Fabrication Uses

The supplement uses can be situated within the designated UDA geographical boundary, but they would not to be included in the calculation of *UDA Developable Acreage (per the legislative definition)*. This does not preclude the Town from recognizing certain existing supplemental land uses for either redevelopment or adaptive reuse.

One last step in the *UDA Impact Area* land use evaluation process cannot be overlooked: *Existing Land Uses*. The UDA legislation is silent on the treatment of existing uses. However, given that they constitute the essential fabric of any community, the location of *UDA Developable Acreage* may be integrally woven into existing land use patterns. However, the existing uses that are envisioned for redevelopment could be included in the calculation of *UDA Developable Acreage*.

Existing Land Uses within the UDA Impact Area =

(existing land uses located within the impact area of the designated UDAs)

Residential Uses + Commercial Uses + Non-Commercial Economic Development Uses + Institutional Uses + Government Uses + Educational Uses + Parks and Recreation Uses + Open Space + Sensitive Environmental Areas

From a Town-wide comprehensive planning perspective, the combination of these three future land use components – *UDA Developable Acreage, UDA Support Areas,* and *Non-Qualifying Employment Areas* – combine with the Town's *Existing Land Uses* to yield the *UDA Impact Area*. Integrating the *UDA Developable Acreage* as its key component, the *UDA Impact Area* represents the "sum of the parts" of the urban land use system and is expressed by:

Total: UDA Impact Area =

UDA Developable Acreage +Support Acreage for the Designated UDAs + Non-Qualifying Commercial Developable Acreage + Existing Land Uses

Marketplace Realities

The statutory definition for the *UDA Developable Acreage* generates a theoretical number that assumes: (1) the entire Town population and employment growth will be channeled to the designated areas over the next 10-20 years, (2) other land uses outside the UDA-defined residential and commercial are to be ignored, and (3) one *unit* of demand can be satisfied by one *unit* of supply. These assumptions are unrealistic, and, from a comprehensive planning viewpoint, the realities of supply and demand give rise to the need for adjustments given that there are other locations within the Town where substantial levels of growth could be absorbed. In addition, for a community that has home-based industry and other non-retail employment located within its core areas, it can be expected that future demands for these uses will compete with UDA locations. On the other hand, for the market to function freely, allocating a single *unit* of supply for each *unit* of demand, this presupposes that the available unit of UDA real estate is perfect in every way – *price, size, location, attractiveness* – to absorb the demand for that particular unit of demand. The following should be considered:

(a) competition amongst end-users for a given tract of land,

(b) competition amongst property owners for a given end user,

(c) land within the UDA that is unsuitable for development, and

(d) landowners that are unwilling to make their land available to the marketplace.

Extensive studies of urban real estate markets throughout the country have shown that the supply/demand relationship assumes that there is more than one unit of supply for every unit of demand. This promulgates competition, choice, and, ultimately, market pricing. In other words, if the "UDA Impact Area" is sized no larger than the calculated "demand" acreage, the marketplace does not function fluidly. Thus, the task of estimating and designating the actual land required in the UDA becomes complicated. In order for this study to account for this phenomenon, the concept of the Free Market Multiplier (FMM) is introduced. The FMM is a factor that is applied to the calculated (theoretical) demand levels for each UDA land use in order to provide a better estimate of the total land area that should be designated.

There is no perfect formula to establish the FMM factor for a given locale. The free market multiplier should be used judiciously. On the other hand, by adding this extra attention to the "real world" characteristics of the marketplace, an enhanced degree of accountability is placed on the planning process to "get it right". As an example, a FMM factor of 1.5 means that for a given unit of demand, the supply of available land within the primary marketplace should equal 150% of the calculated demand. For a FMM equal to 2.0, twenty acres of "supply" should be designated for every ten acres of "demand" for a given use.

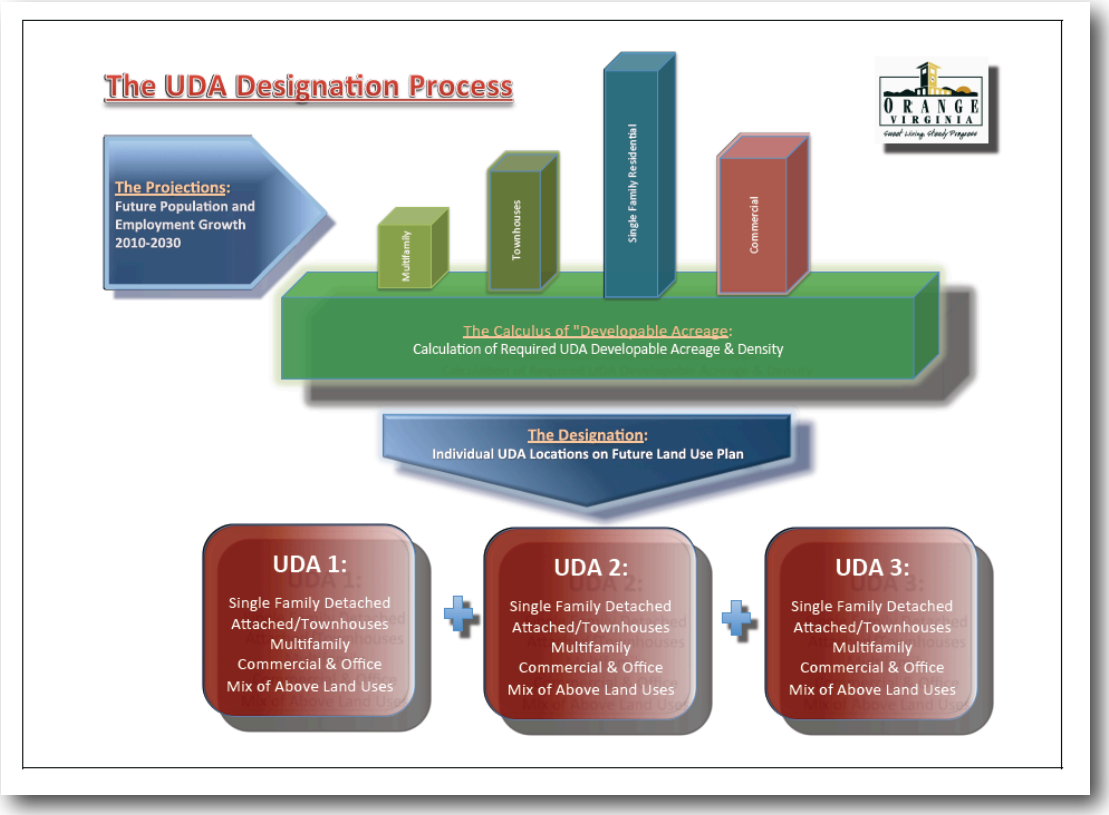
Obviously, for the Town, the "big picture" must be taken into consideration in identifying locations recommended for the full range of urban-area land uses. Given the broad fluctuations that inevitably occur in predicting actual demographic demands from one decennial period to the next, projections of both the *UDA Developable Area* and the *UDA Impact Area* are presented in a broad range that represents the probable inside and outside acreage. The estimated acreage must be viewed as a guideline to be revisited on a periodic basis with adjustments made to reflect evolving demographic trends and land use patterns. Further, the final configuration and designation of the UDA boundaries are subject to a thorough physical, topographic, and environmental analysis and should take into consideration the social, economic, land ownership, and development phasing factors as well.

UDA Land Designation Approaches

With projections in hand, the next step in the UDA grant process is to begin an analysis of areas in the Town the geographical areas suitable for UDA designation. Based on our population estimates and UDA demographic projections, the required land area, regardless of mix of dwelling type, for ranges between roughly 120 and 330 acres. If the *"free market multiplier"* concept is employed, it would be possible to justify a multiple of this acreage. Thus, the Town has a certain degree of flexibility in the amount of acreage to include in the UDAs.

The Town's approach for the selection of the UDA locations for designation on the Future Land Use Map can be viewed from several perspectives. On one hand, the focus can be solely on the designation of undeveloped land, while, on the other, infill and redevelopment properties in and around the downtown core may be equally suitable candidates. A hybrid of this would be to consider some of the properties that have been previously platted as relatively low density residential. While the UDA legislation requires that the above population and developable acreage thresholds must be achieved, it does not limit the Town to either the location of the UDA or the number of UDAs. Also, a combination of both undeveloped and redevelopment areas is permissible, and UDAs do not have to be "attached" to each other. In the process of designating the UDA(s), general locational parameters should be applied. The UDA should be:

(a) close to an established village settlement or town center *(such as your downtown area)*, major institutional or cultural resource *(ie. schools)*, or other densely developed areas *(existing suburban subdivisions or shopping centers)*;
(b) served by adequate public facilities and utilities; and
(c) accessible to existing transportation networks.



Equally important, the selection of individual UDAs should respond to the Town's land use planning "vision" for not only the UDAs, but also for the Town overall. However, given the inherent nature of local government, the choice will likely have political implications that could very well "trump" sound comprehensive planning principles. Since high density, mixed-use projects are not the norm in the Town, we need to consider land areas that are not only appropriately located but , also, that may be some years away from marketability for UDA-styled, higher density development.

Outlined below are the four basic approaches that can assist in the targeting of the candidate UDAs. Depending on what is ultimately the deemed to be most appropriate combination of planning wisdom and political reality, one or more of these targeting approaches may be helpful in guiding the Town's UDA selection process.

1. **Target General Planning Area(s)** - designate undeveloped land within an existing area with full urban infrastructure to serve the UDA(s), regardless of property boundaries and ownership patterns.

- Encourages the application of a macro-view of comprehensive planning; mimics traditional generalist approach to FLUP mapping; works within the constraints of the locale's existing land use ethos.

- Eliminates most of the potential for political "static"; eliminates bias created by site-specific designation or relationship to a particular landowner.

- Effective in larger planning areas served by public facilities and utilities.

- Effective within planning areas where transportation improvements require inter-parcel coordination.

- A good strategy for long-range planning in cases where near-term market and demographic conditions don't point towards immediate development pressures (ie. establishing "holding zones" around attractive, but vulnerable land areas.)

2. <u>Target Single Undeveloped Property</u> - designate single property owner for a new or refined project concept.

- An opportunity to plan and guide development on a property within the context of unique parcel location and/or ownership characteristics.

- Is effective where there are no likely adverse political repercussions over focusing on single property.

- Identifies and embraces a bona fide real estate opportunity.

- Creates opportunity for Town to establish both planning and zoning parameters for all aspects of the proposed development.

- Effective in areas where public/private agreements addressing infrastructure needs can be incorporated into agreements for land use approvals.

- Advances TND goals to obtain commitments for mix of uses and urban design (form-based) standards.

- An effective strategy to employ in cases where growth management intervention is needed to better address active real markets and strong demographic growth that may stimulate near term development pressures.

3. <u>Target and Unify Undeveloped Properties</u> - designate multiple property owners on a new or refined project concept.

- Opportunity to make the *"whole greater than the sum of the parts"*. Discrete, parcel by parcel development along the major streets or existing highway corridors often yields weaker results than planned development partnerships.

- Few/limited adverse political repercussions with targeting a combination of specific properties/ownership.

- Creates opportunity for Town to establish both planning and zoning parameters for all aspects of the proposed development.

- Effective in areas where public/private agreements addressing infrastructure needs can be incorporated into the terms, conditions and proffers related to land use approvals.

- Practical approach to planning and negotiating coordinated inter- and intra-parcel transportation access; can apply proffers more intelligently and creatively with a "master plan" in place.

- Advances TND goals to obtain commitments for mix of uses and apply urban design (form-based) standards to multiple parcels.
- An effective strategy to employ in cases where growth management intervention is needed to better address active real markets and strong demographic growth that may stimulate near term development pressures.

4. **Target Underdeveloped and Revitalization Properties** - a "downtown" or "village" renewal situation where redevelopment opportunities exist and specific building(s) can be targeted.

- Attractive where there is a financial commitment (both public and private) to restoration of a blighted or economically depressed area.
- Improved opportunity to attract development at UDA-specified densities.
- Integrates infill development opportunities.
- Effective where parking and difficult property loading (and other access) solutions can be addressed on a private/public basis.
- Provides opportunity to cluster and locate higher density development within close pedestrian access to existing historic downtown areas.

Population and Employment Projections

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POPULATION & EMPLOYMENT PROJECTIONS

UDA RESIDENTIAL

COUNTY POPULATION PROJECTIONS	Existing 2010		Projected 2020		Projected 2030	
Residential Population Projections *(source: Virginia Employment Commission)*	4,948		6,303		8,624	
Population Growth Increment:	2010-2020:	1,355	2020-2030:	2,321	2010-2030:	3,676
Percentage Increase:	2010-2020:	*27.4%*	2020-2030:	*36.8%*	2010-2030:	*74.3%*

UDA POPULATION DISTRIBUTION SCENARIOS *(by % Population Distribution to Each Dwelling Type)*		Single Family Detached	Townhomes	Multifamily Residences
Scenario 1:	**Predominantly Single Family**	**80%**	**10%**	**10%**
Scenario 2:	**Balanced Mix per Market Expectations**	**50%**	**25%**	**25%**
Scenario 3:	**The Balanced TND Mix**	**33%**	**33%**	**33%**

UDA COMMERCIAL & SUPPORT EMPLOYMENT

COUNTY EMPLOYMENT PROJECTIONS	Existing 2010	Projected 2020	Projected 2030
Town Employment Population Projections *(Source: Virginia Employment Commission)*	**3,567**	**4,583**	**6,324**
Ratio: **Total Town Employment/Resident Population** *(Decennial Incremental Growth)*	74.2%	75.0%	75.0%
Total: **Employment Growth Increment:**	**2010-2020: 1,016**	**2020-2030: 1,741**	**2010-2030: 2,757**

TOWN EMPLOYMENT PROJECTIONS BY SECTOR	Projected 2010-2020:		Projected 2020-2030:		Projected 2010-2030:
DECENNIAL INCREMENTAL EMPLOYMENT GROWTH	*Distribution*	*Increment*	*Distribution*	*Increment*	*20-YEAR Increment*
UDA Commercial & Office	65.0%	661	65.0%	1131	1792
Other Employment Uses:					
Non-UDA Economic Development	15.0%	152	15.0%	261	414
Government and Education *(Local, State & Federal)*	20.0%	203	20.0%	348	551
Total: Projected Decennial Employment Increment	100.0%	**1016**	100.0%	**1741**	**2757**

Summary of UDA Developable Acreage

The Town of Orange

Summary of Scenarios 1, 2 and 3: UDA Developable Areas and Impact Areas

RESIDENTIAL POPULATION GROWTH ASSUMPTIONS — Single Family Detached: 80% | Townhouse/Attached: 10% | Multifamily/Condos: 10%

SCENARIO #1: UDA ACREAGE

	Unadjusted Acreage	FMM = 1.5	FMM = 2.0
UDA Residential Developable Acreage			
Minimum Designation Area Threshold (2010 - 2020)	115.2	172.8	230.4
Maximum Designation Area Threshold (2010 - 2030)	333.9	500.9	667.8
UDA Commercial Developable Acreage			
Minimum Designation Area Threshold (2010 - 2020)	16.0	24.0	32.0
Maximum Designation Area Threshold (2010 - 2030)	49.4	74.1	98.8
Total: UDA Designated Developable Acreage (= Residential + Commercial)			
Minimum Designation Area Threshold (2010 - 2020)	131.2	196.8	262.4
Maximum Designation Area Threshold (2010 - 2030)	383.3	575.0	766.6
add: **UDA Developable Acreage + Impact Area Support (= UDA Residential + UDA Commerical + Industry + Support Area)**	*Unadjusted Acreage*	FMM = 1.5	FMM = 2.0
Minimum Designation Area Threshold (2010 - 2020)	245.5	368.3	491.0
Decennial Increment (2010 - 2020)	520.6	780.9	1,041.2
Maximum Designation Area Threshold (2010 - 2030)	766.2	1,149.3	1,532.4
add: **EXISTING LAND USE IN UDA IMPACT AREA**	*(to be determined by Town upon selection of UDA location and acreage)*		
Total: UDA DEVELOPMENT IMPACT AREA	**(= Existing Land Use + UDA Residential + UDA Commerical + Other Employment + Support Area)**		

The Town of Orange

Summary of Scenarios 1, 2 and 3: UDA Developable Areas and Impact Areas

RESIDENTIAL POPULATION GROWTH ASSUMPTIONS	Single Family Detached: 50%	Townhouse/Attached: 25%	Multifamily/Condos: 25%

SCENARIO #2: UDA ACREAGE	*Unadjusted Acreage*	FMM = 1.5	FMM = 2.0
UDA Residential Developable Acreage			
Minimum Designation Area Threshold (2010 - 2020)	111.6	167.4	223.2
Maximum Designation Area Threshold (2010 - 2030)	329.3	494.0	658.6
UDA Commercial Developable Acreage			
Minimum Designation Area Threshold (2010 - 2020)	16.0	24.0	32.0
Maximum Designation Area Threshold (2010 - 2030)	49.4	74.1	98.8
Total: UDA Designated Developable Acreage (= Residential + Commerical)			
Minimum Designation Area Threshold (2010 - 2020)	127.6	191.4	255.2
Maximum Designation Area Threshold (2010 - 2030)	378.7	568.1	757.4

add: UDA Developable Acreage + Impact Area Support (= UDA Residential + UDA Commerical + Industry + Support Area)	*Unadjusted Acreage*	FMM = 1.5	FMM = 2.0
Minimum Threshold: 2010 -2020	243.1	364.7	486.2
Decennial Increment: 2020 - 2030	528.8	793.2	1,057.6
Maximum Threshold: 2010 - 2030	771.9	1,157.9	1,543.8

add: **EXISTING LAND USE IN UDA IMPACT AREA** *(to be determined by County upon selection of UDA location and acreage)*

Total: UDA DEVELOPMENT IMPACT AREA **(= Existing Land Use + UDA Residential + UDA Commerical + Other Employment + Support Area)**

The Town of Orange

Summary of Scenarios 1, 2 and 3: UDA Developable Areas and Impact Areas

UDA RESIDENTIAL POPULATION ASSUMPTIONS — Single Family Detached: 33% | Townhouse/Attached: 33% | Multifamily/Condos: 33%

SCENARIO #3: UDA ACREAGE	*Unadjusted Acreage*	FMM = 1.5	FMM = 2.0
UDA Residential Developable Acreage			
Minimum Designation Area Threshold (2010 - 2020)	109.6	164.4	219.2
Maximum Designation Area Threshold (2010 - 2030)	326.7	490.1	653.4
UDA Commercial Developable Acreage			
Minimum Designation Area Threshold (2010 - 2020)	16.0	24.0	32.0
Maximum Designation Area Threshold (2010 - 2030)	49.4	74.1	98.8
Total: UDA Designated Developable Acreage (= Residential + Commercial)			
Minimum Designation Area Threshold (2010 - 2020)	125.6	188.4	251.2
Maximum Designation Area Threshold (2010 - 2030)	376.1	564.2	752.2
add: **UDA Developable Acreage + Impact Area Support (= UDA Residential + UDA Commerical + Industry + Support Area)**	*Unadjusted Acreage*	FMM = 1.5	FMM = 2.0
Minimum Designation Area Threshold (2010 - 2020)	241.8	362.7	483.6
Decennial Increment (2020 - 2030)	533.4	800.1	1,066.8
Maximum Designation Area Threshold (2010 - 2030)	775.2	1,162.8	1,550.4
add: **EXISTING LAND USE IN UDA IMPACT AREA**	*(to be determined by County upon selection of UDA location and acreage)*		
Total: UDA DEVELOPMENT IMPACT AREA	**(= Existing Land Use + UDA Residential + UDA Commerical + Other Employment + Support Area)**		

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Summary of Scenarios 1, 2 and 3: UDA Developable Areas and Impact Areas

SCENARIO COMPARISON	*Unadjusted UDA Acreage*	FMM = 1.5	FMM = 2.0
SCENARIO 1: UDA Designated Developable Acreage	**(= UDA Residential + UDA Commercial)**		
Minimum Designation Area Threshold (2010 - 2020)	131.2	196.8	262.4
Maximum Designation Area Threshold (2010 - 2030)	383.3	575.0	766.6
SCENARIO 2: UDA Designated Developable Acreage	**(= UDA Residential + UDA Commercial)**		
Minimum Designation Area Threshold (2010 - 2020)	127.6	191.4	255.2
Maximum Designation Area Threshold (2010 - 2030)	378.7	568.1	757.4
SCENARIO 3: UDA Designated Developable Acreage	**(= UDA Residential + UDA Commercial)**		
Minimum Designation Area Threshold (2010 - 2020)	125.6	188.4	251.2
Maximum Designation Area Threshold (2010 - 2030)	376.1	564.2	752.2

Summary of Scenarios 1, 2, and 3:

UDA Residential Demands

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Projected UDA Population, UDA Residential Acreage & Distribution by Dwelling Type

SCENARIO #1

	Population Distribution *by dwelling type*	Projected Population *(range)* Minimum 2010-2020	*2020-2030*	High 2010-2030	UDA Residential Unit Yield *(range)* Minimum 2010-2020	*2020-2030*	High 2010-2030
Single Family Residential Detached	80%	1,084	1,857	2,941	376	702	1,078
Townhomes	10%	136	232	368	79	160	239
Multifamily Residential	10%	136	232	368	95	199	294
Total Residential Dwelling Yield	100%	1,356	2,321	3,677	550	1,061	1,611
Required UDA Developable Residential Acreage		115	acres	334	2.47	persons/unit	2.28

SCENARIO #2

	Population Distribution *by dwelling type*	Projected Population *(range)* Minimum 2010-2020	*2020-2030*	High 2010-2030	UDA Residential Unit Yield *(range)* Minimum 2010-2020	*2020-2030*	High 2010-2030
Single Family Residential Detached	50%	678	1161	1,839	235	439	674
Townhomes	25%	339	580	919	198	399	597
Multifamily Residential	25%	339	580	919	238	498	736
Total Residential Dwelling Yield	100%	1,356	2,321	3,677	671	1336	2007
Required UDA Developable Residential Acreage		112	acres	329	2.02	persons/unit	1.83

SCENARIO #3

	Population Distribution *by dwelling type*	Projected Population *(range)* Minimum 2010-2020	*2020-2030*	High 2010-2030	UDA Residential Unit Yield *(range)* Minimum 2010-2020	*2020-2030*	High 2010-2030
Single Family Residential Detached	33%	452	774	1,226	157	292	449
Townhomes	33%	452	744	1,196	264	532	796
Multifamily Residential	33%	452	744	1,196	317	665	982
Total Residential Dwelling Yield	100%	1,356	2,262	3,618	738	1489	2227
Required UDA Developable Residential Acreage		110	acres	327	1.84	persons/unit	1.62

Scenario 2

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SCENARIO 2: UDA LAND USE MODEL

UDA Developable Acreage & UDA Impact Area Estimates

POPULATION PROJECTIONS	Existing	Projected	Projected
Projection Year	2010	2020	2030
Town Population Projections	4,948	6,303	8,624
(Source: Virginia Employment Commission)			
Decennial Growth Increment: Future Decades of Growth		2010-2020: 1,355	2020-2030: 2,321
Decennial % Increase: Future Decades of Growth		2010-2020: 27.4%	2020-2030: 36.8%

UDA RESIDENTIAL GROWTH MODEL	Single Family Detached 4 Dwellings per Acre		Townhomes 6 Dwellings per Acre		Multifamily Residences 12 Dwellings per Acre	
Decennial Projection Timeframes	2010 -2020	2020 -2030	2010 -2020	2020 -2030	2010 -2020	2020 -2030
Scenario 2: Population Distribution Assumptions *(Percentage Population Distribution by Dwelling Type)*	50%		25%		25%	
Projected New Residents by Dwelling Type	678	1,161	339	580	339	580
Average Residents/Household Dwelling	*3.0*	*2.7*	*1.8*	*1.5*	*1.5*	*1.2*
Net Residential Dwelling Demand *(# units)*	226	430	188	387	226	484
add: **Vacancy Adjustment** *(% of net demand)*	4%	2%	5%	3%	5%	3%
Total: UDA Dwelling Demand by Unit Type *(units)*	**235**	**439**	**198**	**399**	**238**	**498**

UDA Developable Acreage & UDA Impact Area Estimates

UDA DEVELOPABLE ACREAGE REQUIREMENTS	Single Family Detached		Townhomes		Multifamily Residences	
Decennial Projection Timeframes	2010 -2020	2020 -2030	2010 -2020	2020 -2030	2010 -2020	2020 -2030
UDA Residential Planning Density Guidelines:						
UDA Dwelling Units/Developable Area *(du/acre)*	4	4	6	6	12	12
UDA Residential Developable Acreage	58.8	109.6	33.0	66.5	19.8	41.5

UDA Developable Acreage Requirements by Residential Dwelling Type *(acres)* :			
UDA Minimum: 2010-2020 Growth Accommodation	58.8	33.0	19.8
UDA Maximum: 2010-2030 Growth Accommodation	168.5	99.5	61.4

UDA Impact Area Support Space Allocation	Single Family Detached		Townhomes		Multifamily Residences	
Decennial Growth Increment	2010 -2020	2020 -2030	2010 -2020	2020 -2030	2010 -2020	2020 -2030
Government, Education and Civic Space Allocation Factor *(range: % of net)*	0.15	0.20	0.15	0.20	0.15	0.20
Utility Infrastructure/Easement Allocation Factor *(range: % of net)*	0.10	0.05	0.10	0.10	0.10	0.10
Community Recreation & Open Space Allocation Factor *(range: % of net)*	0.30	0.30	0.40	0.40	0.40	0.40
Total: **UDA Residential Support Factor** *(range: % of net)*	**0.55**	**0.55**	**0.65**	**0.70**	**0.65**	**0.70**
***Total:* UDA Residential Support Acreage**	32.3	60.3	21.5	46.5	12.9	29.1

UDA Developable Acreage & UDA Impact Area Estimates

Scenario 2: Population Distribution Assumptions (Percentage Population Distribution by Dwelling Type)	50%		25%		25%	
	10-Year Projection Period					
Decennial Projection Timeframes	2010 -2020	2020 -2030	2010 -2020	2020 -2030	2010 -2020	2020 -2030
UDA Residential Dwelling Type	Single Family Detached 4 Dwellings per Acre		Townhomes 6 Dwellings per Acre		Multifamily Residences 12 Dwellings per Acre	
Total: UDA Residential Impact Area by Dwelling Type (= UDA Residential Acreage + Residential Support Acreage)	91.2	170.0	54.5	113.0	32.7	70.6

Total: UDA Residential Development Impact Area Acreage (= UDA Residential Area + Residential Support Acreage)	Unadjusted Acreage	add: Market Adjustments =	Free Market Multiplier FMM = 1.5	FMM = 2.0
Projection Timeframes				
2010 - 2020	178.3		267.5	356.6
2020 - 2030	353.6		530.3	707.1
2010 - 2030	531.9		797.8	1,063.8

UDA Developable Acreage & UDA Impact Area Estimates

COMMERICAL, ECONOMIC DEVELOPMENT AND EMPLOYMENT GROWTH MODEL

	2010		2020		2030	
County Employment Population Projections *(Source: Virginia Employment Commission)*	**3,567**		**4,583**		**6,324**	
Ratio: **Total Employment/Resident Population**	72.1%		75.0%		75.0%	
Total: **Decennial Employment Growth Increment:**	**2010-2020:**	**1,016**	**2020-2030:**	**1,741**	**2010-2030:**	**2,757**

TOWN EMPLOYMENT PROJECTIONS BY SECTOR	Projected 2010-2020:		Projected 2020-2030:		Projected 2010-2030:
	Distribution	*Increment*	*Distribution*	*Increment*	*Total: Combined Increment*
Qualifying UDA Commercial & Office	65.0%	661	65.0%	1131	1792
Non-Qualifying Commercial & Economic Development	15.0%	152	15.0%	261	414
Government and Education *(Local, State & Federal)*	20.0%	203	20.0%	348	551
Total: **Projected Decennial Employment Increment**	100.0%	**1016**	100.0%	**1741**	**2757**

UDA Developable Acreage & UDA Impact Area Estimates

UDA DEVELOPABLE ACREAGE by EMPLOYMENT CATEGORY	UDA Commercial		*Other Employment and Economic Development* Non-Qualifying Commercial		Government/Education	
Decennial Projection Timeframes	2010 -2020	2020 -2030	2010 -2020	2020 -2030	2010 -2020	2020 -2030
Total Projected Employment Growth *(# new jobs)*	660.6	1131.5	152.4	261.1	203.3	348.2
Building Space Utilization/Employee *(sfgfa/employee)*	400	500	600	800	300	400
Net Demand for Non-Residential Space (SFGFA)	264,225	565,744	91,463	208,890	60,975	139,260
add: **Vacancy Adjustment**	5%	3%	5%	3%	4%	2%
Net Floor Area SFGFA *(adjusted for vacancy)*	278,132	583,241	96,276	215,351	63,516	142,102
UDA Floor Area Ratio	0.40	0.40	0.20	0.15	0.20	0.15
Net Land Area for Employment Category *(square feet)*	695,329	1,458,102	481,382	1,435,670	317,578	947,347
Net UDA Employment Developable Acreage *(by decennial period increment)*	**16.0**	**33.5**	**11.1**	**33.0**	**7.3**	**21.7**

Other Employment and Economic Development Acreage

Minimum UDA Area: Commercial Growth Accommodation *(2010-2020)* **16.0** **acres**

Maximum UDA Area: Commercial Growth Accommodation *(2010-2030)* **49.4** **acres**

UDA Developable Acreage & UDA Impact Area Estimates

UDA Impact Area Support Space Allocation	UDA Commercial		Other Employment Uses		Government	
Decennial Projection Timeframes	2010 -2020	2020 -2030	2010 -2020	2020 -2030	2010 -2020	2020 -2030
Public & Civic Space Allocation Factor	0.30	0.30	0.30	0.30	0.25	0.25
Infrastructure/Easement Allocation Factor	0.30	0.30	0.30	0.30	0.30	0.30
Environmental & Open Space Allocation Factor	0.30	0.40	0.30	0.40	0.30	0.40
Total: **UDA Non-Residential Support Factor**	**0.90**	**1.00**	**0.90**	**1.00**	**0.85**	**0.95**
Total: **UDA Non-Residential Support Area** *(acres)*	**14.4**	**33.5**	**9.9**	**33.0**	**6.2**	**20.7**
Total UDA Impact Area Gross Acreage for Non-Qualifying Commercial & Other Employment	**30.3**	**66.9**	**21.0**	**65.9**	**13.5**	**42.4**

Total: UDA Commerical Impact Area Developable Acreage (= UDA Commercial + Non-Qualifying Employment + UDA Support)	Unadjusted Acreage	FMM = 1.5	FMM = 2.0
UDA Minimum: 2010 -2020	**64.8**	**97.2**	**129.6**
2020 - 2030 *(increment)*	**175.3**	**262.9**	**350.5**
UDA Maxiumum: 2010 - 2030	**240.1**	**360.1**	**480.2**

UDA Developable Acreage & UDA Impact Area Estimates

Summary: UDA DEVELOPABLE ACREAGE & UDA DEVELOPMENT IMPACT AREA ESTIMATES

UDA Land Use Category	Unadjusted Acreage	*add:* Market Adjustments =	Free Market Multiplier FMM = 1.5	FMM = 2.0
UDA Residential Developable Acreage				
Minimum UDA Threshold: 2010 -2020	111.6		167.5	223.3
Maximum UDA Threshold: 2010 - 2030	329.3		493.9	658.6
UDA Commercial Developable Acreage				
Minimum UDA Threshold: 2010 -2020	16.0		23.9	31.9
Maximum UDA Threshold: 2010 - 2030	49.4		74.2	98.9
Total: UDA Developable Acreage (= UDA Residential + UDA Commercial)				
Minimum UDA Threshold: 2010 -2020	127.6		191.4	255.2
Maximum UDA Threshold: 2010 - 2030	378.7		568.1	757.5

Total: UDA DEVELOPMENT IMPACT AREA (= Residential + Commerical + Other Employment + Support Area)	Unadjusted Acreage	*add:* Market Adjustments =	FMM = 1.5	FMM = 2.0
Minimum UDA Threshold: 2010 -2020	243.1		364.7	486.3
Decennial Increment: 2020 - 2030	528.8		793.3	1,057.7
Maximum UDA Threshold: 2010 - 2030	772.0		1,158.0	1,543.9

Employment Distribution

The Town of Orange Employment Distribution Analysis:

Selected UDA Peer Group Comparisons: **2010**

compare to:

Locality 2010 Employment by Sector Category	TOWN of ORANGE Employment	 % of Total	ORANGE COUNTY Employment	 % of Total	GLOUCESTER Employment	 % of Total	NEW KENT Employment	 % of Total
UDA Commercial Employment:								
Wholesale Trade	53	1.5%	582	7.7%	312	3.5%	28	0.7%
Retail Trade	558	15.6%	1,045	13.8%	1,639	18.6%	423	10.3%
Information		0.0%	47	0.6%	119	1.4%	19	0.5%
Finance and Insurance	106	3.0%	153	2.0%	233	2.6%	66	1.6%
Real Estate and Rental and Leasing	77	2.2%	211	2.8%	133	1.5%	18	0.4%
Professional,Scientific,and Technical Services		0.0%	262	3.5%	221	2.5%	106	2.6%
Management of Companies and Enterprises		0.0%		0.0%	N/A		0	0.0%
Administrative and Support Services	130	3.6%	130	1.7%	266	3.0%	185	4.5%
Health Care and Social Assistance	576	16.1%	402	5.3%	1,181	13.4%	459	11.1%
Arts, Entertainment and Recreation	143	4.0%	158	2.1%	226	2.6%	509	12.3%
Accommodation and Food Services	277	7.8%	652	8.6%	1,042	11.8%	387	9.4%
Other Services (except Public Administration)	431	12.1%	387	5.1%	365	4.1%	153	3.7%
Other Employment *(Non-Qualifying UDA)*:								
Agriculture,Forestry,Fishing and Hunting	5	0.1%	364	4.8%	58	0.7%	47	1.1%
Construction	184	5.2%	410	5.4%	627	7.1%	597	14.5%
Mining,Quarrying,and Oil and Gas Extraction		0.0%		0.0%	N/A		0	0.0%
Utilities	46	1.3%	60	0.8%	N/A			0.0%
Manufacturing	231	6.5%	839	11.1%	160	1.8%	163	4.0%
Transportation and Warehousing	45	1.3%	40	0.5%	300	3.4%	128	3.1%
Government and Education:								
Educational Services	394	11.0%	1,300	17.1%	1,553	17.6%	518	12.6%
Public Administration	311	8.7%	550	7.2%	365	4.1%	319	7.7%
Summary: Total Employment *(1Q, 2010)*	3,567	100.0%	7,592	100.0%	8,800	100.0%	4,125	100.0%
Employment/Population Ratio:	74.2%		22.2%		21.7%		22.1%	

2010 Employment Distribution % by Sector

UDA Commercial	2,351	4,029	5,737	2,353
% of total	65.9%	53.1%	65.2%	57.0%
Other Employment *(non-qualifying)*	511	1,713	1,145	935
% of total	14.3%	22.6%	13.0%	22.7%
Government *(non-qualifying)*	705	1,850	1,918	837
% of total	19.8%	24.4%	21.8%	20.3%

The Town of Orange Employment Distribution Analysis:

Selected UDA Peer Group Comparisons: **2010**

compare to:

Locality 2010 Employment by Sector Category	TOWN of ORANGE Employment	 *% of Total*	GOOCHLAND Employment	 *% of Total*	AMELIA Employment	 *% of Total*	ISLE of WIGHT Employment	 *% of Total*
UDA Commercial Employment:								
Wholesale Trade	**53**	***1.5%***	318	*2.6%*	177	*7.5%*	211	*1.8%*
Retail Trade	**558**	***15.6%***	438	*3.6%*	238	*10.1%*	867	*7.3%*
Information		***0.0%***	14	*0.1%*	17	*0.7%*	45	*0.4%*
Finance and Insurance	**106**	***3.0%***	2,544	*20.8%*	55	*2.3%*	193	*1.6%*
Real Estate and Rental and Leasing	**77**	***2.2%***	77	*0.6%*	5	*0.2%*	111	*0.9%*
Professional,Scientific,and Technical Services		***0.0%***	315	*2.6%*	48	*2.0%*	415	*3.5%*
Management of Companies and Enterprises		***0.0%***	1,782	*14.6%*	0	*0.0%*	126	*1.1%*
Administrative and Support Services	**130**	***3.6%***	484	*4.0%*	69	*2.9%*	466	*3.9%*
Health Care and Social Assistance	**576**	***16.1%***	641	*5.2%*	321	*13.7%*	697	*5.9%*
Arts, Entertainment and Recreation	**143**	***4.0%***	523	*4.3%*	15	*0.6%*	98	*0.8%*
Accommodation and Food Services	**277**	***7.8%***	271	*2.2%*	86	*3.7%*	793	*6.7%*
Other Services (except Public Administration)	**431**	***12.1%***	404	*3.3%*	36	*1.5%*	428	*3.6%*
Other Employment ***(Non-Qualifying UDA)*****:**								
Agriculture,Forestry,Fishing and Hunting	**5**	***0.1%***	66	*0.5%*	157	*6.7%*	186	*1.6%*
Construction	**184**	***5.2%***	1,084	*8.9%*	344	*14.7%*	441	*3.7%*
Mining,Quarrying,and Oil and Gas Extraction		***0.0%***	130	*1.1%*		*0.0%*		*0.0%*
Utilities	**46**	***1.3%***			0	*0.0%*	41	*0.3%*
Manufacturing	**231**	***6.5%***	367	*3.0%*	289	*12.3%*	4,903	*41.4%*
Transportation and Warehousing	**45**	***1.3%***	79	*0.6%*	84	*3.6%*	294	*2.5%*
Government and Education:								
Educational Services	**394**	***11.0%***	680	*5.6%*	296	*12.6%*	1,053	*8.9%*
Public Administration	**311**	***8.7%***	2,001	*16.4%*	109	*4.6%*	470	*4.0%*
Summary: Total Employment *(1Q, 2010)*	**3,567**	***100.0%***	12,218	*100.0%*	**2,346**	*100.0%*	11,838	*100.0%*
Employment/Population Ratio:	**74.2%**		**65.4%**		**17.7%**		**31.9%**	

2010 Employment Distribution % by Sector

UDA Commercial	**2,351**	**7,811**	**1,067**	**4,450**
% of total	**65.9%**	63.9%	45.5%	37.6%
Other Employment *(non-qualifying)*	**511**	**1,726**	**874**	**5,865**
% of total	**14.3%**	14.1%	37.3%	49.5%
Government *(non-qualifying)*	**705**	**2,681**	**405**	**1,523**
% of total	**19.8%**	21.9%	17.3%	12.9%

The Town of Orange Employment Distribution Analysis:

Selected UDA Peer Group Comparisons: **2010**

compare to:

Locality 2010 Employment by Sector Category	TOWN of ORANGE Employment	 % of Total	WASHINGTON Employment	 % of Total	SHENANDOAH Employment	 % of Total	WOODSTOCK Employment	 % of Total
UDA Commercial Employment:								
Wholesale Trade	53	1.5%	738	3.6%	385	2.8%	65	1.4%
Retail Trade	558	15.6%	4,094	20.0%	1,569	11.6%	1,107	24.2%
Information		0.0%	135	0.7%	376	2.8%	0	0.0%
Finance and Insurance	106	3.0%	488	2.4%	189	1.4%	191	4.2%
Real Estate and Rental and Leasing	77	2.2%	173	0.8%	128	0.9%	83	1.8%
Professional,Scientific,and Technical Services		0.0%	563	2.8%	236	1.7%	36	0.8%
Management of Companies and Enterprises		0.0%	820	4.0%	150	1.1%	120	2.6%
Administrative and Support Services	130	3.6%	555	2.7%	250	1.8%	156	3.4%
Health Care and Social Assistance	576	16.1%	1,999	9.8%	1,320	9.7%	928	20.3%
Arts, Entertainment and Recreation	143	4.0%	309	1.5%	112	0.8%	56	1.2%
Accommodation and Food Services	277	7.8%	1,530	7.5%	1,556	11.5%	370	8.1%
Other Services (except Public Administration)	431	12.1%	406	2.0%	413	3.0%	139	3.0%
Other Employment *(Non-Qualifying UDA)*:								
Agriculture,Forestry,Fishing and Hunting	5	0.1%	63	0.3%	201	1.5%	19	0.4%
Construction	184	5.2%	774	3.8%	737	5.4%	137	3.0%
Mining,Quarrying,and Oil and Gas Extraction		0.0%	63	0.3%	0	0.0%	0	0.0%
Utilities	46	1.3%	157	0.8%	66	0.5%	54	1.2%
Manufacturing	231	6.5%	3,240	15.8%	3,499	25.8%	50	1.1%
Transportation and Warehousing	45	1.3%	1,057	5.2%	384	2.8%	51	1.1%
Government and Education:								
Educational Services	394	11.0%	2,220	10.9%	1,381	10.2%	489	10.7%
Public Administration	311	8.7%	1,073	5.2%	595	4.4%	526	11.5%
Summary: Total Employment *(1Q, 2010)*	3,567	100.0%	20,457	100.0%	13,547	100.0%	4,577	100.0%
Employment/Population Ratio:	74.2%		38.9%		32.0%		98.7%	

2010 Employment Distribution % by Sector

UDA Commercial	2,351	11,810	6,684	3,251
% of total	65.9%	57.7%	49.3%	71.0%
Other Employment *(non-qualifying)*	511	5,354	4,887	311
% of total	14.3%	26.2%	36.1%	6.8%
Government *(non-qualifying)*	705	3,293	1,976	1,015
% of total	19.8%	16.1%	14.6%	22.2%

The Town of Orange Employment Distribution Analysis:

Selected UDA Peer Group Comparisons: **2010**

compare to:

Relative Strength Ratio:

Locality 2010 Employment by Sector Category	TOWN of ORANGE Employment	 *% of Total*	STATE OF VIRGINIA Employment	 % of Total	COUNTY EMPLOYMENT SECTOR % / STATE EMPOYMENT SECTOR %
UDA Commercial Employment:					
Wholesale Trade	**53**	***1.5%***	111,700	*3.1%*	**47.2%**
Retail Trade	**558**	***15.6%***	406,984	*11.5%*	**136.3%**
Information		***0.0%***	78,855	*2.2%*	**0.0%**
Finance and Insurance	**106**	***3.0%***	120,368	*3.4%*	**87.6%**
Real Estate and Rental and Leasing	**77**	***2.2%***	52,904	*1.5%*	**144.7%**
Professional,Scientific,and Technical Services		***0.0%***	379,597	*10.7%*	**0.0%**
Management of Companies and Enterprises		***0.0%***	73,291	*2.1%*	**0.0%**
Administrative and Support Services	**130**	***3.6%***	193,191	*5.4%*	**66.9%**
Health Care and Social Assistance	**576**	***16.1%***	372,209	*10.5%*	**153.9%**
Arts, Entertainment and Recreation	**143**	***4.0%***	40,319	*1.1%*	**352.6%**
Accommodation and Food Services	**277**	***7.8%***	290,910	*8.2%*	**94.7%**
Other Services (except Public Administration)	**431**	***12.1%***	126,286	*3.6%*	**339.3%**
Other Employment ***(Non-Qualifying UDA)*****:**					
Agriculture,Forestry,Fishing and Hunting	**5**	***0.1%***	11,698	*0.3%*	**42.5%**
Construction	**184**	***5.2%***	185,701	*5.2%*	**98.5%**
Mining,Quarrying,and Oil and Gas Extraction		***0.0%***	8,452	*0.2%*	**0.0%**
Utilities	**46**	***1.3%***	11,393	*0.3%*	**401.4%**
Manufacturing	**231**	***6.5%***	234,121	*6.6%*	**98.1%**
Transportation and Warehousing	**45**	***1.3%***	96,128	*2.7%*	**46.5%**
Government and Education:					
Educational Services	**394**	***11.0%***	59,435	*1.7%*	**659.1%**
Public Administration	**311**	***8.7%***	693,054	*19.5%*	**44.6%**
Summary: Total Employment *(1Q, 2010)*	**3,567**	***100.0%***	3,546,596	*100.0%*	
Employment/Population Ratio:	**74.2%**		45.0%		

2010 Employment Distribution % by Sector

UDA Commercial	**2,351**	**2,246,614**	
% of total	**65.9%**	63.3%	**104.0%**
Other Employment *(non-qualifying)*	**511**	**547,493**	
% of total	**14.3%**	15.4%	**92.8%**
Government *(non-qualifying)*	**705**	**752,489**	
% of total	**19.8%**	21.2%	**93.2%**

Camptown Buildout Analysis

Development Areas Planning Study

TND Buildout Potentials
for Adopted Urban Development Areas
Camptown #1 and #2

Illustrative TND Buildout

The following example evaluates the land development potentials for a TND community located within the two selected Urban Development Areas: Camptown #1 and Camptown #2. While conceptual in nature, the selected mix of uses and densities reflect those found in other Virginia traditional neighborhood developments. The internal street system and terrain-responsive, hybrid grid layout is consistent with transportation efficient land use practices. Net developable area principles are applied in the calculation of density and yield. The TND Master Plan for each area is based on a hypothetical illustrative concept plan prepared by The Cox Company (Charlottesville, Virginia.)

Qualifying and Non-Qualifying Land Areas

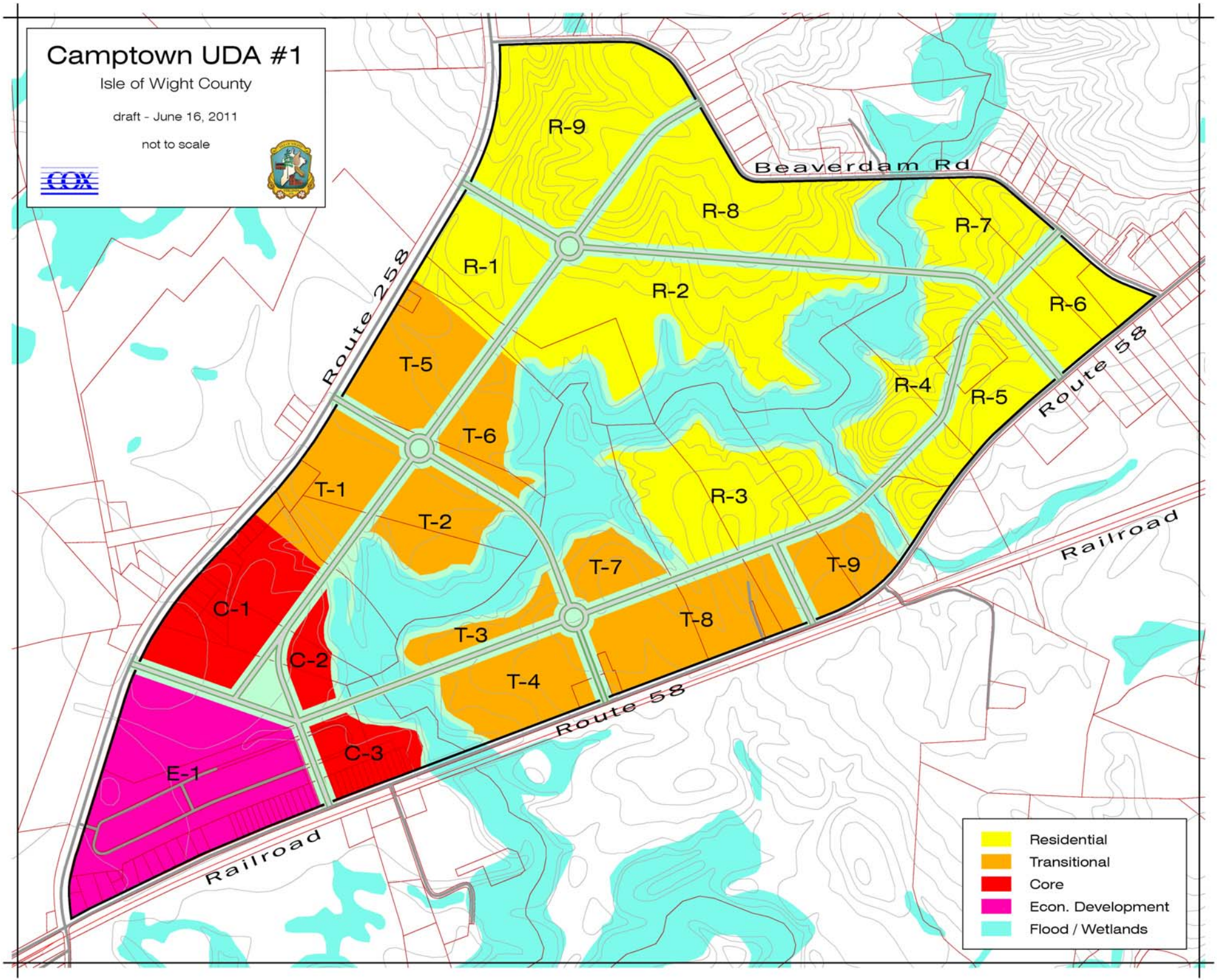
The application of land use densities within a TND project is correlated to the "lay of the land", while taking into consideration existing conditions and environmental characteristics that would limit the development potentials of a property. The allowable range of land use yields within the Sub-Areas is calculated based on the Qualifying Area (or Net Acreage of the individual Sub-Area. The land components that comprise the Non-Qualifying areas include:

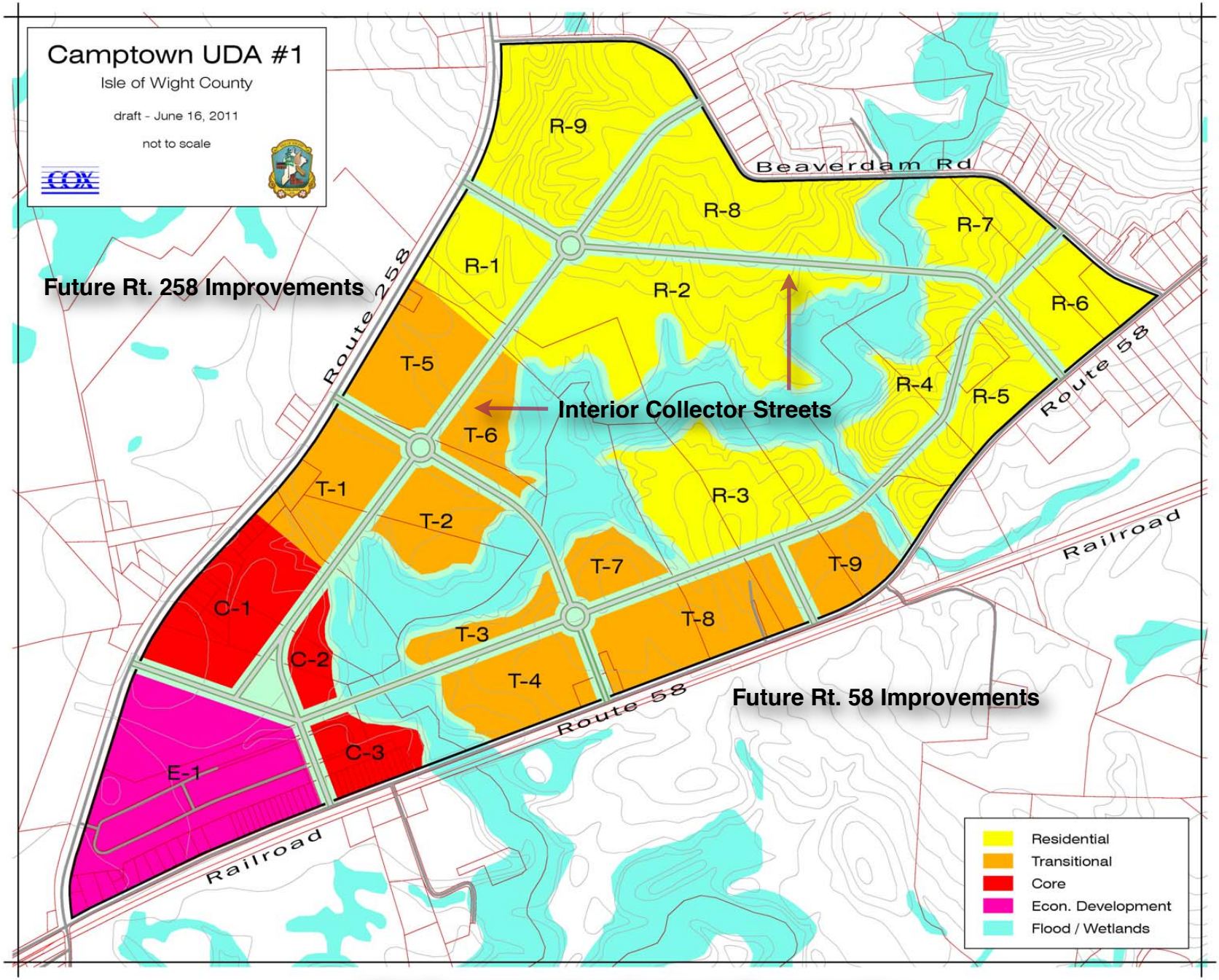
a. existing rights of way, easements, and areas depicted on an adopted Official Map,
b. existing land uses,
a. areas deemed unbuildable due to geological, soils, or other environmental deficiencies,
b. wetlands and floodplains (FEMA 100-year floodplain),
c. existing ponds, SWM facilities and water features not defined by wetlands or floodplains, and
d. terrain with slopes in excess of thirty percent (30%).

Net Qualifying Area Calculation Process

The calculation of minimum and maximum yield for individual uses to be located in the Sub-Areas is based on the application of the minimum and maximum density for each TND use to an adjusted Qualifying Area that reduces the gross area of the TND by the total of the non-qualifying land components within the Sub-Area. The **Qualifying Area (or Net Acreage) = Gross Acreage - Non-Qualifying Area** (acreage of the sum of the Non-Qualifying land components.) The key steps in the calculation process include:

(1) designate and map Sub-Area boundaries in accord with the TND Master Plan,
(2) calculate the gross area of each Sub-Area,
(3) identify, map, and calculate the Non-Qualifying land components within each Sub-Area,
(4) calculate the Qualifying Area within each Sub-Area,
(5) distribute the planned uses by percentage of Net Qualifying for each use within each Sub-Area,
(6) apply the maximum and minimum densities permitted for each land use by net acreage, and
(7) determine aggregate density subject to proffers for the total TND project.


Camptown UDA #1
Isle of Wight County
draft - June 16, 2011
not to scale
COX
R-9
R-8
R-7
R-6
R-5
R-4
R-3
R-2
R-1
T-9
T-8
T-7
T-6
T-5
T-4
T-3
T-2
T-1
C-3
C-2
C-1
E-1
Beaverdam Rd
Route 258
Route 58
Route 58
Railroad
Railroad
Residential
Transitional
Core
Econ. Development
Flood / Wetlands



UDA Transportation Network Opportunities

Camptown Urban Development Area #1

Summary of Camptown UDA Sub-Areas: Development Build-Out Potential

Isle of Wight County Future Land Use Map

Land Use Type and Category	Acreage	Use Distribution	Min. Yield	unit	Max. Yield	unit
Camptown UDA #1: Total Gross Area	**679.0**	*(inclusive of major tributary floodplain and stream valley = approx. 116 acres)*				
Camptown UDA #1: Total Development Area ***	**563.0**	**100.0%**				
Sub-total: Non Qualifying Area components ****	106.0	18.8%				
Camptown UDA #1: Total Net Qualifying Area	**457.0**	**81.2%**				
UDA Retail Commercial*	53.2	11.6%	926,957	*sfgfa*	1,839,974	*sfgfa*
UDA Office and Mixed Use*	40.0	8.8%	696,960	*sfgfa*	1,264,982	*sfgfa*
Other Commercial & Economic Development**	72.0	15.8%	752,717	*sfgfa*	1,630,886	*sfgfa*
Sub-total: **Commercial and Employment**	165.2		**2,376,634**	***sfgfa***	**4,735,843**	***sfgfa***
UDA Single Family Detached*	161.0	35.2%	644	*du*	966	*du*
UDA Townhouse Attached*	98.6	21.6%	707	*du*	871	*du*
UDA Multifamily/Condominiums*	52.1	11.4%	579	*du*	812	*du*
Live/Work Residential Attached*	9.0	2.0%	54	*du*	76	*du*
Sub-total: **Residential**	320.6		**1983**	***du***	**2725**	***du***
Camptown UDA #1 Total:	**485.8**	**106.3%**				

* *Denotes TND land use categories as defined by and subject to Section 15.2-2223.1.B.1 of the Code of Virginia.*

** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development.*

*** *Estimate of Qualifying Acreage is based on an approximation of UDA area based on County planning level mapping sources; acreage exclusive of major tributary floodplain*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*

Camptown Urban Development Area #1

UDA Core Sub-Districts: Summary of Development Build-Out Potential

Isle of Wight County Future Land Use Map

Land Use Type and Category	Min. Density*	Max. Density***	% Allocation	Acreage	Min. Yield	unit	Max. Yield	unit
Core Sub-District: Gross Acreage (estimate of total land area designated for sub-district per UDA FLUP)				51				
less: **Estimate of Non-Qualifying Acreage** ****								
Existing or dedicated public rights of way and easements				1				
Existing private land uses (assumes existing economically stable uses will remain for an extended timeframe)				0				
Unbuildable areas (includes areas of geological and environmental hazard)				2				
100-Year Floodplains and designated wetlands (exclusive of FEMA-mapped floodplains; includes potential upland wetlands)				1				
Existing water features (ponds, stormwater management facilities, excluding floodplains and wetlands)				0				
Critical Slopes > 30%				0				
Potential government, civic, park, and institutional uses				5				
Non-Qualifying Acreage Sub-total: (area to be excluded from min. and max. density calculation)				9				
Core Sub-District: Net (Qualifying) Acreage (contributing acreage to apply density calculation)				42				
Hypothetical Build-Out Scenario: Assumed Mix of Uses and Densities								
UDA Retail Commercial*	0.4 *FAR*	1.0 *FAR*	50.0%	21.0	365,904	*sfgfa*	914,760	*sfgfa*
UDA Office and Mixed Use*	0.4 *FAR*	1.0 *FAR*	30.0%	12.6	219,542	*sfgfa*	548,856	*sfgfa*
Other Commercial and Economic Development**	0.2 *FAR*	0.4 *FAR*	0.0%	0.0	-	*sfgfa*	-	*sfgfa*
Sub-total: **Core Sub-District - Commercial and Employment**			**80.0%**	33.6	**585,446**	*sfgfa*	**1,463,616**	*sfgfa*
Single Family Detached*	4 *du/ac*	6 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Townhouse Attached*	6 *du/ac*	12 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Multifamily/Condominiums*	12 *du/ac*	20 *du/ac*	15.0%	6.3	76	*du*	126	*du*
Live/Work Residential Attached*	6 *du/ac*	10 *du/ac*	5.0%	2.1	13	*du*	21	*du*
Sub-total: **Core Sub-District - Residential**			**20.0%**	8.4	**88**	*du*	**147**	*du*
Core Sub-District Total:			**100.0%**	**42.0**				

* *Denotes TND land use categories and minimum densities as defined by and subject to Section 15.2-2223.1.B.1 of the Code of Virginia*

** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development*

*** *Denotes recommended maximum density for individual uses as cited in the draft TND zoning district*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*

Camptown Urban Development Area #1

UDA Residential Sub-Districts: Summary of Development Build-Out Potential

Isle of Wight County Future Land Use Map

Land Use Type and Category	Min. Density*	Max. Density***	% Allocation	Acreage	Min. Yield	unit	Max. Yield	unit
Residential Sub-District: Gross Acreage (estimate of total land area designated for sub-district per UDA FLUP)				288				
less: **Estimate of Non-Qualifying Acreage** ****								
Existing or dedicated public rights of way and easements				5				
Existing private land uses (assumes existing economically stable uses will remain for an extended timeframe)				4				
Unbuildable areas (includes areas of geological and environmental hazard)				5				
100-Year Floodplains and designated wetlands (exclusive of FEMA-mapped floodplains; includes potential upland wetlands)				5				
Existing water features (ponds, stormwater management facilities, excluding floodplains and wetlands)				8				
Critical Slopes > 30%				1				
Potential government, civic, park, and institutional uses				30				
Non-Qualifying Acreage Sub-total: (area to be excluded from min. and max. density calculation)				58				
Residential Sub-District: Net (Qualifying) Acreage (contributing acreage to apply density calculation)				230				
Hypothetical Build-Out Scenario: Assumed Mix of Uses and Densities								
UDA Retail Commercial*	0.4 *FAR*	1.0 *FAR*	0.0%	0.0	-	*sfgfa*	-	*sfgfa*
UDA Office and Mixed Use*	0.4 *FAR*	1.0 *FAR*	0.0%	0.0	-	*sfgfa*	-	*sfgfa*
Other Commercial and Economic Development**	0.2 *FAR*	0.4 *FAR*	0.0%	0.0	-	*sfgfa*	-	*sfgfa*
Sub-total: **Residential Sub-District - Commercial and Employment**			**0.0%**	0.0	-	*sfgfa*	-	*sfgfa*
Single Family Detached*	4 *du/ac*	6 *du/ac*	70.0%	161.0	644	*du*	966	*du*
Townhouse Attached*	6 *du/ac*	8 *du/ac*	25.0%	57.5	345	*du*	460	*du*
Multifamily/Condominiums*	8 *du/ac*	12 *du/ac*	5.0%	11.5	92	*du*	138	*du*
Live/Work Residential Attached*	6 *du/ac*	8 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Sub-total: **Residential Sub-District - Residential**			**100.0%**	230.0	**1081**	*du*	**1564**	*du*
Residential Sub-District Total:			**100.0%**	**230.0**				

* *Denotes TND land use categories and minimum densities as defined by and subject to Section 15.2-2223.1.B.1 of the Code of Virginia*

** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development*

*** *Denotes recommended maximum density for individual uses as cited in the draft TND zoning district*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*

Camptown Urban Development Area #1

UDA Economic Development Sub-Districts: Summary of Development Build-Out Potential

Isle of Wight County Future Land Use Map

Land Use Type and Category	Min. Density*	Max. Density***	% Allocation	Acreage	Min. Yield	unit	Max. Yield	unit
Economic Development Sub-District: Gross Acreage (estimate of land area designated for per UDA FLUP)				57				
less: **Estimate of Non-Qualifying Acreage** ****								
Existing or dedicated public rights of way and easements				1				
Existing private land uses (assumes existing economically stable uses will remain for an extended timeframe)				0				
Unbuildable areas (includes areas of geological and environmental hazard)				1				
100-Year Floodplains and designated wetlands (exclusive of FEMA-mapped floodplains; includes potential upland wetlands)				1				
Existing water features (ponds, stormwater management facilities, excluding floodplains and wetlands)				2				
Critical Slopes > 30%				0				
Potential government, civic, park, and institutional uses				4				
Non-Qualifying Acreage Sub-total: (area to be excluded from min. and max. density calculation)				9				
Economic Development Sub-District: Net (Qualifying) Acreage (contributing acreage to apply density calculation)				48				
Hypothetical Build-Out Scenario: Assumed Mix of Uses and Densities								
UDA Retail Commercial*	0.4 *FAR*	1.0 *FAR*	10.0%	4.8	83,635	*sfgfa*	209,088	*sfgfa*
UDA Office and Mixed Use*	0.4 *FAR*	1.0 *FAR*	10.0%	4.8	83,635	*sfgfa*	209,088	*sfgfa*
Other Commercial and Economic Development**	0.2 *FAR*	0.4 *FAR*	60.0%	28.8	250,906	*sfgfa*	501,811	*sfgfa*
Sub-total: **Economic Developmentl Sub-District - Commercial and Employment**			**80.0%**	38.4	**418,176**	***sfgfa***	**919,987**	***sfgfa***
Single Family Detached*	4 *du/ac*	6 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Townhouse Attached*	6 *du/ac*	14 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Multifamily/Condominiums*	12 *du/ac*	20 *du/ac*	20.0%	9.6	115	*du*	192	*du*
Live/Work Residential Attached*	6 *du/ac*	10 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Sub-total: **Economic Development Sub-District - Residential**			**20.0%**	9.6	**115**	***du***	**192**	***du***
Economic Development Sub-District Total:			**100.0%**	**48.0**				

* *Denotes TND land use categories and minimum densities as defined by and subject to Section 15.2-2223.1.B.1 of the Code of Virginia*

** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development*

*** *Denotes recommended maximum density for individual uses as cited in the draft TND zoning district*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*

Camptown Urban Development Area #1

UDA Transitional Sub-Districts: Summary of Development Build-Out Potential

Isle of Wight County Future Land Use Map

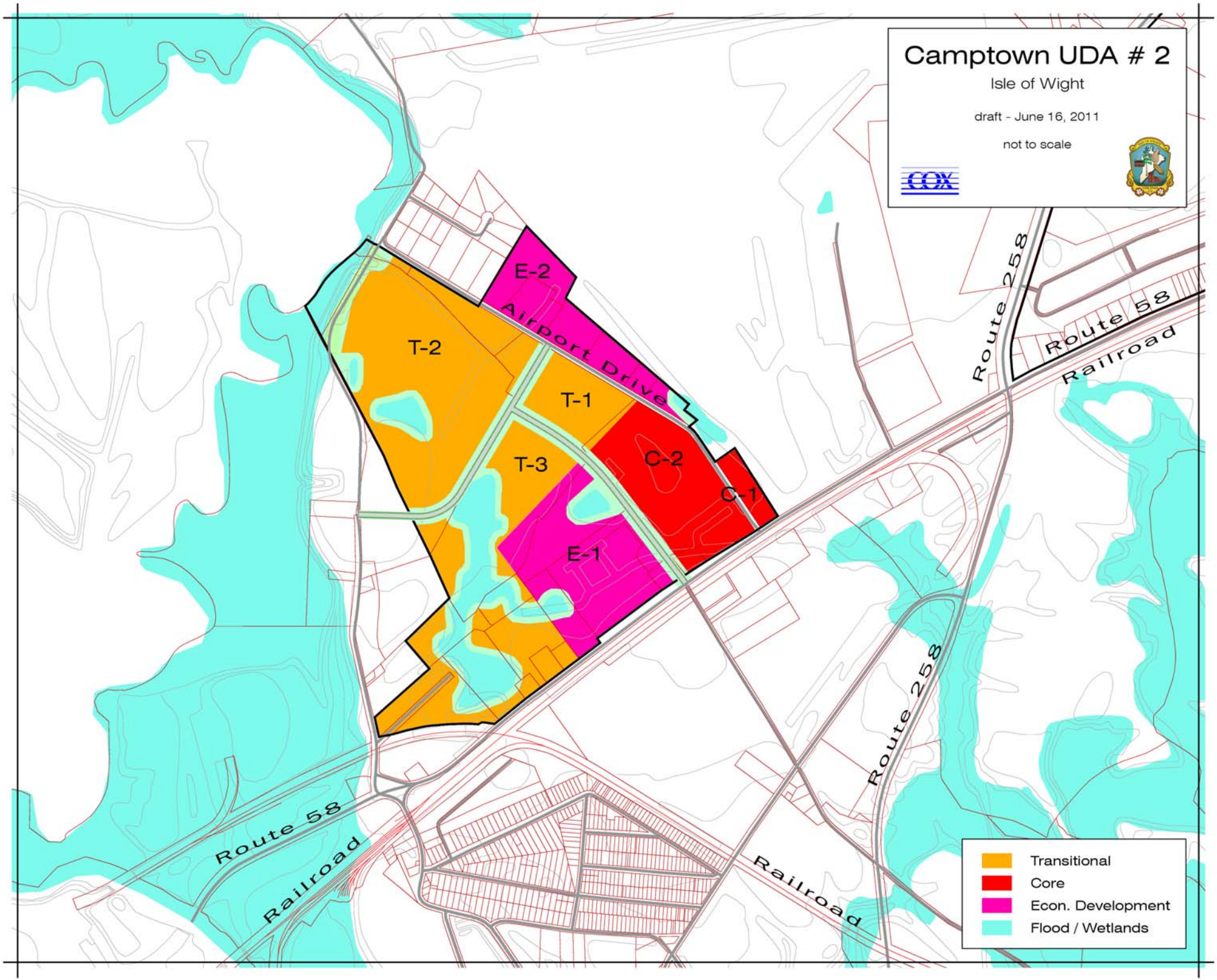
Land Use Type and Category	Min. Density*	Max. Density***	% Allocation	Acreage	Min. Yield	unit	Max. Yield	unit
Transitional Sub-District: Gross Acreage (estimate of total land area designated for sub-district per UDA FLUP)				167				
less: **Estimate of Non-Qualifying Acreage** ****								
Existing or dedicated public rights of way and easements				2				
Existing private land uses (assumes existing economically stable uses will remain for an extended timeframe)				0				
Unbuildable areas (includes areas of geological and environmental hazard)				7				
100-Year Floodplains and designated wetlands (exclusive of FEMA-mapped floodplains; includes potential upland wetlands)				4				
Existing water features (ponds, stormwater management facilities, excluding floodplains and wetlands)				5				
Critical Slopes > 30%				0				
Potential government, civic, park, and institutional uses				12				
Non-Qualifying Acreage Sub-total: (area to be excluded from min. and max. density calculation)				30				
Transitional Sub-District: Net (Qualifying) Acreage (contributing acreage to apply density calculation)				137				
Hypothetical Build-Out Scenario: Assumed Mix of Uses and Densities								
UDA Retail Commercial*	0.4 *FAR*	0.6 *FAR*	20.0%	27.4	477,418	*sfgfa*	716,126	*sfgfa*
UDA Office and Mixed Use*	0.4 *FAR*	0.6 *FAR*	20.0%	27.4	477,418	*sfgfa*	716,126	*sfgfa*
Other Commercial and Economic Development**	0.2 *FAR*	0.4 *FAR*	0.0%	0.0	-	*sfgfa*	-	*sfgfa*
Sub-total: **Transitional Sub-District - Commercial and Employment**			**40.0%**	54.8	**954,835**	*sfgfa*	**1,432,253**	*sfgfa*
Single Family Detached*	4 *du/ac*	6 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Townhouse Attached*	6 *du/ac*	10 *du/ac*	30.0%	41.1	247	*du*	411	*du*
Multifamily/Condominiums*	12 *du/ac*	16 *du/ac*	25.0%	34.3	411	*du*	548	*du*
Live/Work Residential Attached*	6 *du/ac*	8 *du/ac*	5.0%	6.9	41	*du*	55	*du*
Sub-total: **Transitional Sub-District - Residential**			**60.0%**	82.2	**699**	*du*	**1014**	*du*
Transitional Sub-District Total:			**100.0%**	**137.0**				

* *Denotes TND land use categories and minimum densities as defined by and subject to Section 15.2-2223.1.B.1 of the Code of Virginia*

** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development*

*** *Denotes recommended maximum density for individual uses as cited in the draft TND zoning district*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*


Camptown UDA # 2
Isle of Wight
draft - June 16, 2011
not to scale
E-2
Airport Drive
T-2
T-1
T-3
C-2
C-1
E-1
Route 258
Route 58
Railroad
Route 58
Railroad
Railroad
Route 258
Transitional
Core
Econ. Development
Flood / Wetlands

Camptown Urban Development Area #2

Summary of Camptown UDA Sub-Areas: Development Build-Out Potential

Isle of Wight County Future Land Use Map

Land Use Type and Category	Acreage	Use Distribution	Min. Yield	unit	Max. Yield	unit
Camptown UDA #2: Total Gross Area	**197.0**	*(inclusive of major tributary floodplain and stream valley = approx. 22 acres)*				
Camptown UDA #2: Total Development Area ***	**175.0**	**100.0%**				
Sub-total: Non Qualifying Area components ****	39.0	22.3%				
Camptown UDA #2: Total Net Qualifying Area	**136.0**	**77.7%**				
UDA Retail Commercial*	16.9	12.4%	294,466	*sfgfa*	595,030	*sfgfa*
UDA Office and Mixed Use*	14.7	10.8%	256,133	*sfgfa*	499,198	*sfgfa*
Other Commercial & Economic Development**	52.8	38.8%	517,493	*sfgfa*	1,092,485	*sfgfa*
Sub-total: **Commercial and Employment**	84.4		**1,068,091**	***sfgfa***	**2,186,712**	***sfgfa***
UDA Single Family Detached*	20.3	14.9%	81	*du*	122	*du*
UDA Townhouse Attached*	20.3	14.9%	122	*du*	203	*du*
UDA Multifamily/Condominiums*	25.8	18.9%	309	*du*	434	*du*
Live/Work Residential Attached*	5.2	3.8%	31	*du*	43	*du*
Sub-total: **Residential**	71.4		**542**	***du***	**801**	***du***
Camptown UDA #2 Total:	**155.8**	**114.6%**				

* *Denotes TND land use categories as defined by and subject to Section 15.2-2223.1.B.1 of the Code of Virginia.*

** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development.*

*** *Estimate of Qualifying Acreage is based on an approximation of UDA area based on County planning level mapping sources; acreage exclusive of major tributary floodplain*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*

Camptown Urban Development Area #2

UDA Core Sub-Districts: Summary of Development Build-Out Potential

Isle of Wight County Future Land Use Map

Land Use Type and Category	Min. Density*	Max. Density***	% Allocation	Acreage	Min. Yield	unit	Max. Yield	unit
Core Sub-District: Gross Acreage (estimate of total land area designated for sub-district per UDA FLUP)				28				
less: **Estimate of Non-Qualifying Acreage** ****								
Existing or dedicated public rights of way and easements				1				
Existing private land uses (assumes existing economically stable uses will remain for an extended timeframe)				0				
Unbuildable areas (includes areas of geological and environmental hazard)				1				
100-Year Floodplains and designated wetlands (exclusive of FEMA-mapped floodplains; includes potential upland wetlands)				1				
Existing water features (ponds, stormwater management facilities, excluding floodplains and wetlands)				0				
Critical Slopes				0				
Potential government, civic, park, and institutional uses				3				
Non-Qualifying Acreage Sub-total: (area to be excluded from min. and max. density calculation)				6				
Core Sub-District: Net (Qualifying) Acreage (contributing acreage to apply density calculation)				22				
Hypothetical Build-Out Scenario: Assumed Mix of Uses and Densities								
UDA Retail Commercial*	0.4 *FAR*	1.0 *FAR*	40.0%	8.8	153,331	*sfgfa*	383,328	*sfgfa*
UDA Office and Mixed Use*	0.4 *FAR*	1.0 *FAR*	30.0%	6.6	114,998	*sfgfa*	287,496	*sfgfa*
Other Commercial and Economic Development**	0.2 *FAR*	0.4 *FAR*	0.0%	0.0	-	*sfgfa*	-	*sfgfa*
Sub-total: **Core Sub-District - Commercial and Employment**			**70.0%**	15.4	**268,330**	*sfgfa*	**670,824**	*sfgfa*
Single Family Detached*	4 *du/ac*	6 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Townhouse Attached*	6 *du/ac*	12 *du/ac*	0.0%	0.0	0	*du*	0	*du*
Multifamily/Condominiums*	12 *du/ac*	20 *du/ac*	25.0%	5.5	66	*du*	110	*du*
Live/Work Residential Attached*	6 *du/ac*	10 *du/ac*	5.0%	1.1	7	*du*	11	*du*
Sub-total: **Core Sub-District - Residential**			**30.0%**	6.6	**73**	*du*	**121**	*du*
Core Sub-District Total:			**100.0%**	**22.0**				

* *Denotes TND land use categories and minimum densities as defined by and subject to Section 15.2-2223.1.B.1 of the Code of Virginia*

** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development*

*** *Denotes recommended maximum density for individual uses as cited in the draft TND zoning district*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*

Camptown Urban Development Area #2

UDA Transitional Sub-Districts: Summary of Development Build-Out Potential

Isle of Wight County Future Land Use Map

Land Use Type and Category	Min. Density*	Max. Density***	% Allocation	Acreage	Min. Yield	unit	Max. Yield	unit
Transitional Sub-District: Gross Acreage (estimate of total land area designated for sub-district per UDA FLUP)				102				
less: **Estimate of Non-Qualifying Acreage** ****								
Existing or dedicated public rights of way and easements				2				
Existing private land uses (assumes existing economically stable uses will remain for an extended timeframe)				0				
Unbuildable areas (includes areas of geological and environmental hazard)				2				
100-Year Floodplains and designated wetlands (exclusive of FEMA-mapped floodplains; includes potential upland wetlands)				4				
Existing water features (ponds, stormwater management facilities, excluding floodplains and wetlands)				2				
Critical Slopes				0				
Potential government, civic, park, and institutional uses				11				
Non-Qualifying Acreage Sub-total: (area to be excluded from min. and max. density calculation)				21				
Transitional Sub-District: Net (Qualifying) Acreage (contributing acreage to apply density calculation)				81				
Hypothetical Build-Out Scenario: Assumed Mix of Uses and Densities								
UDA Retail Commercial*	0.4 *FAR*	0.6 *FAR*	10.0%	8.1	141,134	*sfgfa*	211,702	*sfgfa*
UDA Office and Mixed Use*	0.4 *FAR*	0.6 *FAR*	10.0%	8.1	141,134	*sfgfa*	211,702	*sfgfa*
Other Commercial and Economic Development**	0.2 *FAR*	0.4 *FAR*	0.0%	0.0	-	*sfgfa*	-	*sfgfa*
Sub-total: **Transitional Sub-District - Commercial and Employment**			**20.0%**	16.2	**282,269**	*sfgfa*	**423,403**	*sfgfa*
Single Family Detached*	4 *du/ac*	6 *du/ac*	25.0%	20.3	81	*du*	122	*du*
Townhouse Attached*	6 *du/ac*	10 *du/ac*	25.0%	20.3	122	*du*	203	*du*
Multifamily/Condominiums*	12 *du/ac*	16 *du/ac*	25.0%	20.3	243	*du*	324	*du*
Live/Work Residential Attached*	6 *du/ac*	8 *du/ac*	5.0%	4.1	24	*du*	32	*du*
Sub-total: **Transitional Sub-District - Residential**			**80.0%**	64.8	**470**	*du*	**680**	*du*
Transitional Sub-District Total:			**100.0%**	**81.0**				

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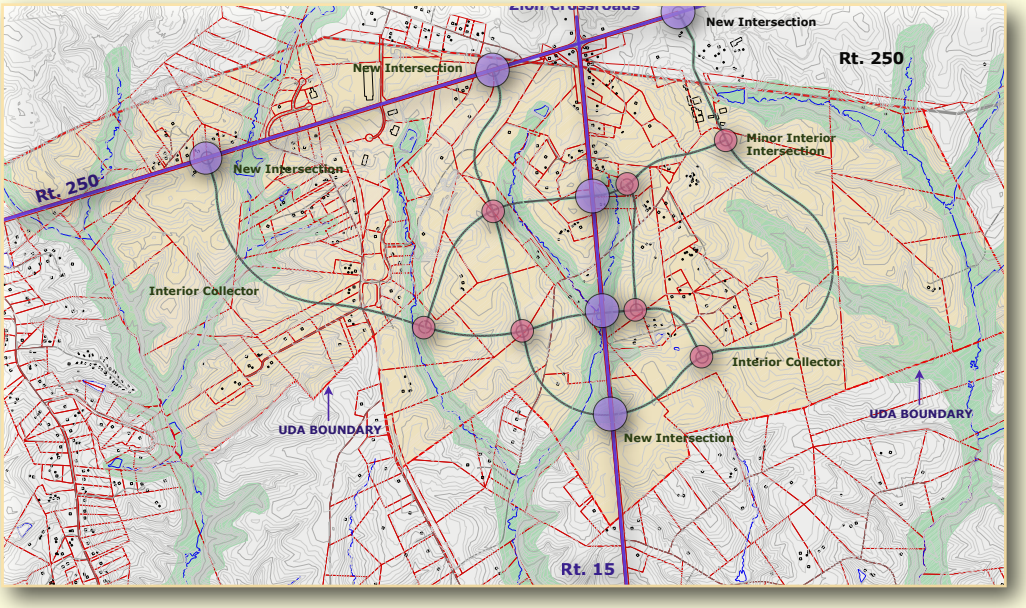
** *Denotes other potential land use categories within the designated UDA; minimum and maximum density established by Code of Development*

*** *Denotes recommended maximum density for individual uses as cited in the draft TND zoning district*

**** *Estimate of Non-Qualifying Acreage is based on non-quantitative observations of planning level mapping sources and rule of thumb estimates for other non-qualifying components.*

APPENDIX B.
Transportation Benefits Studies

Zion Crossroads Development Area
Fluvanna County
Comprehensive Plan Update



Report #7:

TND TRANSPORTATION BENEFITS

July 11, 2011

prepared by: The Cox Company • Charlottesville, Virginia

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TND TRANSPORTATION CHARACTERISTICS

Introduction

This report examines the benefits of TND transportation principles as they apply to transportation efficient land use in the Zion Crossroads UDA. At its core, TND forms of land use provide an interconnected grid street pattern, designed to safely accommodate vehicles, pedestrians, and bikes, with an emphasis on placing commercial, civic, and residential uses in close proximity to each other. The application of TND transportation efficient land use concepts within the Zion Crossroads UDA has the potential to make significant enhancements to the efficiency and effectiveness of this developing area's existing transportation framework.

As it now stands, the Zion Crossroads UDA, with an unorganized structure to its minor public street and private road network, has to rely upon Rt. 250 and Rt. 15 to serve all traffic demands. With its close proximity to a major Interstate 64 interchange to the north of Zion Crossroads, the 2000-acre UDA has abundant capacity to absorb growth, but has limited capacity, at present, to adequately accommodate the projected traffic volumes that will accompany this growth. Thus, with (1) no secondary road interconnectivity, (2) no pedestrian infrastructure, (3) large lot residential development, and (4) isolated commercial and industrial land uses, nearly all trips within the UDA must be by car or truck. In addition, the existing secondary roads within the UDA have awkwardly spaced intersections, meaning most travel internal to the UDA must use the arterial Routes 250 and 15 for local trip purposes. These roads also serve as a commuter corridor to I-64.

The following sections will examine the opportunities and benefits of TND transportation planning and implementation techniques resulting from:

- Transportation Efficient Land Use
- Reduced Trip Generation and Internal Capture
- Increased Transportation System Efficiency
- Reduced Travel Times and Signal Wait
- Relationship to Regional Transportation Network
- Pedestrian and Non-Car Trips

Transportation Efficient Land Use

The planning for and implementation of coordinated TND land use and transportation patterns in Zion Crossroads can offer significant transportation benefits as this area of the County grows. This will result in new development and redevelopment generating fewer, and shorter, vehicular trips than what is currently evidenced by the "status quo" land use patterns in the County. The rise of Traditional Neighborhood Development as a planning and land use trend over the past 20 to 30 years is due in part to its many transportation advantages and benefits when compared to conventional suburban planning and development patterns. Ongoing planning efforts for Zion Crossroads will be able to reveal the area's physical potential to identify, reserve, and implement a system of

interconnected TND streets that will provide excellent long-range benefits to the County, in general, and the I-64/250/15 road network, in particular.

The benefits of strengthened and coordinated land use transportation planning in the Zion Crossroads UDA can extend to everyone who lives and works there, and also to local government and citizens of the larger region. Many of the benefits of TND streets can be measured in terms of increases in system capacity, greater choices to satisfy travel demands, shorter travel times, construction cost savings, and reduced maintenance. On the other hand, other (equally important) attributes are linked to less scientific quality of life, esthetic, and safety factors. The challenge to the County is to ensure that individual property and business owners in the UDA appreciate the value of working hand-in-hand to guide growth in future decades in order that the *"whole is greater than the sum of the parts."* At present, existing land uses and access arrangements in the UDA are disjointed and, as a whole, are not structured to complement the levels of predicted growth in the County. However, the 2000-acre planning area possesses great opportunities to accommodate higher density economic development, residential neighborhoods, civic facilities, and a new network of efficient streets that will reap benefits for both the private and public sectors.

Reduced Trip Generation and Internal Capture

A master planned TND street network for Zion Crossroads has a distinct advantage over the continued proliferation of exurban transportation patterns in that it can reduce the overall traffic burden on the County's regional traffic system as well as the number of vehicle trips that are generated. While today's traffic volumes impacted the I-64/250/15 roadnet cannot be classified as "congested", predicted traffic volumes over the next generation will inundate the Zion Crossroads' exurban road system if transportation efficient land use planning is not pro-actively pursued. It will no longer function as the rural "crossroads" of prior generations.

A main focus of TND communities is their mix of uses that combines residential, civic, institutional, and commercial uses into one project on one site, as opposed to creating an enclave or a geographically isolated project serving an individual use. A resident of a typical TND community would be able to complete certain daily tasks, like grocery shopping, dropping a child off at school, or going out for a meal, without leaving the community. With tighter knit neighborhoods, the vehicle does not need to be used to satisfy each and every trip purpose.

In contrast, these same tasks in a single use exurban or suburban community would require leaving a residential development and driving on an arterial highway or major collector road to a commercial development. Trips by TND residents that are made without leaving the TND are called internal capture. These are trips that are shorter, more accessible, safer, and, in some cases, can be substituted by pedestrian trips.

Care must be taken in measuring and assessing traffic impacts as the UDA develops. When analyzing traffic impacts for new developments, the Virginia Department of Transportation regulations allow for up to 15% of all trips by TND residents to be considered as "internally captured." This means 15% less traffic placed on existing external roads. The greater the allowable rate of "internal capture", the greater the level of savings in right of way requirements, existing road widening, turn lanes, and

signalization. While the VDOT factors are conservative, actual case studies comparing TND to conventional exurban and suburban projects in Virginia and other states have realized even better rates of internal capture, with 25%-30% or more of trips staying within the TND. These traffic projection techniques and trip characteristics will be examined in greater detail in a subsequent section of this report.

In summary, a well planned mix of uses, with residences in closer proximity to employment, schools, and shopping needs, has the potential to reduce overall traffic impacts on Zion Crossroads' major connectors by significant rates.

Increased Transportation System Efficiency

The key difference between TND street patterns and those found in conventional large lot rural subdivisions and "destination" suburban developments is that the TND establishes an interconnected grid of streets. Most sprawl subdivisions use a disconnected pattern of streets with many cul-de-sacs and several high-volume collector roads, resulting in increased trip numbers and trip lengths. The overall effect of the TND grid pattern is to divide neighborhood traffic between many small streets rather than concentrate it on a few large collector roads.

Traffic analyses employing commonly accepted Highway Capacity Manual calculation methods for these two types of street networks clearly reveal that a compact network of small interconnected streets has more traffic capacity than the same street area combined into large collector streets. Intersections, not travel lanes, control the capacity of a street system, and left hand turning movements represent the critical factor that impacts capacity reduction. The typical TND network reduces the loading of left hand turning movements by distributing traffic to and through a larger number of intersections, allowing the entire system to carry a greater load. The net benefit is fewer travel lanes, fewer traffic signals, and fewer traffic accidents while increasing overall system effectiveness.

The overall transportation system capacity of Zion Crossroads is currently dictated by the capacity of Routes 250 and 15. By adding alternative and parallel interior routes linking these arterials, overall UDA system capacity can be increased, and traffic congestion at key points improved. The accompanying schematic transportation concept plan for the UDA illustrates how new alignments for secondary collectors and residential streets could expand and transform the roadnet into a highly efficient and interconnected system.

Reduced Travel Times and Signal Wait

While TND streets have many small, relatively quiet intersections, a locality's major collector and arterial roads typically have very large, complex, and unsafe intersections. This phenomenon does not happen overnight and is typically the result from years of (a) road widenings of the existing system, (b) lack of planning foresight in designating transportation system alternatives, and (c) an inability to select and reserve rights of way for new improvements. The application of transportation efficient land use for new development can better anticipate travel demand characteristics and respond with a street system that reduces travel times and waiting at stop lights.

In a TND, all internal streets should be considered "local" with the express purpose of providing direct access to community land uses via a hierarchy of narrow travel lanes with on-street parking. More complex collector intersections require multiple lanes, a variety of turning lanes, and traffic signal cycles for a variety of movements, all leading to longer waits at traffic lights and reduced system capacity. The transportation network goal should be to plan for sufficient intersections within the community in order to stay below the traffic warrant thresholds for signalization. When the TND pattern spreads traffic over several smaller roads, traffic at these intersections may fall below rates at which signalization is warranted, or, if a signal is necessary, its cycles will be less complex and less time consuming.

Intersections in and around Zion Crossroads are of mixed characteristics, but they cannot be considered as efficient. While traffic demands for improved service levels are only a decade away, street intersections with Routes 15 and 250 are not designed to function at an arterial level. On the other hand, local roads have highly variable design characteristics; some functioning as private access to businesses while others function as rural streets serving large lot residential development.

Relationship to Regional Transportation Network

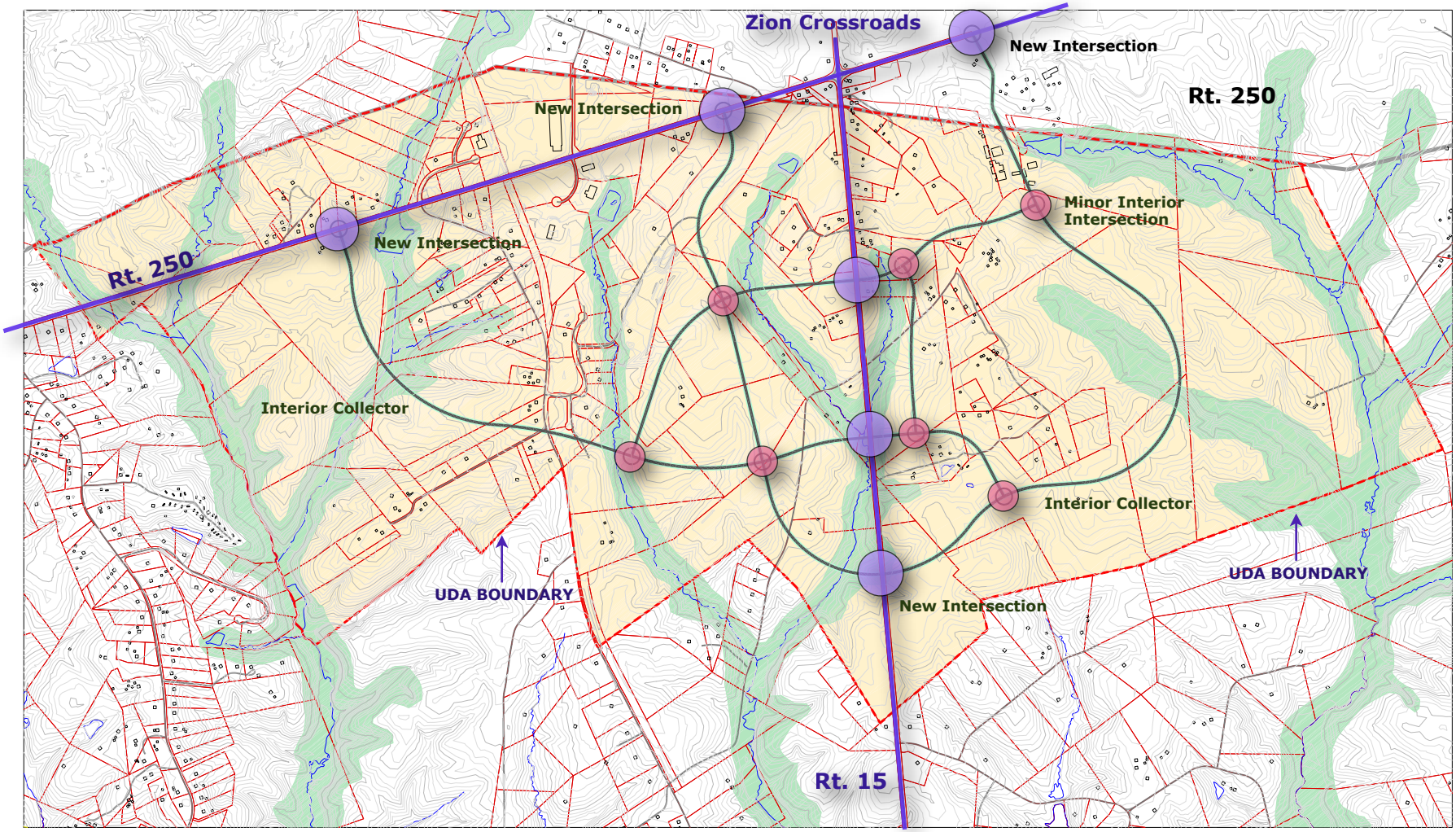
An additional feature of TND street patterns is the ability to establish interconnections with adjacent TND developments and other mixed-use projects. Sprawl subdivisions are typically self-contained, having a single entrance from a major collector road. The impact of this has been witnessed elsewhere in Fluvanna County. Moreover, this is common to many rapidly growing Virginia localities that have experienced increased frontage development pressure on their arterial highways but little in the way of contiguous collector and local street improvements. This means that to visit an adjacent development, a resident would have access the arterial highway (Route 250) or a major collector/minor arterial road (Route 15) and then enter the adjacent development.

Arterial highways are intended to serve regional traffic patterns, with limited access to private properties, the I-64/250/15 roadnet currently serves both regional and local traffic, creating conflicts that, in the future, will be increasingly more difficult to resolve. While traffic engineers can ascribe high (theoretical) capacity ratings to arterial and major collector roads due to their geometric characteristics, in reality, their functional capacity and operating speeds are often much less than predicted due to the phenomenon of "side friction" form poorly planned commercial access and public streets that lack interconnectivity. Arterials located in locales that lack interconnectivity attract dense commercial growth along their frontage. In effect, traffic is funneled to commercial centers from a wide catchment area, creating traffic characteristics that are unbecoming to the original purpose of the arterial.

In general, regional arterial systems are not designed to function well with high levels of frontage access, but commercial traffic cannot be restricted unless local zoning laws become extremely onerous. As evidenced in other locales along the Route 15 Corridor the latter is fraught with political obstacles. The result is increased travel time and trip distance while further diminishing the capacity and function of the existing system. Over time, as arterial traffic increases, the trend is typically to add more lanes to the existing system rather than building another way to access the developed commercial areas: In the long run, this rarely fixes the problem.

Zion Crossroads
UDA Transportation Opportunities

Concept #1



With TNDs, connections to adjacent developments are encouraged as part of an overall grid street system. In this system, a TND resident can access adjacent developments using internal streets built by the TND developers instead of using the external collector road that must be improved at public expense. An interconnected TND system also benefits by accommodating reasonable levels of diverted traffic movements when other peak-hour routes are operating at full capacity. In a region that grows by building multiple TNDs, regional traffic can be shared over many roads rather than crowding a single collector. In Zion Crossroads, transportation efficient TND growth could "contain" local traffic, preventing some car trips, in fact, from ever needing to use either Route 15 or 250.

The Virginia secondary street acceptance requirements (SSAR) provide effective guidelines for VDOT and localities to coordinate and promote interconnectivity between future developments. Continued attention to comprehensive transportation planning throughout the County is essential. A subsequent section of this report addresses the applicability and benefits of the Official Map for this purpose.

Pedestrian and Non-Car Trips

The density, mix of uses, and connected streets that are key features of all TNDs make it possible to navigate new development, and possibly nearby areas, without a car at times. TNDs should ideally place new residential development within a walkable distance of new and existing commercial development. While this doesn't mean that cars aren't necessary in TND communities, it does mean that certain trips, for shopping, dining out, or visiting neighbors, might be short enough to consider walking or bicycling. The narrower TND street with a more compact intersection design and smaller curb radii better accommodates pedestrians and cyclists in a safe and comfortable way to make non-car trips more desirable.

TND transportation guidelines encourage reduced lateral clearance between the street lanes and street trees and other forms of landscaping, thereby creating a natural, more attractive form of traffic calming. Further, with a well planned, interconnected street system, pedestrians and cyclists have the option to select safer and quicker routes based on their knowledge of real-time traffic conditions in their neighborhoods. Unfortunately, road building in Virginia has tended not to emphasize pedestrian improvements, with cost cutting measures penalizing opportunities for pedestrians and bicyclists.

The number of trips made without a car will vary widely depending on the features of village, as well as factors like weather. However, case studies of TNDs reveal high levels of internal traffic capture, showing that among people shopping and dining in TND commercial areas, as many as 18% had traveled there on foot. This represents an 18% reduction in traffic over single-use suburbs where no walking trips are possible due to long distances and unfavorable conditions between residential and commercial areas.

The challenge for future transportation improvements in the Zion Crossroads UDA will be to implement consistent design standards that work coordinatively to enhance capacity. This study points to the need for a comprehensive transportation planning study of the Zion Crossroads UDA that focuses on opportunities for (a) interconnectivity, (b) intersectional capacity enhancements, (c) upgrade of existing interior streets, and (d) integration of new street systems with existing roads.

TRANSPORTATION & INFRASTRUCTURE SAVINGS

TND-Scaled Blocks

Due to more compact TND densities of four or more dwelling units per acre, a TND street with a given number of units is much more compact – both in length and in width – than a conventional subdivision or rural road lot development containing the same number of homes. This means more homes organized in a safe and efficient pattern on a given length of street. TND principles encourage mixed housing types within an appropriately scaled block. The result is that individual residential lots in this more dense configuration have, on average, narrower lot widths than do conventional lots. Further, the grid orientation of proportioned blocks and shorter neighborhood streets reduces the often meandering interconnections between suburban subdivisions.

The following illustration presents a hypothetical 420-foot residential block with typical lot layouts for both a TND block and a conventional residential subdivision. As depicted, an arrangement of conventional residential subdivision lots – 1/3 to 1/4 acre each with 100'+ frontages – are sited to front on a 420-foot section of street, this length being typical of an average TND block length. The resultant yield is only 3 houses. The prototype TND block is shown to accommodate a mix of dwelling types, with lots from 20-feet wide for townhouses to 50-70-feet wide for single family dwellings. For the TND lot arrangement, the same 420' length of street accommodates 10 houses.

As an additional benefit, the prototype TND street has narrower lanes, and provides parking on the street. Houses are sited relatively close to the street, often with garages on an alley in the rear. In the conventional exurban or suburban model, wider streets and rights of way lead to longer driveways that access homes set well back from the street or rural road.

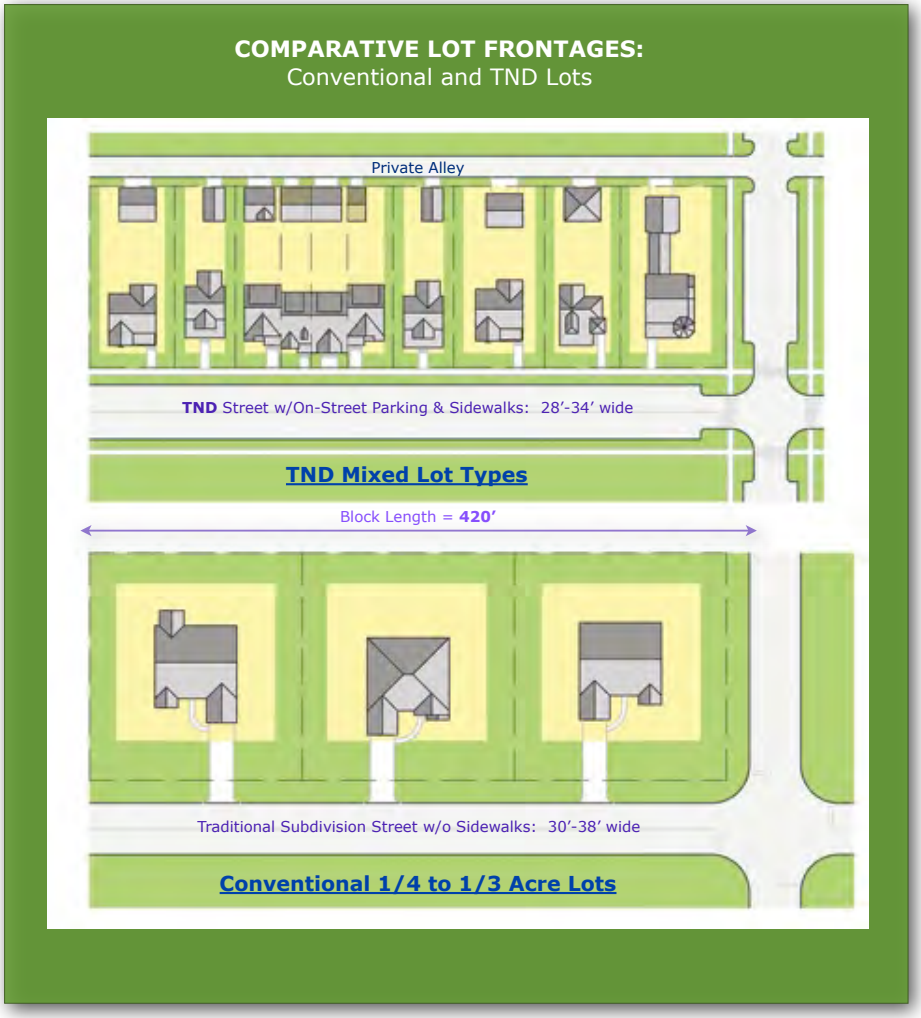
Existing residential in Zion Crossroads tend to fit a more exurban residential lot model, with relatively large lots. Residential lots in and around Zion Crossroads tend to have much wider frontages, with some as wide as 400' to 600'. Obviously large residential lots can be very attractive and serve a particular market, but all of the 18,000 new residents projected for Fluvanna County by 2030 may not be able to locate on residential properties of this size. The combination of transportation efficient land use planning principles and TND street design provides an option.

Reduced Street Widths

Traditional Neighborhood Developments are typically designed around much narrower street cross sections than those found in conventional suburban subdivisions. These narrow streets serve to slow traffic, increase safety for pedestrians, help meet the community's goals of higher density, and also to lower infrastructure costs. These narrow streets of course require less surface pavement, but also save on foundation materials, pavement depth, turns lane length, and other factors due to their lower design speed. Further studies will need to be conducted to determine whether existing narrow roads, lacking curbing and sidewalks, serving UDA land uses could be upgraded to better meet the street section guidelines presented earlier.

On-Street Parking

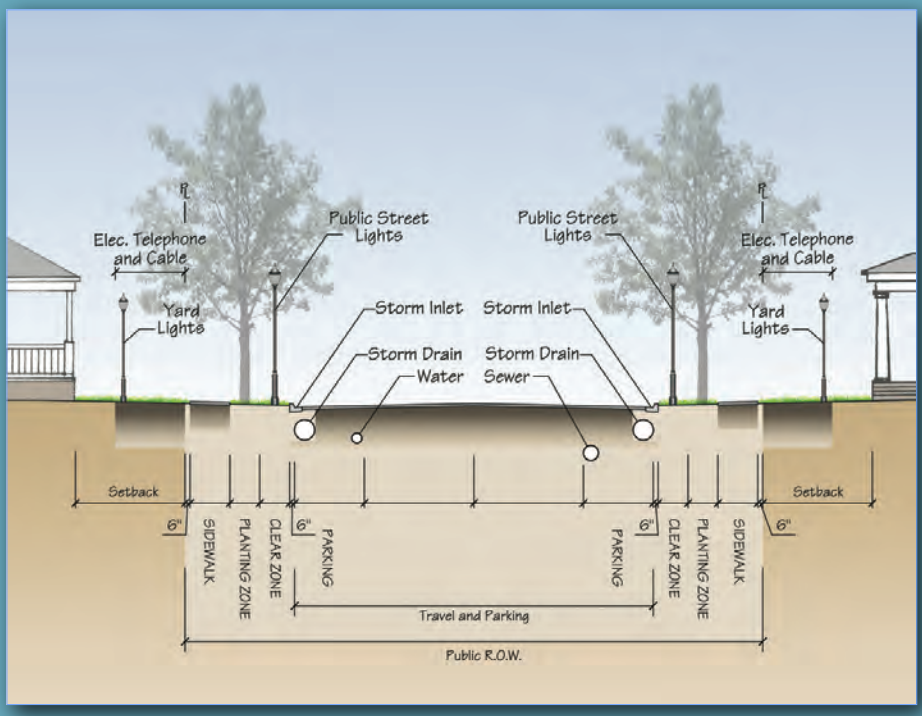
Parking within a master planned TND is primarily located along streets and not in private surface lots and driveways at the front of residences, as seen in many sprawling suburbs. This means less pavement overall dedicated to on-street parking as parking lots provide spaces and aisles, while on-street parking uses the travel lane to serve the aisle function. Many conventional residential suburbs actually are planned for on-street parking, but with ample private driveway access in front of each home, the on-street spaces are awkwardly spaced, very inefficient and rarely used, being located a considerable distance from the residence. Outside of cost alone, this on-street parking solution is more attractive, brings buildings closer to the street, and serves pedestrians better than suburban methods.



More Efficient Utility Systems

Another result of transportation efficient land use is the ability for TND blocks to serve larger numbers of homes with shorter lengths of utility infrastructure. As with savings in travelway improvements, more residences on a block will be served by a given length of utility service for sewer, water, electric, cable, and other public services. Storm drainage systems can be proportionally reduced by virtue of reduced public street pavements, smaller lot sizes, and impervious surfaces.

While TND street systems may demand a more complex engineering approach to infrastructure design, the greatly reduced lengths of essential improvements can markedly reduce capital and maintenance costs on a per lot basis for both construction and maintenance. In addition, narrower streets allow for shorter lateral stub-outs to individual lots and buildings for public water, sewer, electricity, gas and the like.

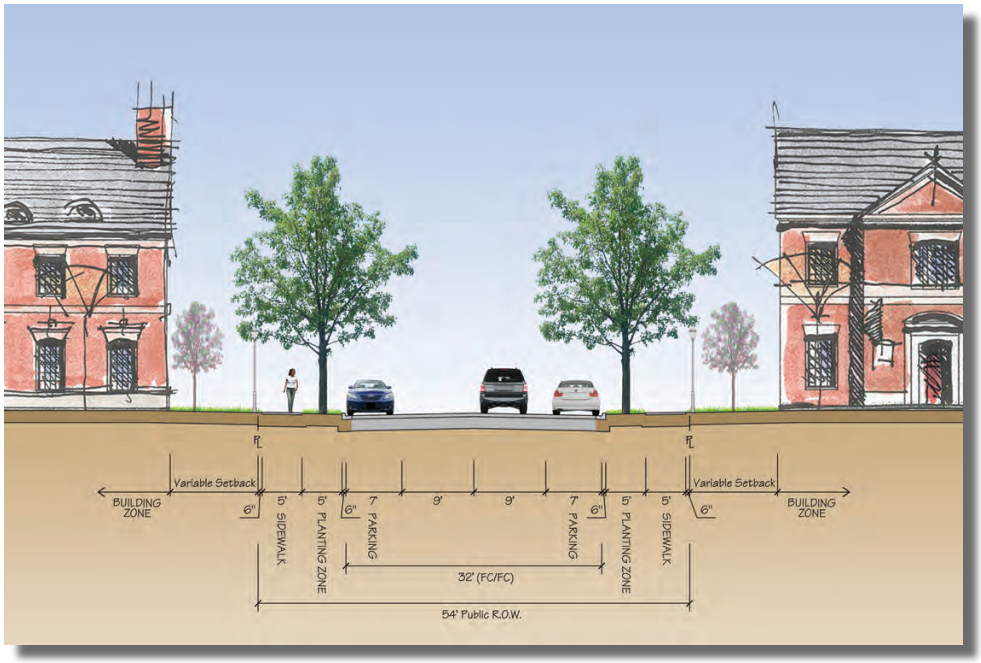


Conceptual Streetscape Plan:
TND Landscape, Hardscape and Infrastructure

For TNDs to achieve the desired intent, it will be necessary in many jurisdictions for VDOT, private utility companies, quasi-public authorities, and local governments to rethink and revise suburban engineering standards. It is well documented that individual utility bureaucracies are "turf conscious" when confronted with requests to modify long-

entrenched standards and criteria. However, for TND design concepts to be effectively implemented, local governments will have to take the lead in orchestrating new design construction standards for transportation efficient land use. It will be essential for all public and private agencies and departments to embrace a new engineering paradigm for compact infrastructure placement, coordinated utility alignments, shared easements, reduced rights of way, landscape placement, curb returns, crosswalks, and modified geometric requirements.

The combined effect of the infrastructure savings mentioned here is to reduce the cost of building TND developments as compared to conventional suburban sprawl developments. The economic benefits of potential infrastructure savings have been measured in a 2009 study for the EPA to be in the range of 32% to 47%. Also, while these benefits to transportation and other infrastructure are directly measurable, some of the more subjective elements of a coordinated TND street and infrastructure system produce additional aesthetic and quality of life benefits that, while difficult to quantify, are no less important.



*Prototype **TND** Residential Street, with 2-9' Travel Lanes, On-Street Parking, Roundabout Intersections, Sidewalks, Street Lights, Landscaping and Curb and Gutter.*

OTHER TND BENEFITS

Safer Streets

The inherently slower speed of TND streets, such as those presented earlier in this document, when compared to highways and suburban collector roads means greater safety for drivers and pedestrians alike. With cars slowed to reasonable in-town speeds, pedestrians are more easily seen by drivers and have more time to cross streets to reach their destinations. Slower automotive speeds also increase safety for drivers, with damage and injury reduced when collisions do occur. A study by Swift and Associates determined that the safest streets were those built 24 feet wide. Despite this, many suburban zoning codes require streets to be built at a minimum of 36 feet wide.

Transit Compatibility

The benefits of public transit are well established, including reductions in traffic and parking demand, as well as cost savings to the individual transit commuter. However, transit cannot deliver these benefits when combined with the very low densities of typical suburbs. A transit stop must be located within a short walk of a substantial number of homes or businesses in order to make the transit system useful. The compactness of TND development makes public transit a viable option. A typical TND town or neighborhood plan is organized around a town center or main street where density or activity is highest. Places like these are ideal locations for transit stops. Future bus service from Zion Crossroads, such as commuter service to Albemarle County and Charlottesville destinations could take advantage of these benefits.

Improved Emergency Response

Another safety issue presented by sprawling and disconnected suburban streets is their effect on emergency response by fire and rescue services. Sprawling suburbs mean longer distances to travel between fire and rescue facilities and some homes, while the

disconnected nature of cul-de-sac streets means traveling indirect routes to answer calls. The proximity and connectivity of TND communities has the potential to shorten emergency response times.

Less Time on the Road

Density and mix of uses puts daily shopping, employment, and entertainment needs within much closer proximity to residential areas. This proximity reduces time spent commuting and adds to residents' free time.

Quality of Life

Quality of life in TND communities is difficult to measure but is apparent in more ways than one. The goal is to create roads and neighborhoods that have a human scale and functionality. TND communities might be described as healthy for two principal reasons.

First, these places tend to have much greater levels of neighborhood social interaction, with residents experiencing a sense of belonging to a community. In effect, they are more "livable". This community vitality promotes the development and serves to attract new residents and businesses, as well as to further promote the TND pattern for future developments. Second, the individual residents of a TND may see health benefits from walking or bicycling within the community in ways that aren't seen in conventional suburbs due to the safety concerns of walking or cycling where appropriate facilities are not present, or where greater travel distances and high speed traffic discourage anything but automobile travel. Right of way landscaping, civic spaces, street lighting, clearly identified crosswalks, and coordinated streetscape elements also attribute to the quality of life in a TND.

TND land use and transportation planning principles yield attractive landscapes, gathering places, and civic spaces to complement both residential and commercial development.

COMPARATIVE TRAFFIC IMPACTS

TND *vs.* Conventional Development Patterns

The primary transportation goal for the TND form of development in the Zion Crossroads UDA should be to promote appropriately scaled, interconnected streets that supplement and enhance the existing arterial highway and local street system. This will require both new transportation improvements and traffic engineering strategies to reduce traffic volumes. This section addresses the latter, traffic reduction. The overall aim is to establish a transportation plan for the Zion Crossroads UDA in order to (1) reduce pressure on the Route 250 and 15 Corridors, (2) improve the function of the existing interior local street network, and (3) expand options for Zion Crossroads traffic origins to be distributed to new streets and strategically placed intersections accessing the Routes 250 and 15 arterial network that serves the larger, multi-jurisdiction region.

This study reveals that traffic patterns influenced by well planned TND projects with the Zion Crossroads UDA could significantly reduce external traffic impacts on local streets as well as the arterial corridors when compared to traffic created by the "destination" patterns of land development in Fluvanna County (and surrounding locales) over the past generations. Destination land use patterns are represented by self contained subdivisions, rural residential lots, and isolated commercial establishments that have no means of inter-connectivity other than via the Route 250 and 15 corridors.

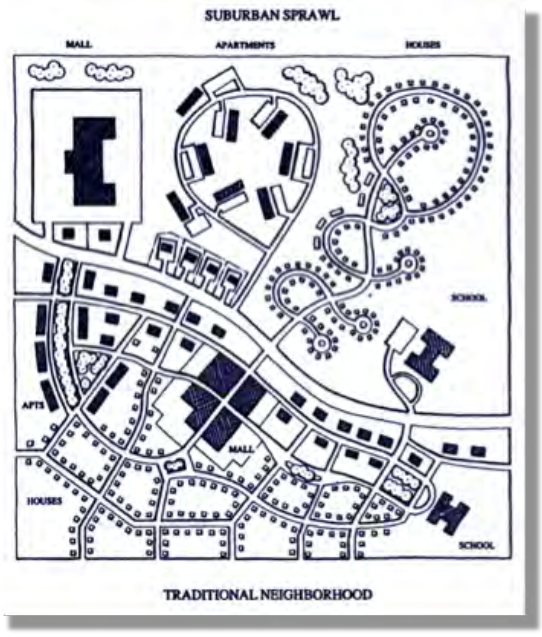
Added to TND traffic reductions are the long-range benefits that result from:

(1) development of new alignments for future local streets within the Zion Crossroads planning area,

(2) selected street improvements to existing Zion Crossroads roads and private streets, and

(3) continued pursuit of future alternative modes of transportation (pedestrian, bike, commuter parking, transit and bus service, etc..)

Employing the TND traffic planning principles cited herein is crucial to improving local traffic patterns within the UDA, given its close, but geo-politically and physically constrained, proximity to Interstate 64. It is clear that (a) Routes 250 and 15 will always remain the local arterial corridors inasmuch as no other supplemental arterial alignment options exist in and



TND/UDA Development w/Arterial Frontage

Neighborhood street interconnectivity
Commercial access from internal streets
Maximize internal capture and bypass movements
Maximize pedestrian and bike opportunities
Promote neighborhood schools and facilities
System attracts diverted trips

around Zion Crossroads, (b) existing local roads have limited capacity as well as connectivity to Routes 250 and 15, (c) Zion Crossroads will attract significant growth over the next 20-50 years, and (d) there are potential future new road network opportunities within the UDA that could be reserved for future collector and local street alignments to relieve the "hour glass" traffic constriction at Zion Crossroads. In response, it is important that the future UDA land use and transportation planning efforts be focused and coordinated to upgrade the character, quality, quantity, and capacity of the UDA's internal traffic patterns.

TND Trip Analysis Objectives

The preceding sections of this "TND Transportation Benefits" report have examined the qualitative transportation benefits and opportunities inuring to the implementation of TND forms of land use in the County, in general, and the UDAs, in particular. While it is not the purpose of this section to present a detailed quantitative traffic impact assessment, it is helpful for comparative purposes to evaluate the daily and peak traffic volumes that will be generated by future demographic and employment demands in Zion Crossroads.

The key traffic planning question to be addressed is: *"Will TND development in the Zion Crossroads result in greater or diminished traffic demands and corresponding impacts on the County's existing highway network when compared to the "status quo" forms of development in the County over the past several generations?"*

TND Traffic Demand Projections

This section employs the *"simple method"* for comparative traffic projections, revealing only a comparative, macro-level traffic assessment based on the two separate future land use scenarios. While this method is an imperfect technique for use in project-specific TIAs (such as VDOT 527 studies), it works well at a macro-level to assess comparative impacts of varying forms of land development.

The technique compares and contrasts traffic volumes that would be generated by:

(1) conventional approaches for land development of future UDA-defined land uses, assuming that these uses were located throughout the County, absorbing the predicted levels of UDA population and employment growth, and

(2) the same amount of UDA-defined growth absorbed by TND forms of development within the designated UDA.

The focus of this analysis is to assess the impact of new traffic on the existing County transportation system – particularly the Route 250 and 15 corridors – recognizing its limitations for substantial enhancement and expansion. Thus, the comparative analysis examines only the impacts of future UDA-defined residential and commercial land uses. The model does not attempt to generate estimates of existing land uses and projected background traffic created by non-UDA defined uses (manufacturing, warehousing, government, and education). While there are many factors that can influence the future traffic volumes, the *"simple method"* provides a generalized, but reliable technique to

analyze the potential to realize reductions in TND transportation impacts attributable to future growth on its existing transportation system.

Since TNDs, by virtue of their compact density, distribute internally generated traffic within a more narrowly defined geographical region, the localized traffic benefit is realized through the distributed patterns for this traffic via interconnected street patterns. This also reduces the concentration of net traffic demands on the external street system at single points of intersection. In contrast, the model reveals that the same development density scattered throughout a much larger geographical area does not benefit from reductions resulting from shared land use patterns.

As previously indicated in this report, the County's population and employment projections have been translated into land use demands for the 2010-2020 and 2010-2030 growth horizons. Regardless of whether these demands are satisfied by the "status quo" land use patterns of prior decades *or* by compact TND forms of mixed-use within the designated UDAs, the demand-based land use projections represent the independent variable in calculating future increases in traffic volumes. The accompanying chart summarizes the predicted population distribution by housing type as well as the projected employment demands in terms of spatial requirements for new or redeveloped facilities.

***Internal Trip Capture is a product of Transportation Efficient Land Use**:*
TND land use encourages the linkage of individual neighborhoods that, in turn, reduces travel demands on the external highway network and encourage pedestrians to make more frequent walks to parks, recreation, commercial and nearby residences.

Traffic Modeling Limitations

There is no consensus amongst state transportation agencies and private sector traffic consultants on the techniques and factors that are used to calculate the traffic a TND project contributes to the surrounding local and regional road net. This is, and will continue to be, the subject of debate between traffic planning experts that extends beyond the scope of this study. In spite of the research, real world experience has shown that this is not an exact science. However, for the purposes of demonstrating the transportation benefits of TND projects, the qualitative and quantitative factors and other assumptions employed by the *"simple method"* allow for an adequate *"big picture"* comparison between (1) compact, mixed-use TND forms of development *and* (2) suburban-styled development patterns characterized by conventional subdivisions and destination uses.

The primary resource supporting the comparative trip estimates in the accompanying *"simple method"* model is derived from the most recent research: "National Cooperative Highway Research Program, Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Development" published by the Transportation Research Board in 2011. The objective of this extensive $250,000 study was to produce a methodology for enhancing internal trip capture estimates that included: (1) a classification system of mixed-use developments that identifies the site characteristics, features, and context that are likely to influence internally captured trips and (2) a data-collection framework for quantifying the magnitude of internal travel to and around mixed-use developments to determine the appropriate reduction rates. It determined that the ITE methodology employed by many DOTs throughout the United States have consistently overestimated traffic while it rarely underestimated traffic.

The TRB's research team proceeded to collect and conduct new studies of TNDs in an effort to (1) rethink the efficacy of continued use of certain institutional "rules of thumb" for capture rates, and (2) present an improved methodology for traffic assessments of this form of development. Given that this study presents the most up-to-date, state of the art approach for developing TIA models, it is highly commended to those professionals in the traffic planning field. While the report recognizes the contribution of the methodologies presented in the ITE Trip Generation Handbook, it cites that the framework for mixed-use development traffic analysis is based on a limited set of data and advises professions in both the public and private sector to *"collect additional data if possible."*

Internal Trip Capture for TNDs

The dominant variables in such an analysis are (a) internal trip capture, (b) pass-by trip reductions, and, in special cases, (c) trip diversions.

"Internal trip" capture is one of the unique transportation characteristics of TND projects that distinguish them from conventional (or "status quo") forms of development. Within TNDs, there is a greater opportunity that an enhanced percentage of internally generated trips will have both origins and destinations within the project itself. These trips, which are known as "internal" trips, do not typically impact the external street network. As a result, the portion of travel demands that are internal to the Zion Crossroads UDA results in an external trip generation estimate that is substantially lower than if the on-site land uses are located as stand-alone sites, scattered throughout the County. Thus, the "internal

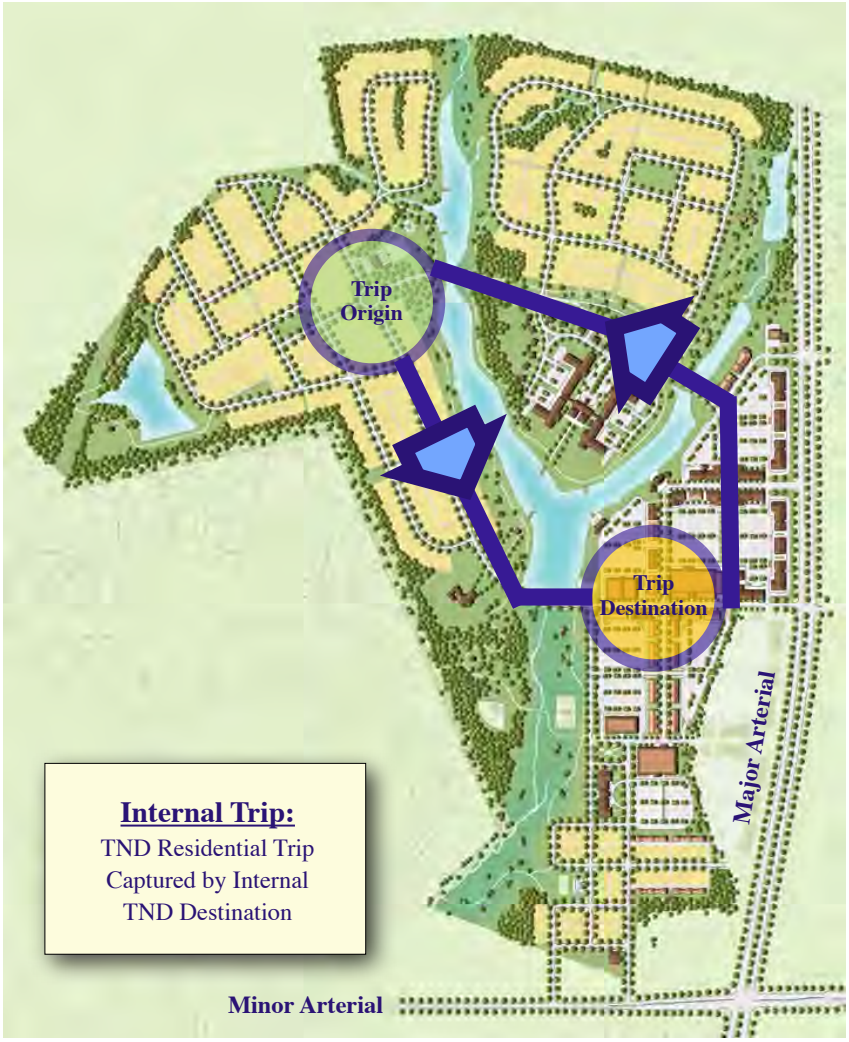
capture rate" provides an essential "tool" for calculating the TND benefits that are realized from combining pedestrian, bicycle, and other forms of travel mode with residential, employment, shopping, recreation, and educational opportunities that are within immediate proximity to each other.

The accurate estimation of internal trip capture for TNDs is an essential element of the transportation planning process. Over-estimating internal trip capture could result in the traffic infrastructure in and around the site being inadequate for the real levels of traffic demand. This would result in breakdowns in level of service and costly future upgrades and right of way acquisition. Underestimating internal trip capture, on the other hand, could lead to excess street improvements and capacity, with the County or developer paying more than necessary to mitigate the traffic impacts of the proposed project.

At present, Zion Crossroads has a relatively non-conforming, incomplete, and aging network of local business and large lot residential streets in the planning area. This is coupled with major deficiencies with the water, sewer and drainage infrastructure. For this reason, it is important to consider the long-term impacts of growth and attendant internal traffic demands, inasmuch as Zion Crossroads will be an attractive location for residential and business opportunities in the years to come. Redevelopment and infill projects are the most probable forms of future land use.

In summary, mixed use projects in Zion Crossroads that result in substantial levels of internal trip capture will be an asset while absorbing growth that would otherwise be scattered to "destination" locations throughout Fluvanna County. The diagram on the following page provides an example routing of an internal trip capture for a hypothethical TND project.

Transportation Efficient Land Use = *Internal Trip Capture*
TND land use encourages the linkage of individual neighborhoods that, in turn, reduces travel demands on the external highway network and encourage pedestrians to make more frequent walks to parks, recreation, commercial and nearby residences.



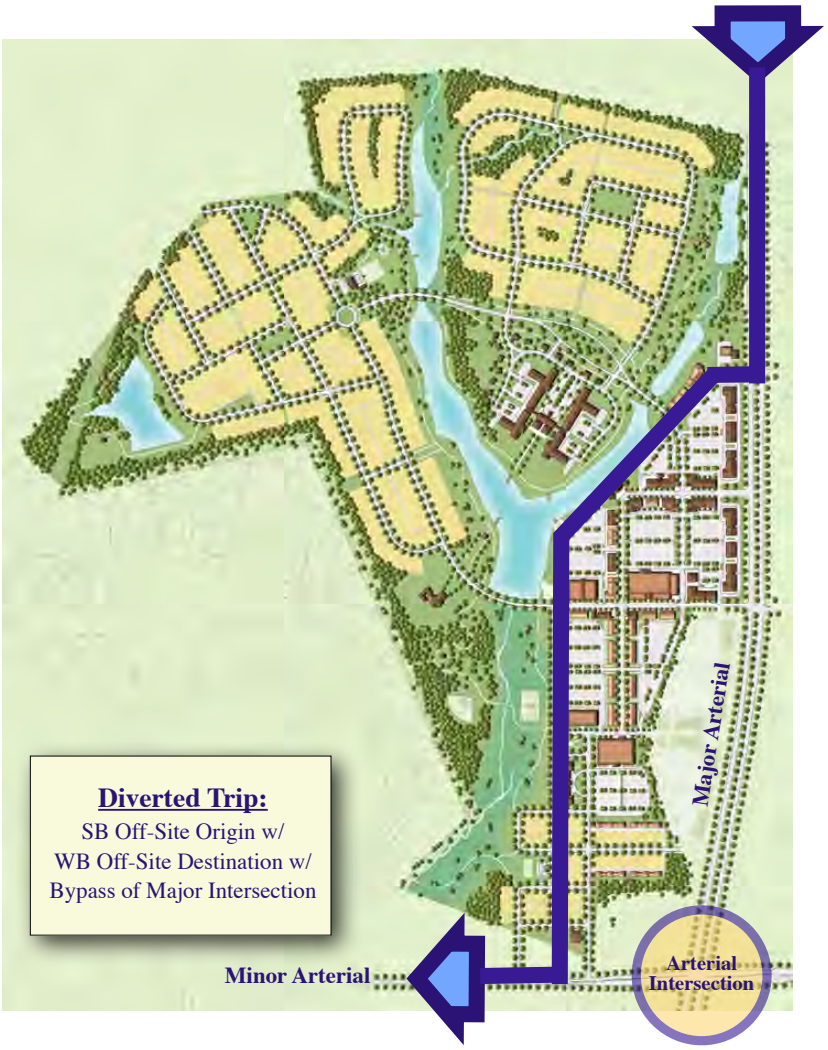
Pass-By Trip Capture for TNDs

"Pass-by" trips are vehicular trips made as intermediate stops on the way from an origin to a primary trip destination. Pass-by trip reductions consider trips, typically non-residential, drawn from the existing traffic stream on an adjacent street, recognizing that trips drawn to a site would otherwise already traverse the adjacent street regardless of existence of the site. Routes 250 and 15 evidence these pass-by trips by virtue of their strip commercial frontage. Pass-by trip reductions allow a percentage reduction in the forecast of trips otherwise added to the adjacent street from the proposed development. The reduction applies only to volumes on adjacent streets, not to ingress or egress volumes at entrances serving the proposed site.

Relative to a mixed-use project, pass-by trip rates for retail land uses essentially translates into a (modest) reduction in the gross retail trip generation factor for a given use, allowing for the total retail trips to be discounted. The traditional method of pass-by trip estimation is regression modeling based on methods described in the Institute of Transportation Engineers (ITE) Trip Generation manual. However, pass-by trips for TND and mixed-use developments are typically larger, due to the overall mix and quality of non-residential development, than those experienced in conventional, scattered development.

Trip Diversion for TNDs

"Trip diversion" represents a generally unrecognized benefit of enhanced TND connectivity under certain conditions. This benefit is typically realized with TND projects located adjacent to or in close proximity to an arterial or major urban collector intersection where new internal street alignments could capture, transfer and divert TND-generated traffic that would otherwise be distributed through the existing intersection. This capture component is not typically included in standard "internal capture" ratios. However, it demonstrates the added traffic benefit of well located TND projects that provide an enhanced level of interconnectivity benefiting locations contiguous to major intersections. Thus, employing a "diversion rate" is location-sensitive and not appropriate in areas where the project's location and interior street system are not capable of providing "bypass" relief to the minor artery at the intersection under observation. In the future, there may be opportunities in the Core and Transitional Sub-Areas where trip diversions may benefit existing intersections with Routes 250 and 15. The diagram below represents the routing of a "diverted trip" around a major intersection contiguous to a hypothethical TND.



TRB Study Recommendations

The 2011 TRB Report 684 documents internal trip capture rates that were analyzed at a number of fully developed, TND-styled projects thoughtout the country. AM and PM peak capture as well as average daily capture were included in the studies. The range in internal trip capture rates was 38% to 41%. Daily pass-by rates ranged from 14% to 40%, with an average of 28%. The report also documents daily by-pass rates observed in six TND communities. The range was 14% to 40% with an average of 28%.

A noteworthy study is from the Brandermill planned development, an established mixed-use community in Chesterfield County. It employs a seldom used (and time consuming) survey technique to evaluate transportation benefits to quantify the characteristics of home-based trips within a community. This requires a commitment to interviewing community residents about their travel habits. Brandermill presents an exceptional case study that reveals the benefits of a bona fide TND project that fulfills the UDA transportation and land use goals. It has a relatively high ratio of residents employed within the Brandermill study area (46%).

The daily average for home-based trips with destinations within Brandermill averaged 35% while home-based trip ends with origins within Brandermill averaged 39%. In other words, approximately 4 out of 10 trips ends to Brandermill residences originated within the Brandermill community. When retail shopping center trips within Brandermill were evaluated, it revealed that approximately two-thirds of the retail destination trips originated with the Brandermill community during the midday and evening peak hours. Internal trip capture was determined to be 51% on a daily basis, with 45% and 55% internal capture during the AM and PM peak periods.

Certain factors and assumptions employed for this study have been applied in a qualitative fashion: They are reasonably debatable, but appropriate for comparative planning purposes. For the Zion Crossroads UDA model, the assumed net internal capture rate is 30%. The matrix employed a 5% rate (residential) and 30% (retail) attributable to a more loosely defined "diversion and pass-by." For the "Status Quo" model, a 6% internal capture rate for residential dwellings and a 25% retail pass-by rate were assumed. Given the existing land use configuration in Zion Crossroads, diversion trips may not be realized until long-term redevelopment occurs.

Based on statistically valid field research, TND proponents can and should make a valid argument for somewhat higher rates, given that current VDOT and ITE factors would not necessarily agree. However, it is recommended that 527 Pre-Scope of Work agreements for specific TND projects require that any approved reduction to current VDOT permissible rates be fully documented by a professional traffic consultant.

Comparative Analysis Process for Zion Crossroads UDA

The *"simple method"* spreadsheets provide a macro-level evaluation technique that demonstrates the potential reduction in traffic impacts of TND/UDA development forms in comparison to status-quo, highway-oriented "destination" location patterns in the subject locality. Four major assumptions underlie and qualify the traffic projections contained herein:

1. *The analysis examines only additional traffic for external trips created by UDA-defined uses generated by new development during the 2010-2020 and 2010-2030 periods. Existing and projected background traffic and non-UDA defined traffic is not included in the generation table.*

2. *The density of development is applied to only the principal land uses defined by the UDA legislation: retail, commercial office and services, single family residential, townhouses, and multifamily residences. Manufacturing establishments, warehousing, government facilities and education uses are not included in the comparisons.*

3. *The TND traffic generation model assumes a representative and sustainable mix of land uses within the designated UDA area for each of the projection periods. In other words, it represents an "ideal case" for the UDA with similar internal capture benefits that have been documented in successful TND projects.*

4. *The "Status Quo" traffic estimates assume that designation-oriented land uses (shopping centers, schools, employment establishments) and scattered residential development on large lots and dispersed subdivisions will be the typical development pattern in future years. In other words, it presents a "worst case" from the standpoint of traffic impacts on the existing outlying County road network.*

While not to be mistaken for a formal impact assessment, the steps outlined below lead to a hypothetical view of the relative traffic reduction benefits from mixed-use, interconnected projects that apply to the UDA planning process.

1. *Determine UDA "developable acreage" and UDA land use yields for the County prepared for this study based on VEC projections. The accompanying models employ County's growth projections for 2010-2020 and 2010-2030. Projected residential demands are compared for both TND and "Status Quo" housing (single family detached, townhouses, and multifamily residences.)*

2. *Determine appropriate ITE land use code and trip generation rates for each UDA land use category.*

3. *Prepare traffic generation estimates employing ADT and PM PHV factors for both the 2010-2020 and 2010-2030 projection periods. As indicated in the accompanying tables, the County population is projected to increase by almost 5539 residents between 2010 and 2020 and an additional 5811 residents between 2020 and 2030.*

4. *Calculate gross traffic generation for each use and combined mix of uses. For the traffic models, it is assumed that the future residential population growth increments cited in (2) above will be distributed per UDA Land Use Scenario #2 among the three UDA housing types: single family detached (50% population capture), townhouses (25% population capture), and multifamily residences (25% population capture).*

Similarly, UDA commercial and office spatial allocations have been pro-rated based on predicted demand levels. The Status Quo model assumes 90% single family detached residential, 5% townhouses and 5% multifamily units.

5. *The gross traffic generation establishes the traffic impact of the conventional, "status quo" form of land use. This is based on the assumption that future County growth will be distributed on a similar widespread basis at densities similar to those of the past generation. No internal capture factor is introduced for the conventional community since a net factor is employed for the TND internal capture.*

6. *Estimate a blended internal capture rate and diversion rate, and calculate the capture volumes for the individual and combined land use mix for the locale's TND/UDA land use model. The "diversion rate" is an additional "benefit factor" that is not typically recognized by VDOT but is helpful in evaluating the potential benefits of a "best case" TND.*

7. *Introduce an estimate for the UDA location-specific estimate of a blended external pass-by rate and diversion rate (if appropriate); calculate the pass-by volumes for the regional background traffic.*

8. *Apply the calculated capture and pass-by volumes, using the generation figures providing an approximate estimate of the traffic impacts of the TND land use model on the surrounding highway network. Do the same for the "Status Quo" traffic, adjusting per assumptions hereinabove.*

9. *Calculate the TND traffic reduction ratios (see accompanying tables.)*

10. *Determine level of background ADT and PHV traffic on adjacent arterial or collector networks.*

11. *Prepare a qualitative assessment of TND vs. the "Status Quo" land use scenarios on the contiguous network.*

Technical Analysis Summary

The *"simple method"* was used to evaluate both the 2010-2020 and 2010-2030 UDA projection periods. *(See following tables.)* For the TND model, an internal trip capture rate of 30% and blended pass-by/diversion rate of 5% were used for all land uses. For the "Status Quo" model, a 6% internal capture rate was employed for traffic created by conventional residential development, with a 25% pass-by capture for commercial uses and 5% for office uses. No diversion was assumed for the "Status Quo".

During the 2010-2020 timeframe, new traffic generation attributable to residential and commercial land uses based on conventional ("status quo") County land use-generated traffic patterns was predicted to create 41,695 daily vehicle trips, 36,762 of which could directly impact the Route 250 and 15 corridors and their intersections in Zion Crossroads. Of this amount, 3300 VPD represents pass-by traffic.

When applying the TND model to the same timeframe, the external impact was an estimated 27,151 VPD, or approximately 74% of the predicted conventional levels. Peak hour generation for the TND model was 2628 VPH, compared to 3718 VPH for the "status quo" PHV trip count, resulting in a reduction of approximately 35.3% when compared to the predicted TND levels and 26.1% when compared to the "status quo" levels. Comparable percentage reductions are forecast for the travel demands based on the 2010-2030 projection period.

In conclusion, the TND form of land use in the designated Zion Crossroads UDA, coupled with accompanying new and upgraded local and collector streets, will enhance the function of overall system. The projected traffic volumes will materialize regardless of whether or not the County pursues compact, village-scaled land use at Zion Crossroads or continues its historic pattern of scattered land use. However, without new internal local collector and arterial improvements within the designated UDA, it would be infeasible for the existing collector and arterial network – entirely reliant on Route 250 and 15 – to adequately serve 100% of predicted 2010-2030 County growth entirely within the Zion Crossroads UDA.

Successful transportation efficient land use depends on communities being created where residents, workers, visitors, and commuters can enjoy shared civic, recreation, education, and institutional activities within close proximity to each other. The vehicle and the pedestrian are given shared priority with the design of "smart streets".

Zion Crossroads UDA Transportation Study

TND Land Use: Comparative Traffic Impact Model - Scenario #2

Population and Employment Growth Levels: 2010 - 2020 (10-year growth horizon)

	UDA Land Use Classifications					
Traffic Characteristics: Generation, Distribution, Reductions	**Single Family**	**Townhouses**	**Multifamily**	**Retail**	**Office**	**Totals**
Residential Population Distribution per TND Land Use	**50%**	**25%**	**25%**			
Planned UDA Yield *(dwelling units or FAR)*	**1469** *du*	**1237** *du*	**1485** *du*	**300,000** *du*	**145,000** sfgfa	
ITE Land Use Code	210	230	220	820	710	
ITE Generation Rate (ADT)	9.57 *vtpd*	5.86 *vtpd*	6.72 *vtpd*	0.04294 *vtpd*	0.01101 *vtpd*	*vtpd*
Gross Traffic Generation (ADT)	14058 *adt*	7249 *adt*	9979 *adt*	12882 *adt*	1596 *adt*	45,765 *adt*
ITE Generation Rate (PM PHV)	1.01 *vtph*	0.52 *vtph*	0.62 *vtph*	0.00375 *vtph*	0.00149 *vtph*	*vtph*
Gross Traffic Generation (PM PHV)	1484	643	921	1125	216	4,389
TND Reduction: TND Enhanced Internal Capture Rate	30%	30%	30%	30%	30%	
TND Reduction: TND Enhanced Internal Capture Volume (ADT)	4217 *adt*	2175 *adt*	2994 *adt*	3865 *adt*	479 *adt*	13729 *adt*
TND Internal Capture Volume (PM PHV)	445 *phv*	193 *phv*	276 *phv*	338 *phv*	65 *phv*	1,317 *phv*
TND Reduction: Diversion and Passby Capture Rate *(optimal)*	5%	5%	5%	25%	5%	
TND Reduction: Diversion and Passby Capture Volume (ADT)	703 *adt*	362 *adt*	499 *adt*	3221 *adt*	80 *adt*	4,865 *adt*
TND Reduction: Diversion and Passby Capture Volume (PM PHV)	74 *phv*	32 *phv*	46 *phv*	281 *phv*	11 *phv*	444 *phv*
Sub-total: TND Volume Reduction Adjustment (ADT)	4920 *adt*	2537 *adt*	3493 *adt*	7085 *adt*	559 *adt*	18,594 *adt*
Sub-total: TND Volume Reduction Adjustment (PM PHV)	519 *phv*	225 *phv*	322 *phv*	619 *phv*	76 *phv*	1,761 *phv*
SUMMARY: TND TRANSPORTATION MODEL IMPACTS						
Total: Net TND Traffic Volume (ADT)	9138 *adt*	4712 *adt*	6486 *adt*	5797 *adt*	1038 *adt*	**27,171** *adt*
Total: Net TND Traffic Volume (PM PHV)	964 *phv*	418 *phv*	598 *phv*	506 *phv*	140 *phv*	**2628** *phv*

Zion Crossroads UDA Transportation Study

"Status Quo" Land Use: Comparative Traffic Impact Model

Population and Employment Growth Levels: 2010 - 2020 (10-year growth horizon)

	Conventional Land Use Classifications					
Traffic Characteristics: Generation, Distribution, Reductions	**Single Family**	**Townhouses**	**Multifamily**	**Retail**	**Office**	**Totals**
Population Distribution per "Status Quo" Land Use	**90%**	**5%**	**5%**			
Projected Development Yield *(dwelling units or FAR)*	**2610** *du*	**178** *du*	**178** *du*	**300,000** *du*	**145,000** *sfgfa*	
ITE Land Use Code	210	230	220	820	710	
ITE Generation Rate (ADT)	9.57 *vtpd*	5.86 *vtpd*	6.72 *vtpd*	0.04294 *vtpd*	0.01101 *vtpd*	*vtpd*
Gross Traffic Generation (ADT)	24978 *adt*	1043 *adt*	1196 *adt*	12882 *adt*	1596 *adt*	41,695 *adt*
ITE Generation Rate (PM PHV)	1.01 *vtph*	0.52 *vtph*	0.62 *vtph*	0.00375 *vtph*	0.00149 *vtph*	*vtph*
Gross Traffic Generation (PM PHV)	2636.1	92.56	110.36	1125	216.05	4,180
Conventional Reduction: Internal Capture Rate	6%	6%	6%	0%	0%	
Conventional Reduction: Internal Capture Volume (ADT)	1499 *adt*	63 *adt*	72 *adt*	0 *adt*	0 *adt*	1633 *adt*
Conventional Internal Capture Volume (PM PHV)	158 *phv*	6 *phv*	7 *phv*	- *phv*	- *phv*	170 *phv*
Conventional Reduction: Passby Capture Rate *(optimal)*	0%	0%	0%	25%	5%	
Conventional Reduction: Passby Capture Volume (ADT)	0 *adt*	0 *adt*	0 *adt*	3221 *adt*	80 *adt*	3,300 *adt*
Conventional Reduction: Passby Capture Volume (PM PHV)	0 *phv*	0 *phv*	0 *phv*	281 *phv*	11 *phv*	292 *phv*
Sub-total: Volume Reduction Adjustment (ADT)	1499 *adt*	63 *adt*	72 *adt*	3221 *adt*	80 *adt*	4,933 *adt*
Sub-total: Volume Reduction Adjustment (PM PHV)	158 *phv*	6 *phv*	7 *phv*	281 *phv*	11 *phv*	462 *phv*
SUMMARY: "STATUS QUO" LAND USE MODEL TRANSPORTATION MODEL IMPACTS						
Total: Net Traffic Volume (ADT)	23479 *adt*	980 *adt*	1124 *adt*	9662 *adt*	1517 *adt*	**36,762** *adt*
Total: Net Traffic Volume (PM PHV)	2478 *phv*	87 *phv*	104 *phv*	844 *phv*	205 *phv*	**3718** *phv*

Zion Crossroads UDA Transportation Study

TND vs. STATUS QUO Land Use: Comparative Traffic Impact Model

Population and Employment Growth Levels: 2010 - 2020 (10-year growth horizon)

Comparison of TND and "Status Quo" Trip Generation by Projected Land Use

Comparative Summary	Single Family	Townhouses	Multifamily	Retail	Office	Totals
TND TRANSPORTATION MODEL IMPACTS - Scenario #2						
Total: Net TND Traffic Volume (ADT)	9138 *adt*	4712 *adt*	6486 *adt*	5797 *adt*	1038 *adt*	**27,171** *adt*
Total: Net TND Traffic Volume (PM PHV)	964 *phv*	418 *phv*	598 *phv*	506 *phv*	140 *phv*	**2628** *phv*
"STATUS QUO" LAND USE MODEL TRANSPORTATION MODEL IMPACTS						
Total: Net Traffic Volume (ADT)	23479 *adt*	980 *adt*	1124 *adt*	9662 *adt*	1517 *adt*	**36,762** *adt*
Total: Net Traffic Volume (PM PHV)	2478 *phv*	87 *phv*	104 *phv*	844 *phv*	205 *phv*	**3718** *phv*

COMPARATIVE TRAFFIC IMPACTS: TND LAND USE VS. "STATUS QUO" COUNTY LAND USE PATTERNS

Total Estimated ADT Trip Reduction: TND Land Use Model vs. Status Quo	**9,591** *adt*
Total Estimated PHV Trip Reduction: TND Land Use Model vs. Status Quo	**1090** *phv*
Comparative Reduction Ratio #1: % = (TND Land Use Model ADT) / (Status Quo Model ADT)	**73.9%**
Comparative Reduction Ratio #2: % ADT Reduction = (TND Land Use Model ADT) - (Status Quo Model ADT) / (Status Quo Model ADT)	**26.1%**
Comparative Reduction Ratio #2: % ADT Reduction = (TND Land Use Model ADT) - (Status Quo Model ADT) / (TND Model ADT)	**35.3%**

Zion Crossroads UDA Transportation Study

TND Land Use: Comparative Traffic Impact Model - Scenario #2

Population and Employment Growth Levels: 2010 - 2030 (20-year growth horizon)

	UDA Land Use Classifications					
Traffic Characteristics: Generation, Distribution, Reductions	**Single Family**	**Townhouses**	**Multifamily**	**Retail**	**Office**	**Totals**
Residential Population Distribution per TND Land Use	**50%**	**25%**	**25%**			
Planned UDA Yield *(dwelling units or FAR)*	**3279** *du*	**2883** *du*	**3542** *du*	**900,000** *du*	**434,000** *sfgfa*	
ITE Land Use Code	210	230	220	820	710	
ITE Generation Rate (ADT)	9.57 *vtpd*	5.86 *vtpd*	6.72 *vtpd*	0.04294 *vtpd*	0.01101 *vtpd*	*vtpd*
Gross Traffic Generation (ADT)	31380 *adt*	16894 *adt*	23802 *adt*	38646 *adt*	4778 *adt*	115,501 *adt*
ITE Generation Rate (PM PHV)	1.01 *vtph*	0.52 *vtph*	0.62 *vtph*	0.00375 *vtph*	0.00149 *vtph*	*vtph*
Gross Traffic Generation (PM PHV)	3312	1499	2196	3375	647	11,029
TND Reduction: TND Enhanced Internal Capture Rate	30%	30%	30%	30%	30%	
TND Reduction: TND Enhanced Internal Capture Volume (ADT)	9414 *adt*	5068 *adt*	7141 *adt*	11594 *adt*	1434 *adt*	34650 *adt*
TND Internal Capture Volume (PM PHV)	994 *phv*	450 *phv*	659 *phv*	1,013 *phv*	194 *phv*	3,309 *phv*
TND Reduction: Diversion and Passby Capture Rate *(optimal)*	5%	5%	5%	25%	5%	
TND Reduction: Diversion and Passby Capture Volume (ADT)	1569 *adt*	845 *adt*	1190 *adt*	9662 *adt*	239 *adt*	13,504 *adt*
TND Reduction: Diversion and Passby Capture Volume (PM PHV)	166 *phv*	75 *phv*	110 *phv*	844 *phv*	32 *phv*	1,226 *phv*
Sub-total: TND Volume Reduction Adjustment (ADT)	10983 *adt*	5913 *adt*	8331 *adt*	21255 *adt*	1672 *adt*	48,155 *adt*
Sub-total: TND Volume Reduction Adjustment (PM PHV)	1,159 *phv*	525 *phv*	769 *phv*	1,856 *phv*	226 *phv*	4,535 *phv*
SUMMARY: TND TRANSPORTATION MODEL IMPACTS						
Total: Net TND Traffic Volume (ADT)	20397 *adt*	10981 *adt*	15471 *adt*	17391 *adt*	3106 *adt*	**67,346** *adt*
Total: Net TND Traffic Volume (PM PHV)	2153 *phv*	974 *phv*	1427 *phv*	1519 *phv*	420 *phv*	**6494** *phv*

Zion Crossroads UDA Transportation Study

"Status Quo" Land Use: Comparative Traffic Impact Model

Population and Employment Growth Levels: 2010 - 2030 (20-year growth horizon)

	Conventional Land Use Classifications					
Traffic Characteristics: Generation, Distribution, Reductions	**Single Family**	**Townhouses**	**Multifamily**	**Retail**	**Office**	**Totals**
Population Distribution per "Status Quo" Land Use	**90%**	**5%**	**5%**			
Projected Development Yield *(dwelling units or FAR)*	**5917** *du*	**438** *du*	**438** *du*	**900,000** *du*	**434,000** *sfgfa*	
ITE Land Use Code	210	230	220	820	710	
ITE Generation Rate (ADT)	9.57 *vtpd*	5.86 *vtpd*	6.72 *vtpd*	0.04294 *vtpd*	0.01101 *vtpd*	*vtpd*
Gross Traffic Generation (ADT)	56626 *adt*	2567 *adt*	2943 *adt*	38646 *adt*	4778 *adt*	105,560 *adt*
ITE Generation Rate (PM PHV)	1.01 *vtph*	0.52 *vtph*	0.62 *vtph*	0.00375 *vtph*	0.00149 *vtph*	*vtph*
Gross Traffic Generation (PM PHV)	5976.17	227.76	271.56	3375	646.66	10,497
Conventional Reduction: Internal Capture Rate	6%	6%	6%	0%	0%	
Conventional Reduction: Internal Capture Volume (ADT)	3398 *adt*	154 *adt*	177 *adt*	0 *adt*	0 *adt*	3728 *adt*
Conventional Internal Capture Volume (PM PHV)	359 *phv*	14 *phv*	16 *phv*	- *phv*	- *phv*	389 *phv*
Conventional Reduction: Passby Capture Rate *(optimal)*	0%	0%	0%	25%	5%	
Conventional Reduction: Passby Capture Volume (ADT)	0 *adt*	0 *adt*	0 *adt*	9662 *adt*	239 *adt*	9,900 *adt*
Conventional Reduction: Passby Capture Volume (PM PHV)	0 *phv*	0 *phv*	0 *phv*	844 *phv*	32 *phv*	876 *phv*
Sub-total: Volume Reduction Adjustment (ADT)	3398 *adt*	154 *adt*	177 *adt*	9662 *adt*	239 *adt*	13,629 *adt*
Sub-total: Volume Reduction Adjustment (PM PHV)	359 *phv*	14 *phv*	16 *phv*	844 *phv*	32 *phv*	1,265 *phv*
SUMMARY: STATUS QUO LAND USE MODEL TRANSPORTATION MODEL IMPACTS						
Total: Net Traffic Volume (ADT)	53228 *adt*	2413 *adt*	2767 *adt*	28985 *adt*	4539 *adt*	**91,932** *adt*
Total: Net Traffic Volume (PM PHV)	5618 *phv*	214 *phv*	255 *phv*	2531 *phv*	614 *phv*	**9233** *phv*

Zion Crossroads UDA Transportation Study

TND vs. STATUS QUO Land Use: Comparative Traffic Impact Model

Population and Employment Growth Levels: 2010 - 2030 (20-year growth horizon)

Comparison of TND and "Status Quo" Trip Generation by Projected Land Use

Comparative Summary	Single Family	Townhouses	Multifamily	Retail	Office	Totals
TND TRANSPORTATION MODEL IMPACTS - SCENARIO #2						
Total: Net TND Traffic Volume (ADT)	20397 *adt*	10981 *adt*	15471 *adt*	17391 *adt*	3106 *adt*	**67,346** *adt*
Total: Net TND Traffic Volume (PM PHV)	2153 *phv*	974 *phv*	1427 *phv*	1519 *phv*	420 *phv*	**6494** *phv*
"STATUS QUO" LAND USE MODEL TRANSPORTATION MODEL IMPACTS						
Total: Net Traffic Volume (ADT)	53228 *adt*	2413 *adt*	2767 *adt*	28985 *adt*	4539 *adt*	**91,932** *adt*
Total: Net Traffic Volume (PM PHV)	5618 *phv*	214 *phv*	255 *phv*	2531 *phv*	614 *phv*	**9233** *phv*

COMPARATIVE TRAFFIC IMPACTS: TND LAND USE VS. "STATUS QUO" COUNTY LAND USE PATTERNS

Total Estimated ADT Trip Reduction: TND Land Use Model vs. Status Quo	**24,585** *adt*
Total Estimated PHV Trip Reduction: TND Land Use Model vs. Status Quo	**2739** *phv*
Comparative Reduction Ratio #1: % = (TND Land Use Model ADT) / (Status Quo Model ADT)	**73.3%**
Comparative Reduction Ratio #2: % ADT Reduction = (TND Land Use Model ADT) - (Status Quo Model ADT) / (Status Quo Model ADT)	**26.7%**
Comparative Reduction Ratio #2: % ADT Reduction = (TND Land Use Model ADT) - (Status Quo Model ADT) / (TND Model ADT)	**36.5%**

Travel Reduction for TND Resident Workers

Economic development in the County over the next 20 years is projected to create 9534 new jobs. Future employment will be distributed over a wide range of occupations, the locations for which are subject to County planning and zoning oversight. Approximately 57% to 65% of new employment will be in retail, service, and office sector (as defined by the UDA statute) with the balance in industry, manufacturing, warehousing, government, and education. The table below summarizes the range of UDA-defined land uses, comparing the projected distribution for both the TND form of development and the "status quo" form of development evidenced in the County over the past generation.

Zion Crossroads UDA

Demographic and Population Growth Projections

Land Use Demands: TND Land Use vs. "Status Quo" Land Use

	% Distribution	UDA Projection Period		
		2010-2020	2020-2030	2010-2030
Population Growth Increment *		**8462**	**9577**	**18,039**
UDA Growth Distribution Scenario #2 *(TND demands per VEC population projections)*				
Residential Dwelling Demand		*du*	*du*	*du*
Single Family Detached	*50%*	1469	1810	3279
Townhouses/Attached	*25%*	1237	1646	2883
Multifamily Residences	*25%*	1485	2057	3542
Total Residential Unit Demand	*100%*	4191	5513	9704
"Status Quo" Growth Distribution Scenario *(conventional land use patterns)*				
Residential Dwelling Demand		*du*	*du*	*du*
Rural Single Family Detached	*75%*	2133	2715	4848
Suburban Single Family Detached	*15%*	477	592	1069
Suburban Mixed Density	*10%*	356	520	876
Total Residential Unit Demand	*100%*	2966	3827	6793
Retail and Employment Scenario *(same for both UDA and Status Quo Scenarios)*				
Non-Residential Space Demand		*sfgfa*	*sfgfa*	*sfgfa*
UDA Commercial, Office and Service		445,368	888588	1,333,956
Non-UDA Economic Development		334,026	473,913	807,939
Government/Education		165,273	234,539	399,812

Note: ***du:*** *residential dwellings units;* ***sfgfa:*** *square feet gross commercial floor area;* * *Projection source:* ***VEC***

To accommodate this new employment growth, the combination of (1) regional growth trends and (2) continued reduction in the level of service on the Route 250 and 15 corridors will place greater residential development demands and impact on County land. With respect to the UDA, the potential for travel reduction attributable to TND projects has been well documented in technical studies. High quality and properly located mixed-use projects have been shown to provide employment for over half of their resident workers. This phenomenon could significantly benefit the quality of life of citizens who both work and live in and around Zion Crossroads.

Transportation studies of TND and conventional subdivisions performed by the University of North Carolina and other sources revealed that the average household TND trip distance was approximately 25% less than that created by the average suburban subdivision, with an average daily trip length reduction of 12 to 18 miles. The TND household made 9% to 11% fewer vehicular trips per day than the conventional residential household and owned 25% fewer automobiles per household.

In Fluvanna County, over 70% of its employed residents work outside of the County (based on the US Census 2000). In-commuters anchored only one-third of the total County employment base. The majority of the in-commuter work force resides in Buckingham County 40%), Albemarle County (32%), with Louisa, Goochland, and Henrico counties providing the balance of the in-commuters. Of the County's 7000+ out-commuters, 53% work in Albemarle County and 39% in the City of Charlottesville.

While the Census provides no statistical data for travel length for Zion Crossroads in-commuters, the TND trip reduction factor of 12 miles observed in the North Carolina case study provides a conservative benchmark that can be employed to assess the employment-related travel benefits of TND development in the County. However, based on regional employment distribution, 20+ miles for the average one-way trip commute would be a better estimate. The following table presents mileage estimates for *place of residence to place-of-employment* trip reductions for a prototypical TND project compared to a conventional subdivision that lacks both proximity and connectivity to places of work. Estimates are provided for only employment trips and do not include potential trip savings to the County from outlying areas for shopping, education, recreation, and other purposes.

Two scenarios are evaluated for both average daily and annual residence-to-work reductions. Scenario 1 assumes that (a) 25% of the estimated employment sector during the UDA 2010-2030 projection period will be both working and residing within the Zion Crossroads planning area, (b) the TND resident portion of the employment sector will displace an equivalent number of commuter employees, (c) the net mileage reduction for the average displaced commuter trip will be 12 miles (one-way), and (d) the average work week is 5 days consuming an average annual 48 week employment period. Scenario 2 assumes that (a) 40% of the County employment workforce added between 2010 and 2030 will be absorbed by TND resident/workers located in the designated Zion Crossroads UDA, and (b) a 20-mile one-way commuter trip/employee will be displaced. With the region lacking commuter-targeted transit service and organized carpooling opportunities, all commuter trips are assumed to be via private vehicle.

ZION CROSSROADS UDA

TND Resident Employment Trip Reduction Estimates

TND Employment vs. "Status Quo" Employment Patterns

	% Distribution	UDA Projection Period		
		2010-2020	2020-2030	2010-2030
County Employment Growth Increment *		**3709**	**5825**	**9,534**

Scenario 1: TND Resident - Average Daily Employment Trip Mileage Reduction

TND Residential/GP UDA Employment Capture = 25%; assumed one-way mileage reduction = 12 miles.

		miles	*miles*	*miles*
TND Commercial and Office	*50%*	11,127	17,475	28,602
Non-TND Commercial	*25%*	5,564	8,738	14,301
Government and Education	*25%*	5,564	8,738	14,301
Average Daily Reduction		**22,254**	**34,950**	**57,204**
Average Annual Reduction		**5,340,960**	**8,388,000**	**13,728,960**

Scenario 2: TND Resident - Average Daily Employment Trip Mileage Reduction

TND Residential/GP UDA Employment Capture = 40%; assumed one-way mileage reduction = 20 miles.

		miles	*miles*	*miles*
TND Commercial and Office	*50%*	29,672	46,600	76,272
Non-TND Commercial	*25%*	14,836	23,300	38,136
Government and Education	*25%*	14,836	23,300	38,136
Average Daily Reduction		**59,344**	**93,200**	**152,544**
Average Annual Reduction		**14,242,560**	**22,368,000**	**36,610,560**

* *Employment estimates by VEC and the Cox Company per UDA population projections (see Appendix)*

As indicated in the table above, the more conservative Scenario 1 estimates that the trip reductions resulting for the TND *place of residence-to-place of employment* trips will yield approximately 13.7 million fewer miles travelled per year for the TND-based

workforce, while Scenario 2 estimates a savings of 36.6 million miles. The economic benefit to the TND resident is meaningful: In Scenario 1, the average TND resident/employee would travel approximately 5760 fewer miles than one's commuter counterpart. With gasoline prices at $3.60/gallon and 20 mpg fuel efficiency, the resident worker would save $1037/year in work-related fuel expenditures.

The results for Scenario 2 would yield annual savings of 9600 miles travelled and approximately $1728 in fuel expenditures. Total TND fuel savings for Scenario 2 would be roughly $6.6 million/year. The realization of the assumptions in Scenario 2 would result in a total annual fuel reduction for TND resident/workers of 1.8 million gallons, which further translates into more benefits that are somewhat more difficult to quantify, such as personal quality of life, lower drive times, highway safety, natural resource conservation, congestion reduction, lower maintenance costs, parking cost savings, and reduced emissions.

TND Traffic Impact Studies

Traffic impact analysis is fundamental to any land development activity that impacts the County's street and highway system. The County should coordinate the Zion Crossroads UDA planning effort with the VDOT 527 regulations. In addition, individual land use applications should be considered in light of the 527 process.

In conjunction with rezoning applications for TND projects, the County and property owner shall determine whether or not the project shall require a traffic impact statement to be prepared consistent with VDOT 527 regulations. Upon input from VDOT, if a 527 traffic impact analysis is required, the landowner shall prepare and submit a Pre-Scope of Work Meeting Form to the County on or before the date of formal submission of the zoning district amendment application. The Pre-Scope form shall be processed, reviewed by and between the County, VDOT, and the landowner in accord with adopted regulations and procedures.

In rezoning cases where the County believes that an independent TIA should be prepared but that the 527 regulatory thresholds have not been met, the County shall determine whether or not an independent TIA must be submitted. In those instances, the landowner shall meet with the Planning Director to determine the required scope for a traffic analysis for the TND project The Planning Director shall approve the elements to be addressed in the study scope. The traffic analysis shall be submitted with the zoning amendment application. Minimum requirements may include the following:

(1) Existing traffic counts (AM and PM peak hour) at key intersections.

(2) Trip generation estimates for the planned land uses within the TND.

(3) Trip distribution and assignments to the existing road network of traffic projected for the development at full-buildout.

(4) Estimates of background traffic growth on impacted streets and highways.

(5) Analysis of future conditions, to include HCM level-of-service analysis.

(6) Signal warrants analysis.

(7) Recommended transportation improvements to provide adequate levels of service for the traffic generated by the proposed project.

Transportation Planning and the Official Map

Given the fiscal demands increasingly placed on VDOT and local governments for road improvements, the majority of future new major and minor collector streets will be funded and constructed by the private enterprise. Unless new legislation creates other approaches to implementation, these will obviously have to be constructed in conjunction with private sector land development efforts.

Over the next decade, Virginia transportation funding will be focused on major highway improvements and maintenance. Transportation deficiencies in the future will not be solved by historical approaches. In recognition of this, it should be the County's goal to ensure that transportation improvements within the Zion Crossroads UDA will be implemented to:

(1) maximize public benefits,

(2) upgrade existing street system inadequacies,

(3) provide for adequate long-term capacity,

(4) minimize, if not eliminate, economic impacts on state and local fiscal structures,

(5) be developed in conjunction with and by new development, and, most importantly,

(6) be located where they need to be.

Virginia's statutes for local comprehensive planning and zoning — particularly the VDOT 527 requirements — as well as the VDOT 6-Year Improvement Program are a step in the right direction. However, a valuable, but virtually neglected, section of the Code of Virginia has been long overlooked by both local and state planners. As a companion to the UDA planning process in the County, there is one essential "tool" that will need to be employed to successfully address both the existing and anticipated transportation demands that will impact the Zion Crossroads UDA: It is the Official Map *(reference: Section 15.2-2233 of the Code.)*

In concert with the County's ongoing comprehensive planning efforts, it will be important to advance its level of traffic and transportation planning to include the preparation of an Official Map for its long-range street and highway network. While past County planning efforts have typically focused on generalized transportation objectives, the comprehensive plan, in and of itself, cannot ensure the ultimate establishment of rights of way, nor can it provide the footing for the potential acquisition of rights of way for such alignments. However, the County has the opportunity to utilize the Official Map

in a way that facilitates the establishment and acquisition of planned street and road alignments.

In Fluvanna County, as in all Virginia locales, the opportunities for meaningful governmental input to privately initiated projects is limited to individual rezoning reviews and approvals. It is usually "too late" to influence "big picture" transportation goals by the time a property owner applies for site plan or subdivision plat approvals. Unfortunately, most local comprehensive plans give too little attention to intermediate and long-range transportation alignments. In cases where alignments are depicted on a comprehensive plan, they account for the fact that future alignments will impact multiple parcels and property owners, some with sufficient by-right zoning and some with competing real estate interests.

If "smart road" alignments are absent from the comprehensive planning process, new streets that are incorporated into private land development will be dictated by project-specific objectives and will not necessarily be in the public interest. Thus, left to one's own devices, the individual developer will locate roads where they optimally benefit their specific project while the public planner will likely overlook the "trees for the forest." From a comprehensive viewpoint, the 527 process doesn't address this concern, given that it really doesn't come into play until the individual developer has already defined their project and the strategic approach to gaining approvals for it.

To ensure continuity in the planning/implementation process, the Comprehensive Plan's requirements for new and expanded transportation alignments should be contemplated, tested, established and adopted well in advance of discrete zoning, subdivision and site plan applications. It is at the end of the local comprehensive plan update process where the real value of the Official Transportation Map legislation can be recognized. Without an Official Transportation Map for inter-parcel, interconnecting road and street systems, the governing body has no real legal mechanism to preserve the preferred alignments in conjunction with the processing of future subdivision plats and site plans. Simply having "desire lines" for these streets loosely drawn on a comprehensive plan is not nearly enough to define, preserve and secure required rights of way for essential roads. One misplaced subdivision lot can effectively block the best laid plans for an otherwise well conceived and integrated access system.

Under the Code of Virginia, the Official Transportation Map is the only formal mechanism by which the alignment for proposed roads and infrastructure can be established in advance by local government, allowing for the proposed rights-of-way to be reserved for future public acquisition or proffered dedication. The Official Map process benefits both the private and the public sector in that landowners can proceed with development plans with the full knowledge and precision of where transportation improvements are to be located. On the other hand, without the ability to pin down inter-parcel access alignments, the locality is virtually impotent in its ability to secure right of way reservation.

To move forward coordinately with a transportation plan that (1) complements the locality's Comprehensive Plan, (2) addresses the VDOT SSAR and 527-defined traffic planning, and (3) establishes the Official Map for future transportation rights of way, the County would only need to undertake a relatively straight forward master planning, preliminary design, and alignment study as the next step in the Zion Crossroads UDA

planning process. This would take the form of a neighborhood-specific "Transportation Plan and Official Map," with the key tasks to include the following:

1. Preparation and adoption of a Small Area Plan that includes the next level of specific land use planning studies and development impact evaluations of existing and proposed future land uses. This would document both deficiencies in the existing interior street network and opportunities for new and expanded transportation systems that complement Zion Crossroads's "vision for the future."

2. Compilation of topographic mapping and property boundaries of the area impacted by the candidate alignments and right of way improvements as identified by the Small Area Plan. (A County's GIS system or VDOT mapping sources may be sufficiently accurate for this purpose if adequate SPCS control is available.)

3. Schematic transportation plans and supporting traffic analysis to establish the most feasible alignment options and right of way requirements for the needed streets to successfully implement the Zion Crossroads UDA transportation priorities. (Similar in scope to the traditional VDOT "functional plan.")

4. Coordinate the Small Area planning process with community work shops and charrettes to address ongoing coordination with property owners in selecting the preferred option for alignments and system requirements for each future street.

5. Preparation of preliminary engineering plans and profiles to establish the vertical and horizontal alignment for the preferred options (using a County GIS, if adequate, and Route 250 and 15 corridors mapping available through VDOT.)

6. Preparation of metes and bounds for the rights of way for the preferred alignments (again, using existing GIS, if accurate, and VDOT as-built mapping sources): this represents the Official Map "product" for the rights of way to be reserved.

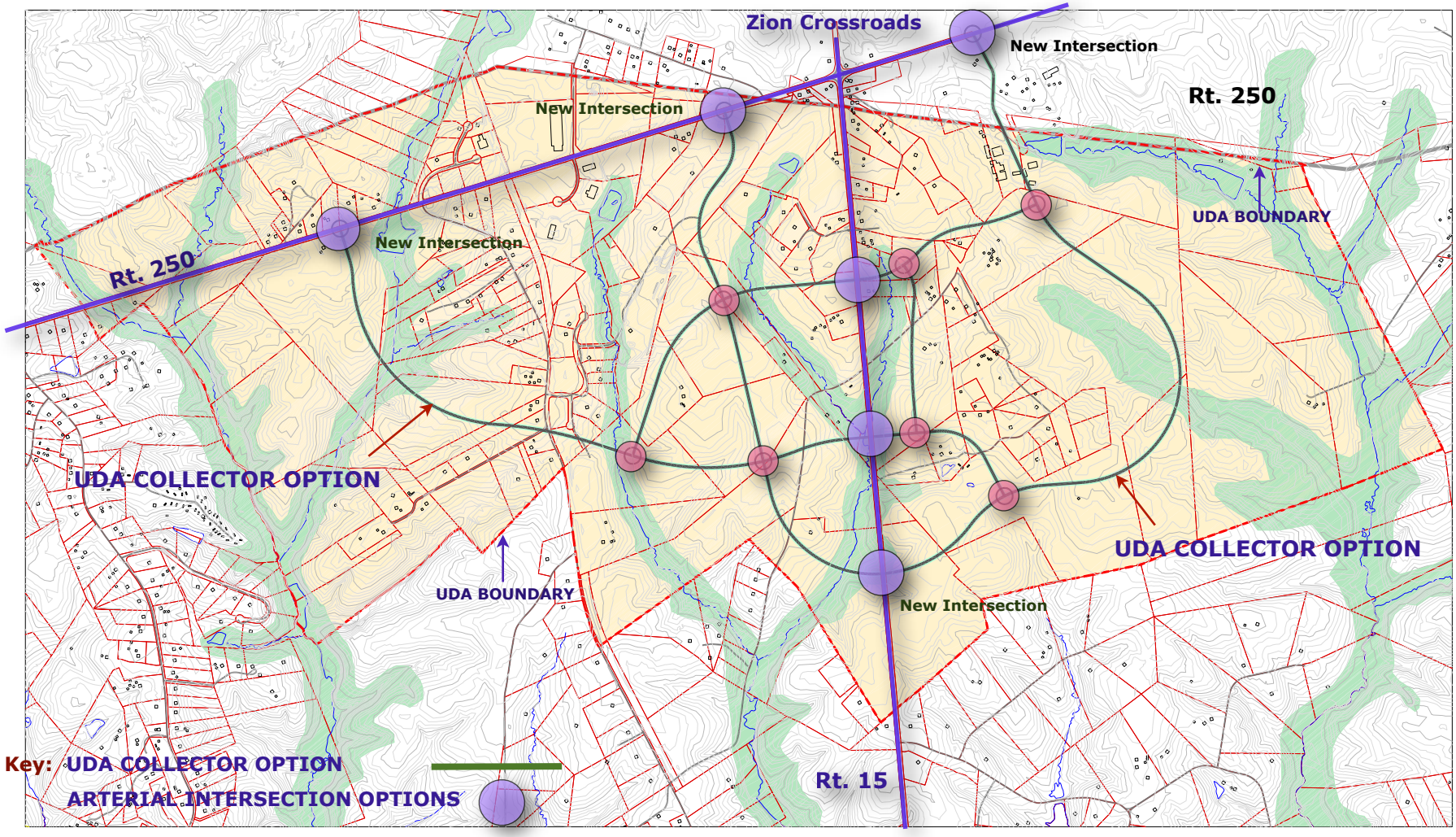
7. Review of the Official Map by the public interest groups, the Planning Commission and VDOT.

8. Adoption of the Official Map for the transportation system by the Board of Supervisors.

In prior generations, the Official Map was a costly and time consuming effort for local governments. This is one reason it has been employed so sparingly in Virginia. However, at the end of the day, the fruits of the Official Map effort can have real "finishing power". The Official Map process is neither new nor untried. Many rapidly growing jurisdictions throughout the State have expended tremendous resources to obtain regional GIS mapping capable of supporting infrastructure planning and design. While most GIS systems are underutilized and undermanned, they represent a very efficient and cost effective tool for transportation planning. In most GIS systems, land use, real estate,

Zion Crossroads Urban Development Area:
Candidate Alignments for Official Map Consideration

Interior Collectors



and topographic mapping is of sufficient detail to be readily (and inexpensively) deployed by engineers and planners to establish accurate transportation alignments in response to anticipated future land uses as adopted by the locale.

Another very important reason that the Official Map has not been in vogue as a growth management tool is that most exurban and suburban locales have not had to worry, for the most part, whether or not adequate land would be available for sub-arterial and inter-neighborhood transportation improvements: Land was ample, density was generally low, sprawl was prototypical (and accepted), and existing highway corridors could be widened to accommodate traffic movement resulting from scattered, strip-styled growth. In effect, interconnecting suburban (local roads, minor arterials and collectors) street systems were neither desired nor required to make traffic flow. Many of these communities have now run out of ROW expansion space along existing commercial corridors; only so many more lanes can be added to thoroughfares that absorb the traffic demands of Route 15. The result is that far too few inter-neighborhood collectors have been achieved via traditional local planning efforts.

What should the County do at this point in time? Foremost is the need to structure a transportation planning process that enables the County to reserve and acquire the rights-of-way and construction easements for essential street improvements. If thoughtfully employed, the Official Map could be the most effective growth management "tool" that fits this purpose. Relative to the County's ongoing planning efforts in Zion Crossroads, it is essential to recognize that infill development and redevelopment pose threats to obtaining additional rights of way. The Official Map for Zion Crossroads should be a major priority to benefit the interests of both existing and future County citizens. The cost/benefit of such planning to local government should be readily apparent upon close scrutiny.

Sources:

Smart Growth and Conventional Suburban Development: Which Costs More?
Traditional Neighborhood Development: Will the Traffic Work?
Emergency Response and Street Design
Defining and Measuring the Sustainable Transportation Network
VDOT TIA Guidelines
UNC TND Trip Generation Study
NCHRP Report 684
ITE Parking Generation Handbook
ITE Trip Generation Documents
Highway Capacity Manual
The Design of New Urban Streets
ITE Traditional Neighborhood Development Street Guidelines
TND Design Guidelines-North Carolina DOT

UDA Planning Study

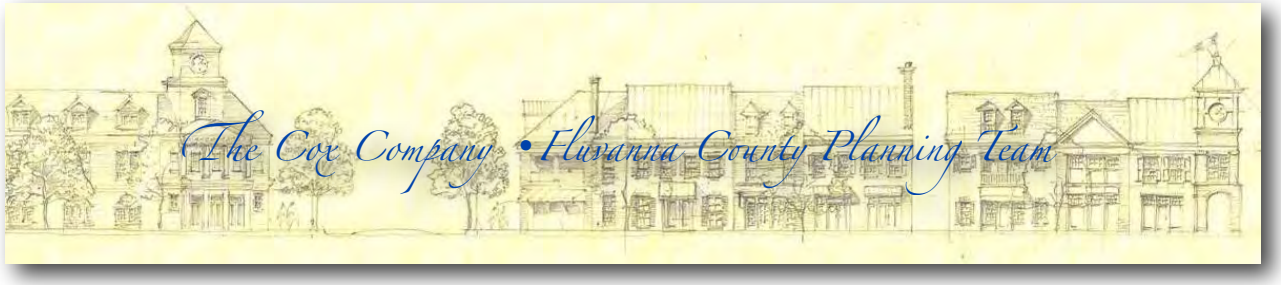
and

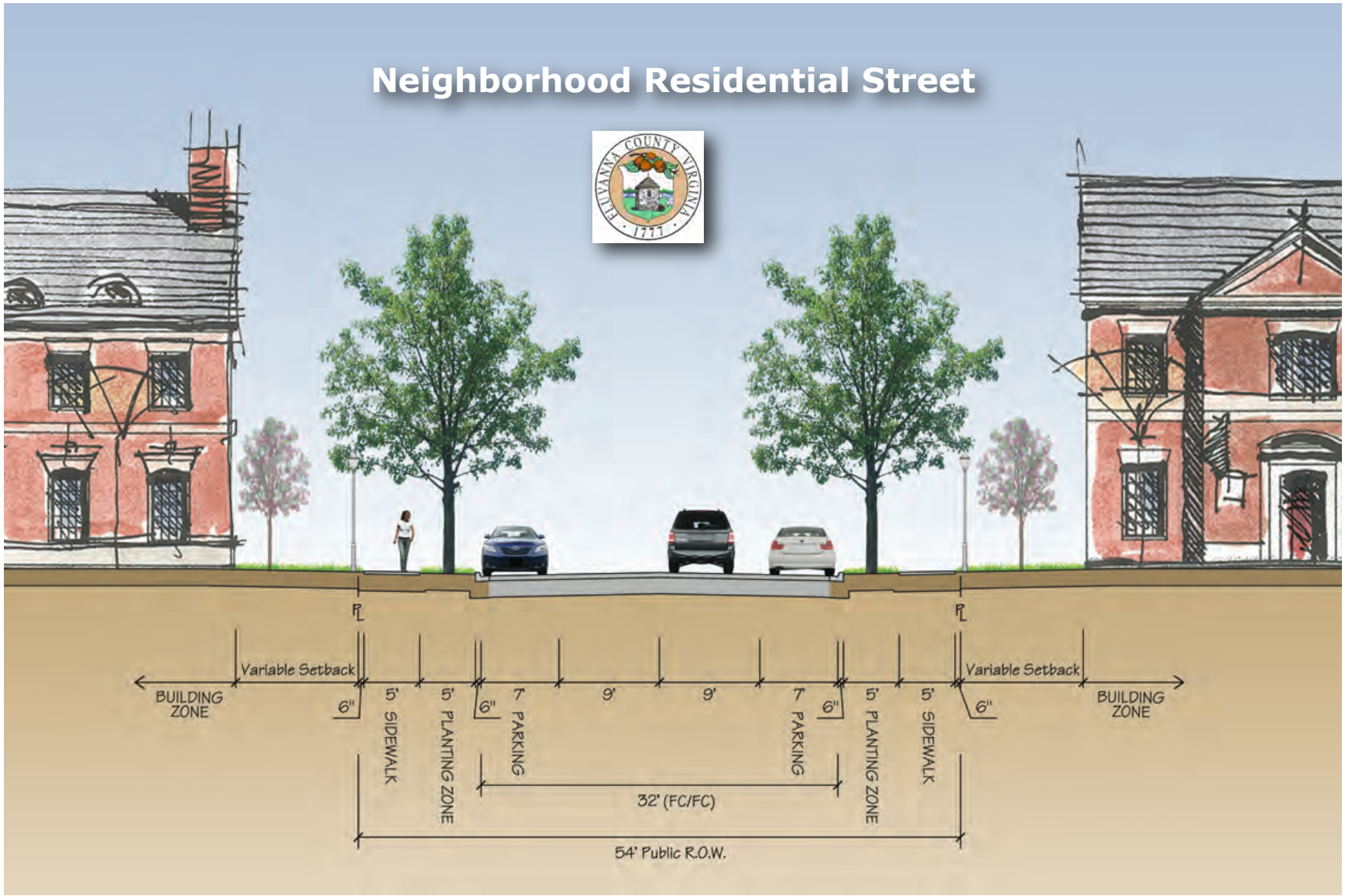
Zoning Ordinance Update

Appendix 1:

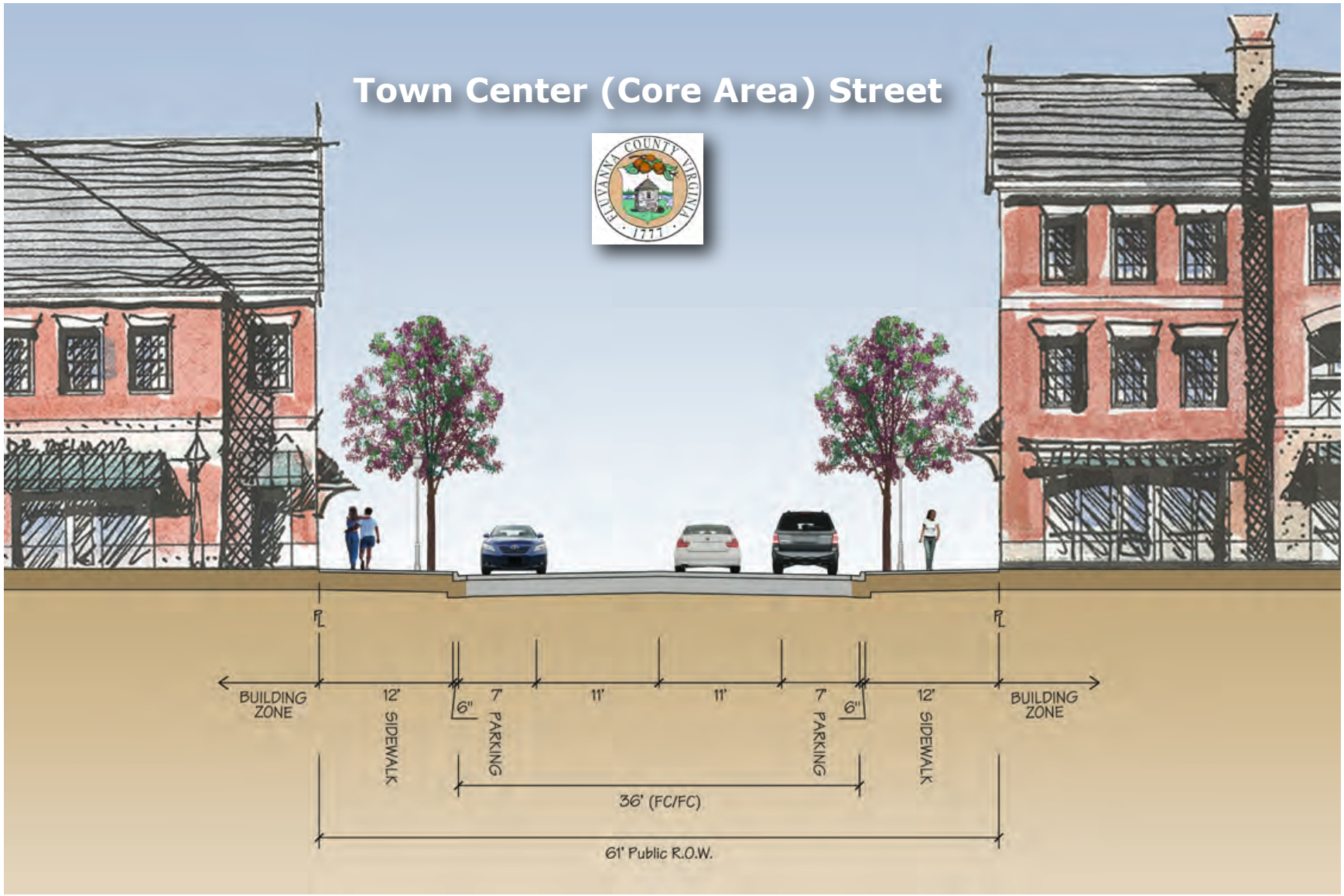
Prototype TND Streets

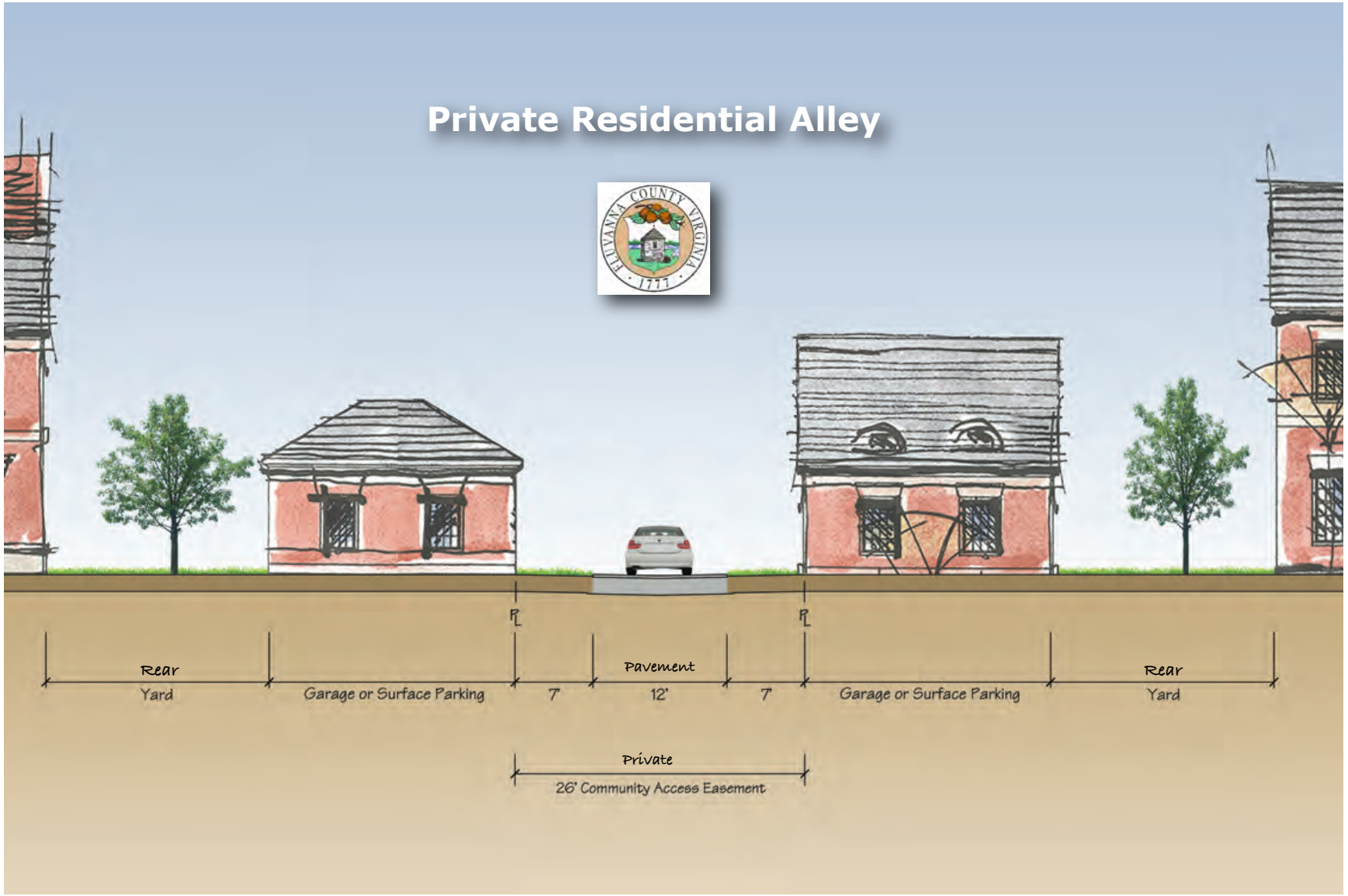
July 8, 2011

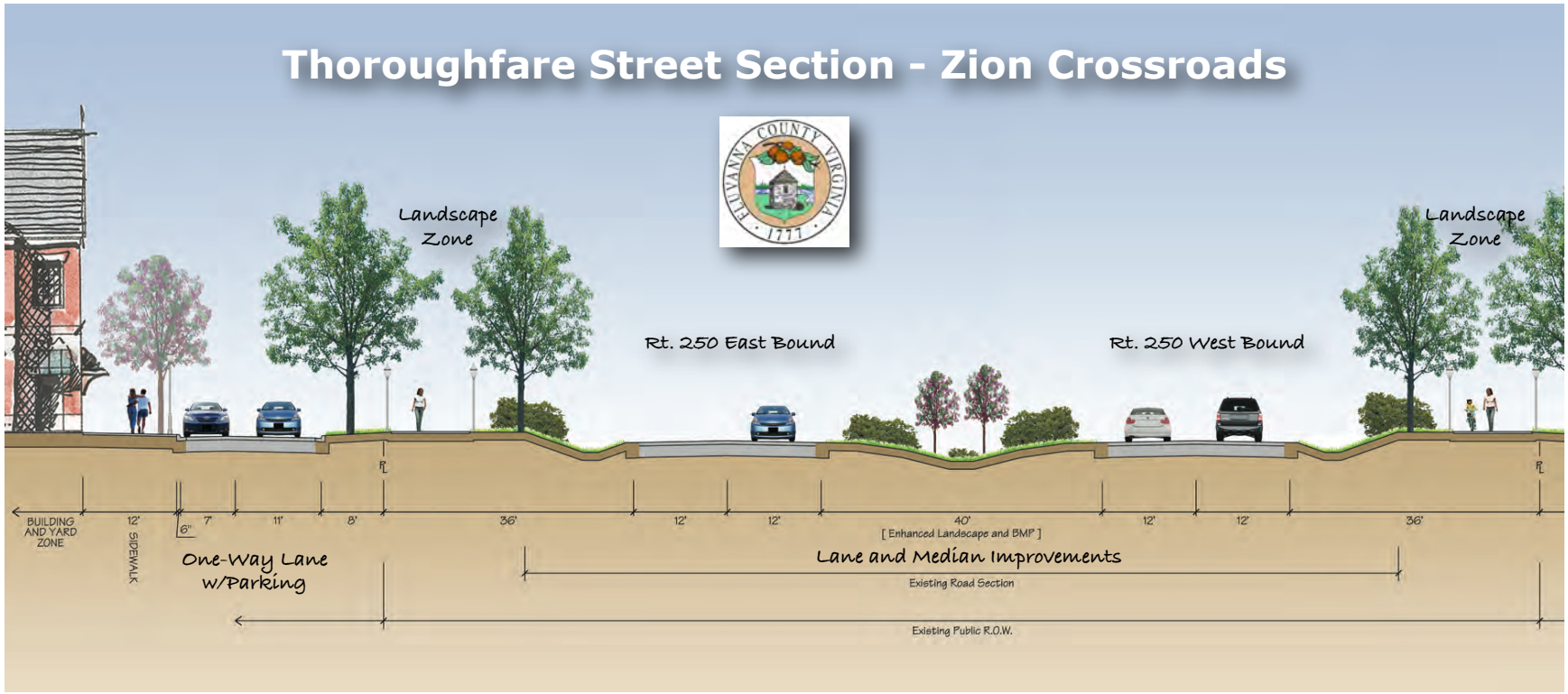



Neighborhood Residential Street
BUILDING ZONE
Variable Setback
6"
5' SIDEWALK
5' PLANTING ZONE
6"
7' PARKING
9'
9'
7' PARKING
6"
5' PLANTING ZONE
5' SIDEWALK
Variable Setback
6"
BUILDING ZONE
32' (FC/FC)
54' Public R.O.W.


One-Way Residential Street
SAVANNA COUNTY VIRGINIA
1777
℄
℄
Variable Setback
Variable Setback
BUILDING ZONE
BUILDING ZONE
6"
5' SIDEWALK
5' PLANTING ZONE
6"
7' PARKING
13'
6"
5' PLANTING ZONE
5' SIDEWALK
6"
20' (FC/FC)
42' Public R.O.W.


Town Center (Core Area) Street
BUILDING ZONE
12' SIDEWALK
6"
7' PARKING
11'
11'
7' PARKING
6"
12' SIDEWALK
BUILDING ZONE
36' (FC/FC)
61' Public R.O.W.


Private Residential Alley
Rear
Yard
Garage or Surface Parking
7'
Pavement
12'
7'
Garage or Surface Parking
Rear
Yard
Private
26' Community Access Easement


Thoroughfare Street Section - Zion Crossroads
Landscape Zone
Landscape Zone
Rt. 250 East Bound
Rt. 250 West Bound
BUILDING AND YARD ZONE
12'
SIDEWALK
6"
7'
11'
8'
36'
12'
12'
40'
[Enhanced Landscape and BMP]
12'
12'
36'
One-Way Lane w/Parking
Lane and Median Improvements
Existing Road Section
Existing Public R.O.W.

RENAISSANCE PLANNING GROUP

TECHNICAL MEMORANDUM

Potential Transportation Benefits of Urban Development Areas

Albemarle County, Virginia

DRAFT December 2, 2011

I. Background

Focusing future growth into designated Urban Development Areas in compliance with Section 15.2-2223.1 has potential benefits in terms of a more compact – and thus more efficient – service area for public infrastructure, utilities and capital facilities. In addition, general transportation benefits may also be realized from implementation of UDAs, primarily through shorter trip lengths and the potential for less automobile dependency overall. This technical memorandum broadly discusses these potential transportation benefits and uses generally accepted professional standards and methodologies to quantify these benefits as reductions in vehicle trips, vehicle miles traveled (VMT), average trip length, and additional mode splits.

II. Current Development Trends

In order to establish a baseline of development trends in the county prior to the adoption of UDAs, Renaissance did an analysis of recent development activity in Albemarle County. Available data from county building records was used to establish a general pattern of existing "trend" development in the county. Building permit data was analyzed with respect to both type of development and location of development in order to establish what was built and where in the county. Albemarle County has a wide range of development patterns. Development patterns within the designated growth areas along US 29 north of Charlottesville and along US 250 in Pantops can be categorized as suburban commercial centers. Crozet and the Village of Rivanna could be considered small village centers surrounded by residential communities. The larger designated development areas play an important role in accommodating density, mixed use, pedestrian orientation, and multimodal transportation. The remaining areas outside of the designated growth areas are generally rural and agricultural land uses with large lot suburban subdivisions. In these rural areas, pedestrian facilities are generally lacking along most roads, and transportation options other than the private automobile are limited. However, pedestrian facilities and transit service in Albemarle County's designated growth areas are generally available for basic travel needs. Especially in the Pantops and Places 29 areas, pedestrian facilities provide basic although somewhat disconnected amenities.

Albemarle County relies on the Neighborhood Model for accommodating future growth, focusing development into designated growth areas to retain the rural and agricultural character of the majority of the county. Albemarle County's UDAs are a subset of the designated growth areas, which can be envisioned as the next stage of UDA expansion.

Building permit data provides a good idea of the location and pattern of recent development. Available building permit records for new residential and non-residential construction in Albemarle County between January 2006 and May 2011 were examined and

mapped as shown below in **Figure 1**. The data is only for new buildings and does not include permits for alterations or additions.

Table 1 summarizes the residential building permit information. Fifty-nine percent of new residential buildings for which addresses were available in this time period were single family detached homes. Fifty-six percent of the residential building permits were for site-built single family homes, and three percent were for industrialized or manufactured homes. Seven percent of dwelling units constructed within the past five years were multifamily apartment units.

Only two percent of the newly constructed dwelling units with the County were built on land that was subsequently (in May of 2011) designated as a UDA. Interestingly, 15 percent of single family condo units were constructed on land now designated as a UDA, indicating that previous planning efforts and market demand for higher densities are already surfacing in these areas. For non-residential construction, as summarized in **Table 2**, 12 percent of building permits were issued for land now designated as a UDA, although the total number of non-residential building permits is much lower than residential building permits. **Figure 2** provides a closer look at Albemarle County's Urban Development Areas and the issued building permits within and outside the UDA. **Figure 3** shows the extents of the growth area boundaries and the building permits issued within these areas. **Tables 3 and 4** show the distribution of new construction inside of the designated growth areas. These tables show Albemarle County has successfully focused the majority of new development within the growth area boundaries.

Table 1. Albemarle County Residential Building Permits from 2006 to 2011 - Urban Development Areas

Permit Type	Inside UDA	Outside UDA	Total	% In UDA	Distribution
Single Family Detached	0	1543	1543	0%	56%
Mobile Home	2	87	89	2%	3%
Duplex	0	35	35	0%	1%
Single Family Attached	0	66	66	0%	2%
Single Family Townhouse	14	645	659	2%	24%
Single Family Condo	28	158	186	15%	7%
Multi Family Apartments[1]	8	184	192	4%	7%
Total Residential	**52**	**2718**	**2770**	**2%**	**100%**

Table 2. Albemarle County Non-Residential Building Permits from 2006 to 2011 – Urban Development Areas

Permit Type	Inside UDA	Outside UDA	Total	% In UDA
Commercial	24	142	166	14%
Institutional	0	28	28	0%
Total Non-Residential	**24**	**170**	**194**	**12%**

[1] Represents the number of dwelling units, not necessarily the number of building permits.

Table 3. Albemarle County Residential Building Permits from 2006 to 2011 – Growth Areas

Permit Type	Inside Growth Areas	Outside Growth Areas	Total	% In Growth Areas	Distribution
Single Family Detached	640	903	1543	41%	56%
Mobile Home	51	38	89	57%	3%
Duplex	34	1	35	97%	1%
Single Family Attached	59	7	66	89%	2%
Single Family Townhouse	651	8	659	99%	24%
Single Family Condo	186	0	186	100%	7%
Multi Family Apartments[2]	179	13	192	93%	7%
Total Residential	**1800**	**970**	**2770**	**65%**	**100%**

Table 4. Albemarle County Non-Residential Building Permits from 2006 to 2011 – Growth Areas

Permit Type	Inside Growth Areas	Outside Growth Areas	Total	% In Growth Areas
Commercial	137	29	166	83%
Institutional	14	14	28	50%
Total Non-Residential	**151**	**43**	**194**	**78%**

[2] Represents the number of dwelling units, not necessarily the number of building permits.

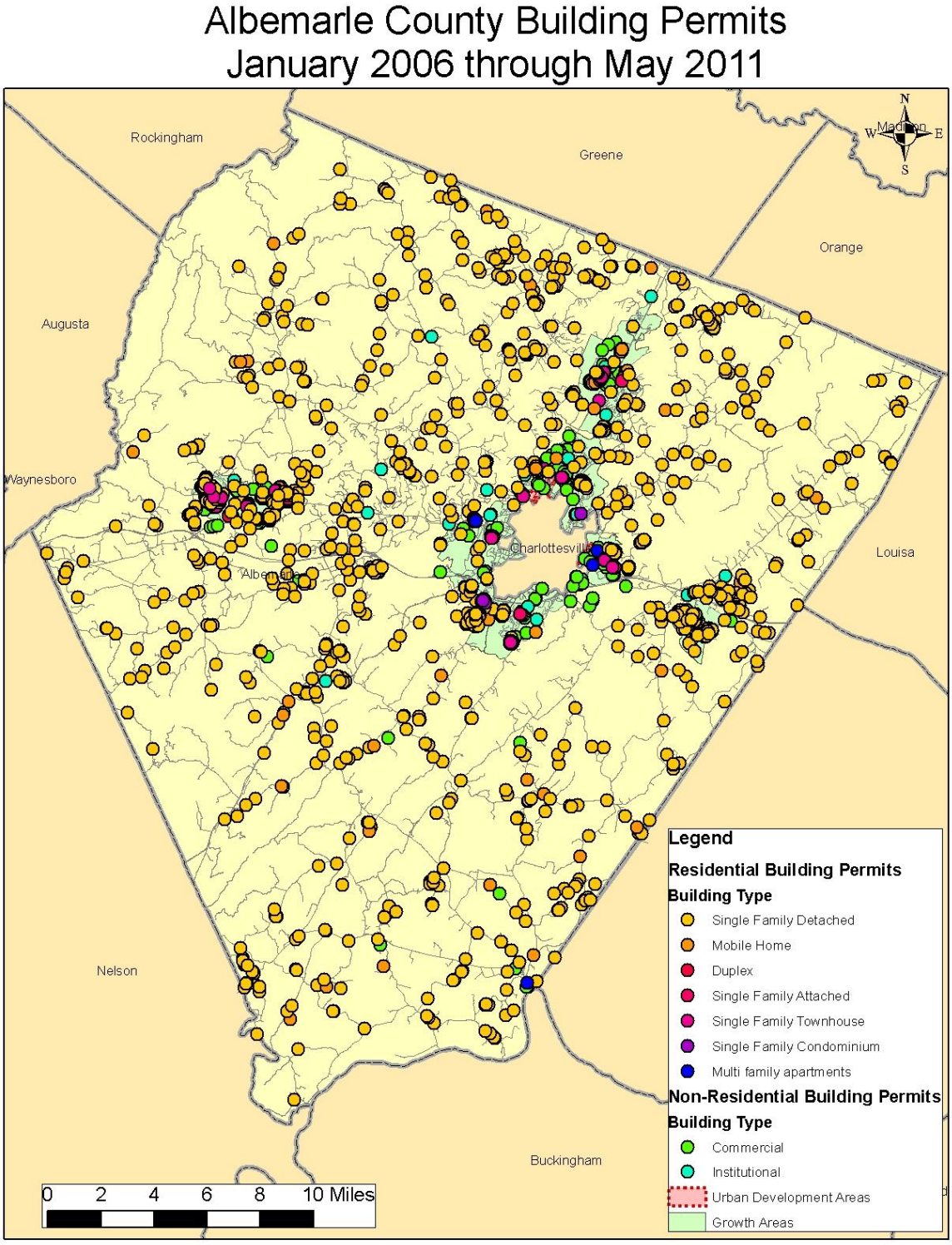


Figure 1. Albemarle County Building Permits from 2006 to 2011

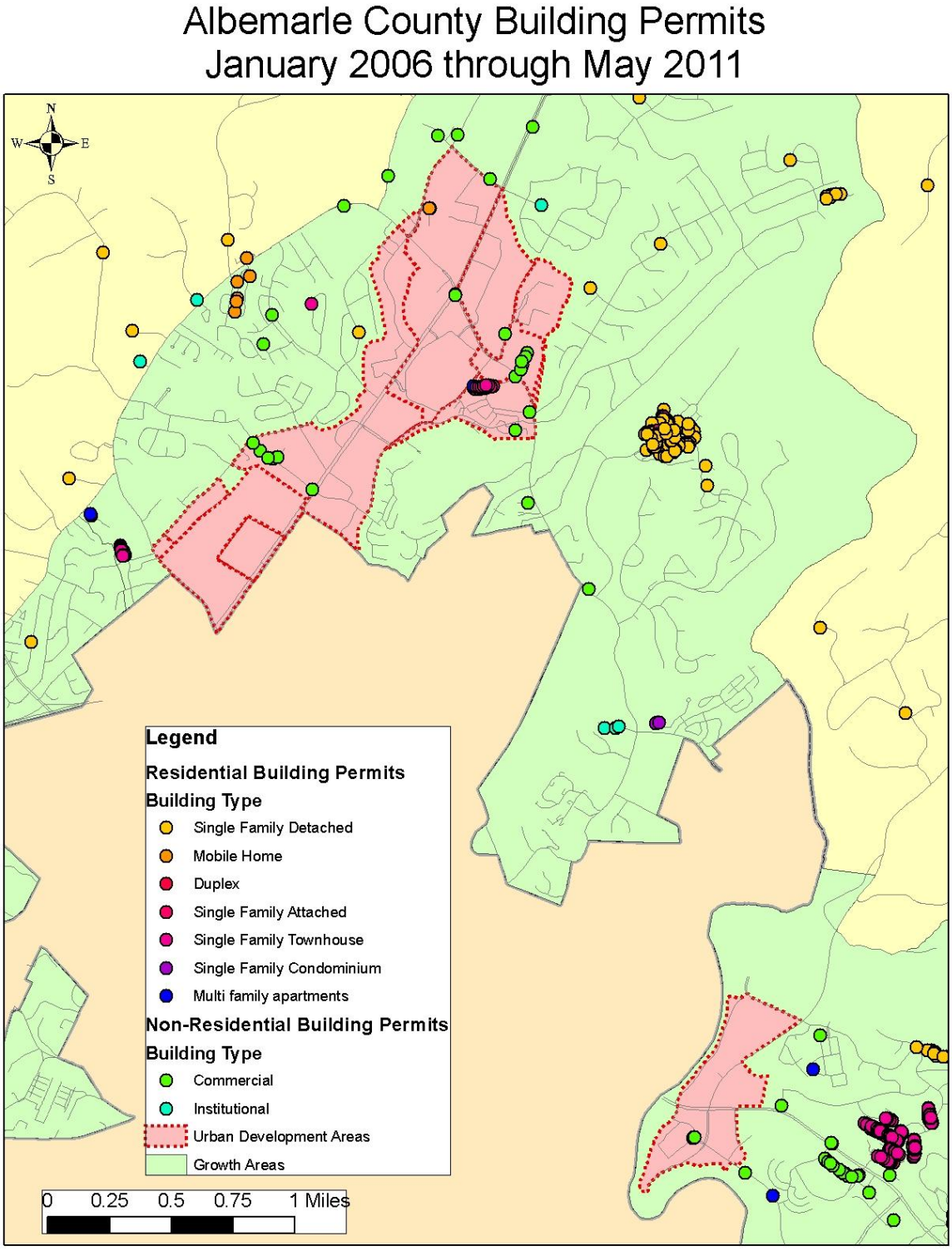


Figure 2. Albemarle County Building Permits Near Urban Development Areas from 2006 to 2011

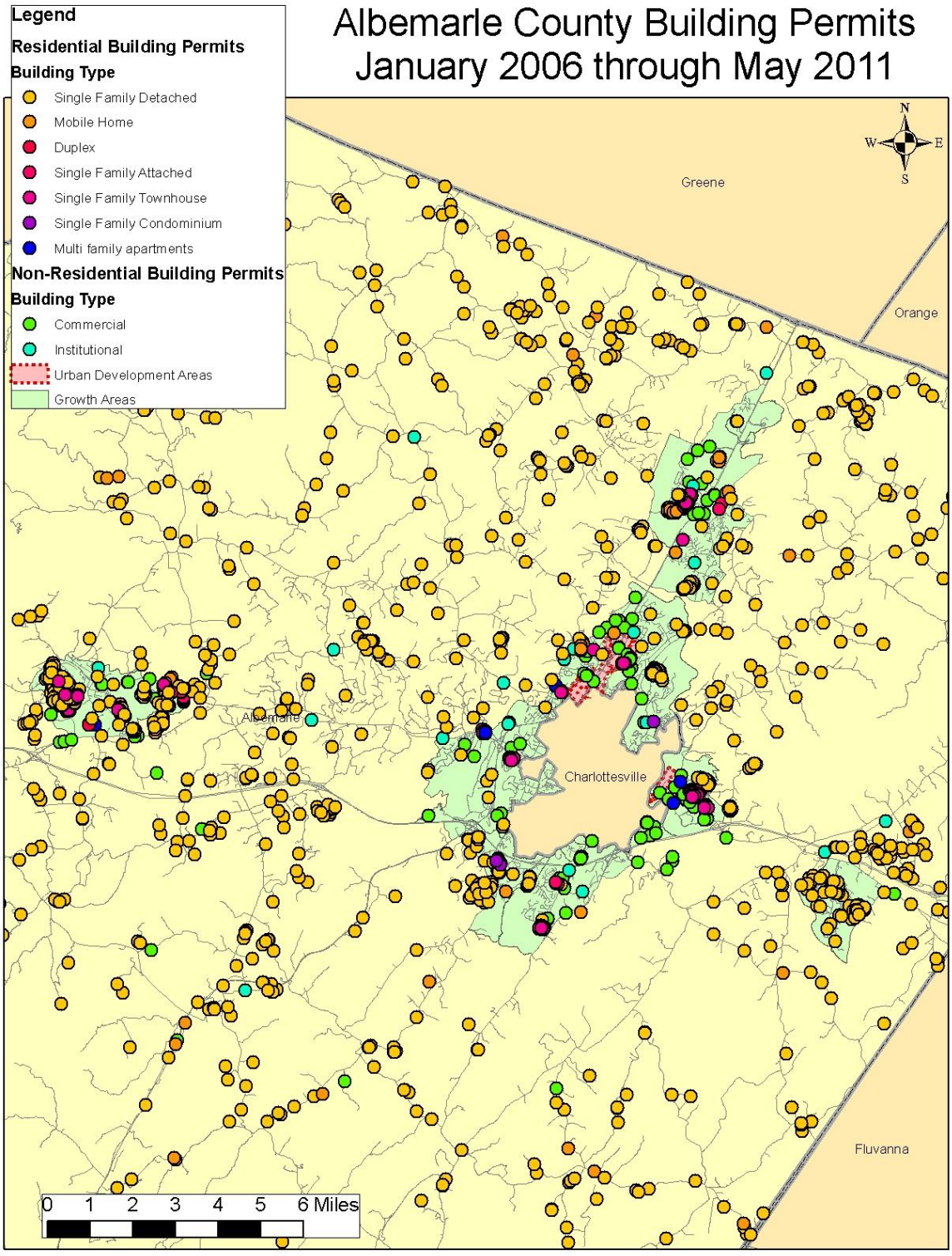


Figure 3. Albemarle County Building Permits Near Designated Growth Areas from 2006 to 2011

III. Growth Projections and Assumptions

The UDA legislation requires that the UDA boundaries be large enough to meet projected residential and commercial growth for at least 10 years but not more than 20 years.[3] The UDA legislation also requires the Comprehensive Plan to describe financial incentives to direct development to UDAs, and "to the extent possible" direct state and local funding for transportation, housing, utilities, and economic development toward the UDAs.

Based on these requirements, it is assumed that an increased proportion of the new growth in Albemarle County will occur in the designated UDAs, deviating from the trends of recent development for the entire County shown in the building permit analysis. It is assumed that the financial incentives and state and local investment in the UDAs could direct up to 50 percent of new county growth into the UDAs over the next 20 years. The 50 percent figure is assumed for purposes of this analysis to analyze the transportation benefits of concentrating development into UDAs; however, the ultimate distribution of actual growth may vary greatly in reality and will depend on market and state and local policy factors that are beyond the scope of this analysis.

The UDA legislation also establishes density parameters to be encouraged in the locality's Comprehensive Plan, depending on the population of the locality. Albemarle County has a population less than 130,000. The legislation requires that the Comprehensive Plan be amended to encourage the following densities, or any proportional combination thereof:

- 4 single family dwellings per acre
- 6 townhouses per acre
- 12 apartments, condos or cooperative units per acre
- 0.4 Floor Area Ratio for commercial development

The UDA legislation also contains design standards to be incorporated into the comprehensive plan amendment for UDAs. The Comprehensive Plan must include Traditional Neighborhood Design (TND) principles such as:

- Pedestrian-friendly road design
- Street interconnection
- Connectivity of road and pedestrian networks
- Natural area preservation
- Mixed-use neighborhoods & housing types
- Reduced building setbacks
- Reduced subdivision street width/turning radii

[3] Growth projections can be based on estimates from the Weldon Cooper Center for Public Service, the Virginia Employment Commission, or the U.S. Census.

Given the density and design requirements, it is assumed that development within the UDA will have a greater mix of uses with residences located closer to non-residential destinations, a more dispersed range of housing types with apartment and townhouses making up a greater share of the housing stock, a higher density of activity in both residential dwelling units and commercial land uses, and a more connected street network with greater intersection and street density, than areas outside UDAs in general.

A. Housing Type Assumptions

In the county as a whole, single family detached (site built and mobile homes) account for 59 percent of new residential construction. Duplexes, townhouses, condos, and other single family attached units comprise 34 percent of new construction, and the remaining seven percent are multifamily apartments.

However, the building permit data shows that none of the recently constructed residential units within the areas subsequently designated as UDAs are site built single family detached houses. Four percent are mobile homes, and the remaining 96 percent are townhouse, condo or apartment units. In areas outside of the designated UDAs, the building permit data shows 79 percent of new residential units constructed since January 2006 are single family detached, 17 percent are townhouses or condos, and four percent are multifamily apartments.

For purposes of analysis, it is assumed that future residential development within the UDAs will continue to be more compact with single family attached and multifamily homes than the rest of the county, where single family detached homes comprise the majority of new residential construction. These assumptions for future development are clarified in **Table 5**.

Table 5. Assumed Distribution of Future Development by Housing Type Inside and Outside UDAs

	Single Family Detached	Townhouse/Condo	Apartment
Inside UDAs*	**4%**	**48%**	**48%**
Outside UDAs**	**79%**	**17%**	**4%**

*Building permit data shows single family detached houses comprise four percent of residential units constructed since January 2006 on land subsequently designated as UDAs. It is assumed that future development within UDAs will be similar, with only four percent as single family detached homes. The remaining 96 percent is assumed to be split between townhouse/condo and multifamily apartments.

**It is assumed that future development in areas outside of UDAs will have the same housing type distribution as indicated in the building permit data.

It is important to underscore that this is only an assumption and that the actual proportions will be dictated by market dynamics and other local and State policies. However, for the purposes of this analysis, these assumptions have been used.

B. Growth Projections

Between 2010 and 2030, it is anticipated that Albemarle County's population will grow by 25 percent, based on estimates from the Virginia Employment Commission (VEC). The County is projected to have 9,958 new households and 1,493,635 additional commercial square feet by 2030. These growth calculations and assumptions were used in the determination of Albemarle County's UDAs and are shown in **Table 6**.

Table 6. Countywide Growth Projections based on VEC estimates

	10 Years	**20 Years**
Projected Population Growth	11,839 persons	24,894 persons
Projected Household Growth	4,735 households	9,958 households
Projected Commercial Growth	710,323 sq. ft.	1,493,635 sq. ft.

Based on the historical development trends identified in the building permit analysis, almost all of this new growth would occur in the areas outside of the UDAs. But with anticipated State and local incentives, it is assumed that the new growth patterns will differ, and that half of future development could potentially be focused within the UDA boundaries, as shown in **Table 7.**

Table 7. Location of past and potential future development

	Based on Past Five Years of Development Trends*		**Based on Redirected Growth Assumptions toward UDAs****	
	Residential	Non-Residential	Residential	Non-Residential
Inside UDA	2%	12%	50%	50%
Outside UDA	98%	88%	50%	50%

*percentages calculated from building permit data, based on past five years
**represents future development for next 20 years

C. Potential Future Development by Location and Housing Type

By applying the 20-year growth projections from **Table 6** to the assumptions for new development in **Tables 5 and 7**, a breakdown of new dwelling units and commercial square footage can be calculated by location and by housing type, as shown in **Table 8. Table 8** represents two different scenarios. The Trend Scenario assumes anticipated future development occurs in patterns consistent with the past five years as identified in the building permit data analysis. The UDA Scenario assumes half of new development will be

located in UDAs, with the majority of new residences constructed as townhouses/condos or apartments.

Table 8. Potential Housing Mix for Projected Future Household Growth in Albemarle's UDAs

		Single Family Detached	Townhouse/ Condo	Apartment	Total Dwelling Units	Commercial Sq. Ft.
Trend Scenario Based on Past Five Years of Development Trends*	Inside UDA	8	96	96	199	179,236
	Outside UDA	7,709	1,659	390	9,759	1,314,399
	Total	7,717	1,755	486	9,958	1,493,635
UDA Scenario Based on Redirected Growth Assumptions of UDAs**	Inside UDA	199	2,390	2,390	4,979	746,818
	Outside UDA	3,933	846	199	4,979	746,818
	Total	4,133	3,236	2,589	9,958	1,493,635

Note that in both scenarios the total number of dwelling units and commercial square feet is the same – 9,958 dwelling units and 1,493,635 commercial square feet, which is from the Countywide Growth Projections based on VEC estimates. It is simply the location of the new development and the variation in housing type that is different.

In the Trend Scenario, about 200 dwelling units and 180,000 commercial square feet will be located in the areas designated as UDAs. About 7,700 of the 10,000 new residential units constructed countywide will be single family detached homes.

In the UDA Scenario, half of the new dwelling units and commercial development will be located in the UDAs. About 4,000 of the 10,000 new residential units constructed countywide will be single family detached homes.

IV. National Trends and Research

In addition to changing the type and location of development, it is assumed that development within the UDA will be more conducive to walking and bicycling, both by virtue of shorter trip lengths and by pedestrian-friendly design. Density, diversity, design, destination accessibility and distance to transit are characteristics of development that can affect travel patterns.[4,5]

Numerous studies have shown the potential benefits of planning for development in a way that is consistent with the standards called for in the UDA legislation. Arranging new growth in compact patterns, preserving forested and agricultural land, providing a range of housing types, and implementing a connected network of streets and trails are all concepts tied to the idea of *smart growth*.

Generally, design principles such as reduced setbacks and narrower streets make pedestrians feel more comfortable walking along the streets. Drivers typically drive slower on narrower streets, increasing pedestrian safety. These factors can increase the viability of walking for a portion of daily trips.

Increasing the diversity of uses results in less miles and hours of travel. Putting jobs and households closer together reduces the number of vehicle miles traveled (VMT) and vehicle hours traveled (VHT) for work trips. Similarly, putting households and retail destinations closer together reduces VMT and VHT for shopping trips.[6] Areas with lower densities and single uses have higher VMTs, with longer trips and less walking.[7] Increasing the number of retail establishments within walking distance significantly influences the walking mode split for non-work trips.[8]

Land use policies like mixed use zoning, revitalization of traditional neighborhood shopping areas, incentives for infill, and street connectivity ordinances are designed to bring residents and destinations closer together and provide viable transportation alternatives to driving. These policies will result in less driving, particularly when accessibility is increased.[9]

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[4] Cervero, R., and Kockelman, K. 1997. "Travel Demand and the 3Ds: Density, Diversity, and Design." *Transportation Research Part D: Transport and Environment*. 2(3): pp. 199-219.
[5] Ewing, R., Bartholomew, K., Winkelman, S., Walters, J., and Chen, D. 2008. *Growing Cooler: The Evidence on Urban Development and Climate Change*. Washington, DC: Urban Land Institute.
[6] Cervero, R., and Duncan, M. 2006. "Which Reduces Vehicle Travel More: Jobs-Housing Balance or Retail-Housing Mixing?" *Journal of the American Planning Association*. 72(4).
[7] Ewing, R. 2005. "Land Use and Transportation Interactions." *Smart Growth and Transportation: Issues and Lessons Learned*. Conference Proceedings 32. Transportation Research Board.
[8] Lawrence, F., Kavage, S., and Litman, T. *Promoting Public Health Through Smart Growth: Building Healthier Communities Through Transportation and Land Use Policies and Practices*. SmartGrowthBC.
[9] Handy, S., Cao, X., and Mokhtarian, P. 2005. "Correlation or Causality between the Built Environment and Travel Behavior? Evidence from Northern California." *Transportation Research Part D: Transport and Environment*. 10(6).

From a travel demand modeling perspective, local land use and urban form affect the mode choice for intrazonal (within a traffic analysis zone or TAZ, usually a neighborhood) trips; trips with origins and destinations within the same TAZ are six times more likely to be made by walking than driving.[10]

Even in suburban medium-density mixed use environments, land use characteristics influence pedestrian activity levels. With a mix of uses, a substantial number of persons will walk in suburban areas to neighborhood commercial centers. Design details can have a major affect on regional vehicle trip generation and VMT from pedestrian travel.[11] Amongst otherwise similar suburban communities, average travel distances for commuting and non-work travel were much less in communities with traditional design, mix of uses and walkability as compared to typical single-use communities.[12]

National research consistently concludes that developing at higher residential and employment densities is likely to reduce VMT from both logic and empirical evidence, by bringing trip origins and destinations closer together. Research suggests the effects of compact mixed use development on VMT can be enhanced when combined with street network connectivity to accommodate non-motorized travel and good neighborhood design. The amount to which VMT can be reduced by compact mixed use development depends on where in a region development occurs, and current research lacks empirical data on how specific design features applied in different contexts affect VMT. [13]

A compilation of more than 200 studies on the effects of density, diversity, design, destination accessibility, and distance to transit on travel patterns concluded that VMT is most closely correlated to job accessibility by auto and distance to downtown, and secondarily related to intersection density and road network design. Walking is most closely correlated to intersection density and land use diversity, and the number of destinations within walking distance. Transit use most strongly correlates to distance to transit and street network design. [14]

While the majority of these studies are conducted in metropolitan areas much larger than Albemarle County, they have consistently proven that the character of design influences travel behavior. The methodological approaches to these studies widely vary, yet the conclusions show that development density, diversity and design can have positive effects

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[10] Greenwald, M. 2006. "The Relationship Between Land Use and Intrazonal Trip Making Behaviors: Evidence and Implications." *Transportation Research Part D: Transport and Environment.* 11(6).
[11] Hess, P.M., Vernez-Moudon, A., Snyder, M.C., and Stanilov, K. 1999. "Site Design and Pedestrian Travel." *Transportation Research Record*. 1674.
[12] Soltani, A., and Allan, A. 2005. "Analyzing the Impacts of Microscale Urban Attributes on Travel Evidence from Suburban Adelaide, Australia." *Journal of Urban Planning and Development*. 132(3). American Society of Civil Engineers.
[13] Transportation Research Board. 2009. *Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions*. Special Report 298.
[14] Ewing, R., and Cervero, R. 2010. "Travel and the Built Environment: A Meta-Analysis" *Journal of the American Planning Association*. 76(3): pp. 265-294.

on travel behavior including decreasing overall vehicle miles traveled (VMT) and increasing walking.

V. Assessment of Potential Transportation Benefits

A. Qualitative Transportation Benefits

Based on the trends and findings of previous research efforts, compact mixed use developments with connected transportation networks can result in the following general transportation benefits:

- *Increasing the mix of uses can shorten trip lengths and create opportunities for more modal choices. When daily destinations are far apart, people have few alternatives to driving on high-speed corridors for frequent trips. As overall demand grows, longer distances between origins and destinations increase the vulnerability of all travelers to delay and bottlenecks from congestion and incidents. Strategically connected local street networks offer route choices for local destinations, and can separate longer-distance traffic from local traffic, ultimately reducing congestion.*
- *Bicycle routes and sidewalks that are continuously connected to origins and destinations can increase the potential to walk or bike for daily trips by providing convenient and safe alternatives to busy roadways.*
- *Transportation systems are stronger when there are multiple choices of travel modes and routes. Transportation networks that provide multiple route options are more resilient in the face of congestion, crashes and emergencies. Modal options allow travelers to reach their destinations when their prior or usual mode of travel is unavailable or no longer desirable*
- *Bringing origins and destinations closer together through a greater mix of uses allows travelers to walk and bicycle to destinations and decreases the time and distance people spend driving on commutes and non-work trips.*

With the adoption of the Urban Development Areas into its Comprehensive Plan, Albemarle County may realize the transportation benefits similar to that documented in the research on this topic. Focusing new growth into the UDAs will bring destinations closer together, leading to shorter trips, and reducing the number of vehicle-miles traveled and the wear-and-tear on the County's road system. Also with destinations closer together, walking becomes a more viable option for some trips, which can remove some vehicle trips from the road system altogether. Development within the UDAs should be more diverse than typical suburban-style single use development, and the street network should be better connected with higher intersection densities, both of which are primary factors influencing walk mode share.

B. Quantitative Transportation Benefits

Aside from the general research on the qualitative transportation benefits that can be realized from smart growth principles, several industry standard approaches can help demonstrate potential transportation benefits of such growth principles in Albemarle County.

One of the primary ways of measuring a tangible benefit to the transportation system is in reduced Vehicle Miles Traveled. VMT reductions can occur from several factors: (1) if less trips in general are made; (2) if vehicle trips are removed from the network through walking or biking; and (3) if those vehicle trips that are made are shorter. Concentrating development into a smaller area reduces the distance between destinations, thereby shortening trip length. Development that is compact and pedestrian-oriented allows people more options to walk and make fewer trips.

These three types of trip and VMT reductions were estimated for Albemarle County using generally accepted industry best practices, including trip generation rates derived from the Institute of Transportation Engineers (ITE)'s *Trip Generation Manual 8th Edition* and reductions for pedestrian and bicycle trips from the Virginia Department of Transportation (VDOT)'s Traffic Impact Analysis Regulations Administrative Guidelines. In addition, results from the Jefferson Area Eastern Planning Initiative (EPI), an integrated land use and transportation study on the future possible growth patterns and resulting transportation impacts conducted in a three county area of central Virginia including Albemarle County in 2001, were examined to estimate the VMT reduction benefits from shorter trip lengths. The EPI study developed a preprocessing tool to refine the inputs of a travel demand model such that they are more sensitive to changes in land use patterns and urban design. This tool, CorPlan, was used to quantify the transportation impacts of several long range growth scenarios. The EPI study, CorPlan tool, and data analysis is explained in more detail in Section VI.B.2.

1. Housing Types and Trip Reductions

As discussed in the Background section in the beginning of this memo, current building permit data indicates that almost all of the new development within the past five year has occurred outside of the land area now designated as a UDA (98 percent of residential development and 88 percent of non-residential development). The building permit data also showed that 59 percent of new residential units were single-family detached houses.

As noted above, under "Assumptions," it is possible that these development patterns will change somewhat with the adoption of UDAs. For purposes of this analysis, it was assumed that up to 50 percent of the new residential and commercial growth in Albemarle County over the next 20 years would happen within the UDAs, and the residential growth within the UDAs would be primarily townhouses/condos and apartments.

ITE's *Trip Generation Manual 8th Edition* provides average daily trip rates for each type of housing unit. These rates are universally accepted and used in all VDOT-accepted traffic impact studies and other relevant traffic and roadway engineering projects. According to the ITE manual, one single-family detached house produces 9.57 trips that either originate from or end at the house. One multi-family rental apartment unit produces 6.65 trips per day, and one owner-occupied condominium unit or townhouse unit produces 5.81 trips per day.[15] Applying these rates to the future growth assumptions in Albemarle County results in an **overall vehicle trip reduction of 13 percent**, as shown in **Table 9**.

Table 9. Anticipated Vehicle Trip Reduction from Assumed Change in Housing Mix

		In UDA			Outside UDA				
		Single-Family Detached	Town-house/ Condo	Apart-ment	Single-Family Detached	Town-house/ Condo	Apart-ment	**Total**	Reduc-tion in Vehicle Trips
Future Trend Scenario**	No. of New Units	8	96	96	7,709	1,659	390	**9,958**	
	Daily Trips*	76	555	636	73,780	9,639	2,596	**87,282**	
Future UDA Scenario**	No. of New Units	199	2,390	2,390	3,933	846	199	**9,958**	
	Daily Trips*	1,906	13,885	15,893	37,643	4,918	1,324	**75,569**	**13%**
ITE Trip Rate		9.57	5.81	6.65	9.57	5.81	6.65		

*Used Average Rate to compute daily trips, not fitted curve equation

**Future development scenarios represent anticipated development for 20 years into the future. The Trend Scenario assumes future development will be of the same type and occur in the same spatial pattern as identified from the past five years of building permit data. The UDA Scenario assumes half of new development will occur in the UDA and have an even mix of housing types, as described in Section IV Growth Projections and Assumptions.

The ITE manual specifically states that the vast majority of developments from which the trip rates were developed are single use suburban locations lacking pedestrian facilities.

> *Data were primarily conducted at suburban locations having little or no transit service, nearby pedestrian amenities, or travel demand management (TDM) programs. At specific sites, the user may wish to modify trip generation rates presented in this document to reflect the presence of public transportation service, ridesharing, or other TDM measures; enhanced pedestrian and bicycle trip-making opportunities; or other special characteristics of the site or surrounding area.*

The variation in daily trips therefore is assumed not due to a difference in proximity of destinations or from walking or biking mode share. Rather, these may reflect differences in socioeconomics. Whatever the reason for the difference, this analysis clearly demonstrates that providing a more even mix of housing types in the UDA as opposed to a dominance of

[15] Trip rates are from ITE Land Use Codes 210 (Single-Family Detached Housing), 220 (Apartment), and 230 (Residential Condominium/Townhouse).

single family detached houses results in fewer vehicle trips that use the road network, which directly corresponds to a reduction in VMT.

2. Destination Proximity and Trip Reductions

Although national research on elasticities and internal capture trip reduction rates demonstrate the transportation benefits of compact mixed use developments development design characteristics, many of the sites that were used in these studies greatly differ from the context in which Albemarle County's UDAs exist. Most study sites are located in urban areas and within a much larger metropolitan context with available public transportation. It would be misleading to directly apply the trip reduction rates from these studies to the UDA in Albemarle County.

However, the Jefferson Area Eastern Planning Initiative, finished in 2002, provides a more relevant regional analysis of a more rural Virginia region and development trends that are more analogous to Albemarle County. The Jefferson Area EPI developed CorPlan, a spreadsheet tool with interfaces to ArcGIS that modifies travel demand model inputs to reflect the differences in travel patterns that result from variations in urban design and development patterns. This bottom-up approach of quantifying the transportation benefits based on alternate land use and development scenarios was customized to the Thomas Jefferson PDC area, and reflects a theoretical model-based approach. It is more applicable to the smaller communities of UDAs in Virginia than many of the test sites for national research on compact mixed use trip reduction.

a) EPI Scenario Planning and Community Elements

The EPI study analyzed four different scenarios for future growth, illustrated below in **Figure 4**. Future population and employment forecasts were projected for a 50-year horizon and held constant through all four scenarios. The distribution of the jobs and households varied significantly. In the dispersed scenario, about 60 percent of the entire land area is developed, whereas in the town centers and core scenarios the percentage of land that is preserved as rural agriculture and forest is 77 and 89 percent respectively. Preserving the agricultural and forest land is one of the major goals of the UDA process.

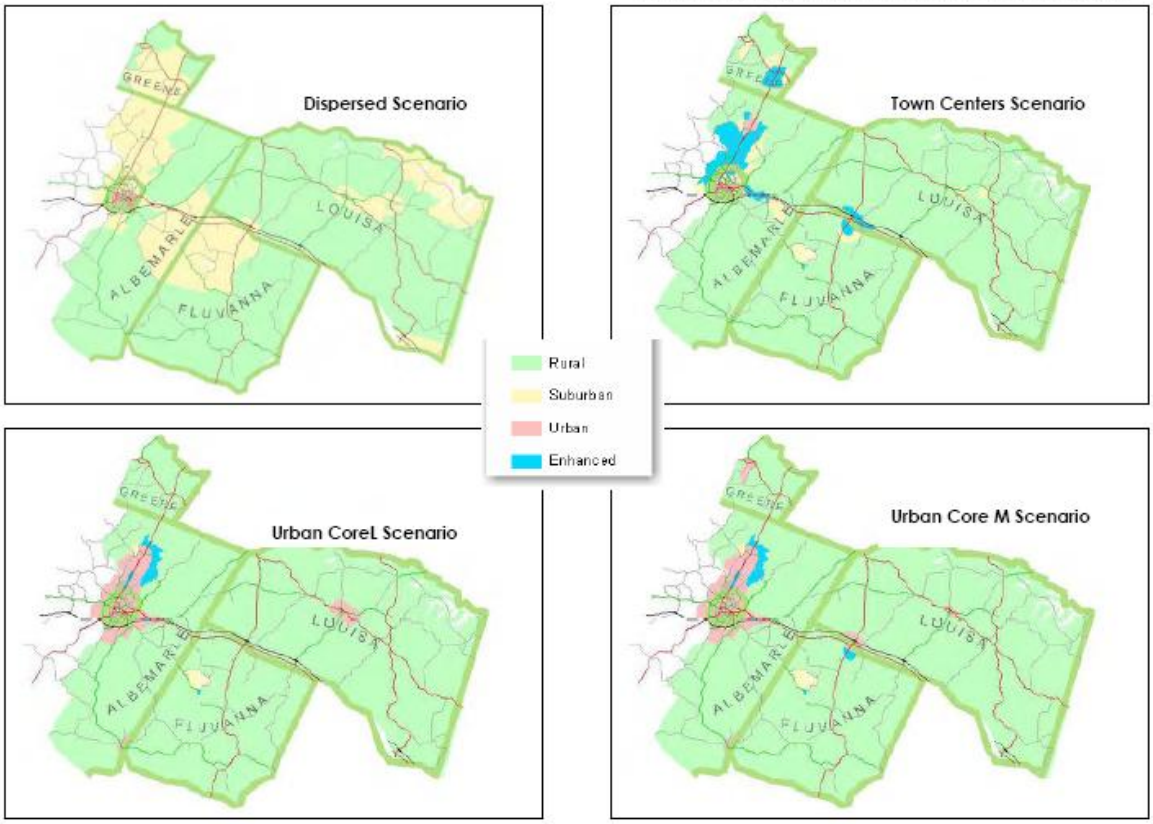
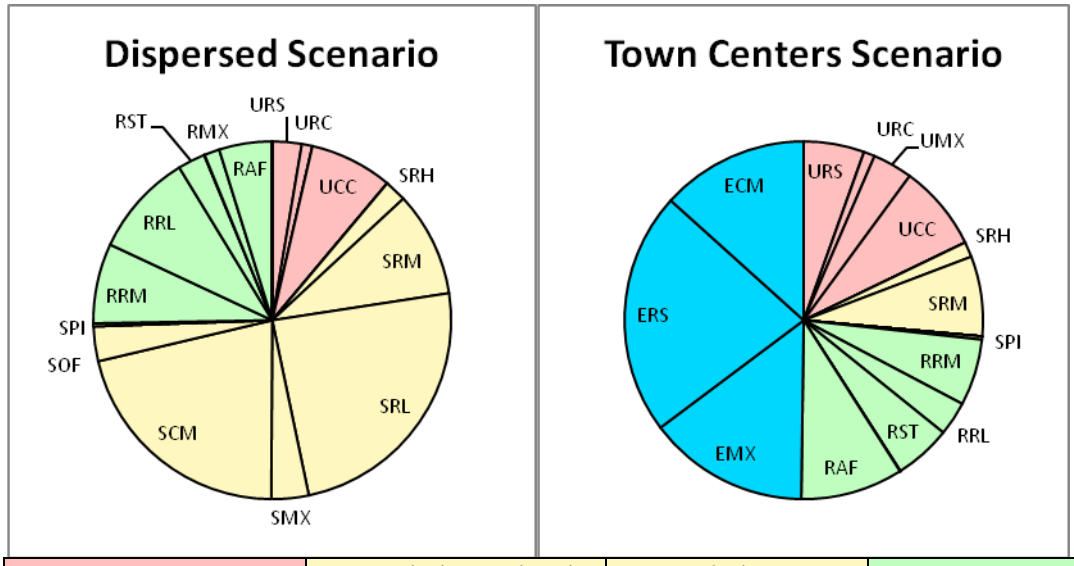


Figure 4. Eastern Planning Initiative Land Use Scenarios

The CorPlan tool used a variety of community elements to distribute the jobs and households throughout the study area. Each community element represented about 30 acres of land, contained a certain number of jobs and households through a specified allocation of land uses, and reflected assumptions about road and sidewalk connectivity, density and other design characteristics. The community elements were grouped into four general categories: urban, suburban, rural and enhanced. Enhanced elements generally reflected suburban densities but with more desirable urban design characteristics, typically found in traditional neighborhood developments (TNDs) like more street connections, smaller setbacks, less front-lot commercial parking etc. These TND characteristics are precisely those required by the UDA legislation for inclusion in the Comprehensive Plan.

In the dispersed scenario, 64 percent of the new jobs and households were allocated to typical suburban community elements. In the town centers scenario, only nine percent of the new growth occurred in typical suburban community elements, and 50 percent of the new growth occurred in enhanced community elements with TND characteristics. **Figure 5** shows the allocation of new growth by community element type for the dispersed and town centers scenarios. Each pie piece represents community element in which a proportion of

new households and jobs has been allocated. Red elements are urban, yellow elements are suburban, green elements are rural, and blue elements are enhanced.



URS	Urban Residential	SRM	Suburban Residential Moderate Density	SIN	Suburban Industrial	RMX	Rural Mixed Use
URC	Urban Residential College	SRL	Suburban Residential Low Density	SPI	Suburban Public Institution	RAF	Rural Agriculture/Forest
UMX	Urban Mixed Use	SMX	Suburban Mixed Use	RRM	Rural Residential Moderate Density	EMX	Enhanced Mixed Use
UCC	Urban College Campus	SCM	Suburban Commercial	RRL	Rural Residential Low Density	ERS	Enhanced Residential
SRH	Suburban Residential High Density	SOF	Suburban Office	RST	Rural Small Town	ECM	Enhanced Commercial

Figure 5. EPI Growth Allocations by Community Type

The difference between the dispersed scenario and the town center scenario in the EPI study is similar to the variation between the two future scenarios of Albemarle County (growth with and without UDA designation). The UDA designation means that much of the growth in the County will occur within the UDA, similar to the town center scenario. The core scenarios represent densities that are too extreme for comparison to Albemarle County. The type of development within Albemarle County's UDA will be most comparable to the enhanced community elements. The town center is similar to the future scenario for Albemarle County with UDA designation, because about half of the new growth (households and jobs) is through the enhanced community elements, which are more compact and preserve rural agricultural and forest lands relative to the dispersed scenario.

b) EPI Results

The travel demand model results for each of these four future scenarios are shown in **Figure 6**. As anticipated, focusing future growth into compact development and preserving rural

land produced transportation benefits. The number of total daily person trips remained at 1,900,000 for each scenario, indicating that the level of travel activity stayed the same. Residents and employees were making just as many trips in the dispersed scenario as in the others. Concentrating development increased the number of walk trips, and reduced overall VMT, showing more people were spending less time in the car to make trips. The town center scenario resulted in a 22 percent decrease in total VMT. The core scenarios resulted in a decrease in total VMT between 29 and 31 percent.

	Dispersed	Town Ctr	CoreL	CoreM
Total person trips (000s)	1,900	1,900	1,900	1,900
Vehicle trips (000s)	1,300	1,100	1,000	1,100
Walk trips (000s)	73	274	322	341
Percent walk trips	4%	14%	17%	17%
Vehicle miles traveled (000s)	15,700	12,300	10,900	11,200
Vehicle hours traveled (000s)	730	450	370	380
Average speed (mph)	22	28	29	29
Pct. VMT congested	44%	27%	20%	21%

All statistics are reported for an average weekday in 2050

Data from TRANPLAN assignment report

Figure 6. EPI Travel Demand Model Results

The reduction in VMT resulted because destinations were closer. Travelers shifted from driving to walking for some of their daily trips, and those that still drove had a shorter distance to drive. From these outputs, one can conclude that focusing about half of the new development into compact areas with enhanced urban design characteristics can result in a 22 percent reduction in VMT; 15 percent due to walking and six percent due to shorter trip lengths.[16] Thus, focusing roughly half of the new jobs and households into compact development with enhanced urban design features, similar to the development expected in Albemarle County's UDA, can result in a six percent decrease in VMT from shorter driving distance alone. This figure excludes the VMT reductions due to increased pedestrian and bicycle activity.

[16] To determine how much VMT was reduced because of walking and how much was reduced because of shorter driving trips, the average trip length for each scenario was calculated by dividing the VMT by the number of vehicle trips. The average trip length was 12.1 miles in the dispersed scenario and 11.2 miles in the town center scenario; drivers drove an average of 0.9 miles less per trip than in the dispersed scenario. Multiplying this difference by the total number of vehicle trips represents the reduction of VMT due to shorter trip length, about 1 million VMT in the town center scenario. The remaining 2.4 million VMT saved is attributable to walking.

3. Pedestrian and Bicycle Activity and Trip Reductions

A widely accepted way of estimating the trip reductions due to pedestrian and bicycle activity is found in VDOT's Traffic Impact Study Administrative Guidelines. This analysis uses the allowable VDOT reductions to estimate the potential transportation benefits from increased walking and biking. When estimating the impacts of new development, VDOT allows vehicle trip reductions for pedestrian or bicycle mode share when certain criteria are met. If the area has sidewalks, pedestrian-paths or multi-use trails along 80 percent of the roadway network, and it has a link-to-node ratio of 1.4 or greater indicating good connectivity, and has at least two different land uses, then reductions may be applied for pedestrians. If the pedestrian service level is ranked as an *A*, a four percentage reduction may be applied, meaning that four percent of the trips that the new development generates will travel by walking. A three percent reduction may be applied for service level *B*, and a one and one-half percent reduction may be applied for service level *C.*

The design requirements within the UDA legislation align with the VDOT requirements for trip reductions for pedestrian accommodations. Assuming that the pedestrian facilities, urban design, street connectivity, and other development attributes within the UDA will satisfy a pedestrian service level of *A*, four percent of all trips that have an origin or destination within the UDA will potentially be made by walking.

VDOT's Traffic Impact Study Administrative Guidelines also provide guidelines for trip reductions for bicycle accommodations. The criteria are almost identical to those for reductions for pedestrian accommodations. Bicycle accommodations[17] must exist on or along 80 percent of the road network with 2,000 feet of the proposed development, the link-to-node ratio must be 1.4 or greater, and there must be at least two different land uses. A three percent reduction may be applied for a bicycle service level of *A*; two percent for service level *B*; and one percent for service level *C*.

As with pedestrian facilities, the design requirements in the UDA legislation are intended to encourage bicycling. Assuming the design characteristics of the UDA will satisfy a bicycle service level of *A*, three percent of all trips that have an origin or destination within the UDA will be made by bicycling.

The VDOT reductions for non-motorized modes are shown in **Table 10**. By combining the trip reductions for pedestrian and bicyclist mode share, seven percent of all trips going to or from the UDA will be made by non-motorized modes. **Table 11** shows the number of vehicle

[17] Bicycle accommodations are streets with 25MPH or slower design speed carrying 400 vehicels per day or less; on-street bike lanes; sidewalks, pedestrian paths, or multi-use trails; paved shoulders of roadways that are not part of the designated traveled way for vehicles and are at least two feet wide; or exclusive and shared off-street bicycle paths.

trips that would potentially be removed from Albemarle County's road system due to walking and bicycling using the number of trips calculated in **Table 9** on page 15.

This seven percent figure does not include the anticipated transportation benefits from shorter driving distance, as explained in Section VI.B.2 Destination Proximity and Trip Reductions.

Table 10. Potential Reductions for Non-Motorized Modes*

Pedestrian Service Level	Peak Hour Trip Reduction	Bicycle Service Level	Peak Hour Trip Reduction
A	4%	A	3%
B	3%	B	2%
C	1.5%	C	1%

*as per VDOT Traffic Impact Analysis Regulations Administrative Guidelines 24VAC30-155.

Table 11. Potential Mode Share for New Trips in UDA Scenario*

Mode	Trips	Mode Share
Vehicle	70,279	93%
Pedestrian	3,023	4%
Bicycle	2,267	3%
Total	75,569	100%

*calculated using vehicle trips shown in Table 7 on page 14

C. Summary of Quantitative Benefits

Concentrating future growth into compact development patterns will result in travel pattern changes, reducing the miles of travel on Albemarle County's road system, and saving wear and tear on infrastructure and greenhouse gas emissions. The previous subsections have attempted to quantify the transportation benefits that will result from Albemarle County's adoption of UDAs.

Increasing the diversity of housing types to include more townhomes, condominiums and apartments will decrease the number of trips residents make, as evidenced in ITE's Trip Generation rates. Drawing destinations closer together, implementing a connected street network, and providing pedestrian and bicycle facilities will allow travels to walk or bike for a portion of their daily trips, further removing trips from the road network, as indicated by the reduction allowances for pedestrian and bicycle accommodations in VDOT's Traffic Impact Analysis Regulations Administrative Guidelines. These strategies will also shorten the average length of trips that are made by automobile, as shown qualitatively in many national research reports and quantified in a Virginia context by the Jefferson Area Eastern Planning Initiative. **Table 12** summarizes these quantitative benefits, using the 2030 population and employment forecasts from the VEC, and the methodology explained in the previous sections.

Table 12. Summary of Potential Quantitative Transportation Benefits of UDAs

Change from UDA Designation	Transportation Benefit
Diverse mix of housing types*	13 percent overall trip reduction*
Increase in walking and bicycling**	7 percent reduction in vehicle trips**
Decrease in vehicle trip length***	6 percent reduction in VMT***

*ITE Trip Generation Manual average trip rates
**VDOT Traffic Impact Analysis Regulations Administrative Guidelines trip reductions for pedestrian and bicycle accommodations
***Jefferson Area Eastern Planning Initiative CorPlan results

VI. Conclusion

Albemarle County's designation of urban development areas (UDAs) will result in more compact, mixed use and walkable development than in the past. These areas should have a greater mix of housing types and residential and non-residential land uses, and the infrastructure and connectivity to make walking and bicycling viable modes of transportation for a portion of daily trips.

The potential qualitative transportation benefits of compact mixed use development include reduction in VMT, increase in walking mode share, greater transportation mode choice, reduction of the wear and tear on the County's road nework, decrease in average household transportation costs, and reduction in fossil fuel consumption and greenhouse gas emissions..

Quantitatively, the changes in development patterns can reduce the number of vehicle trips, average vehicle trip length and number of vehicle miles traveled. The ITE Trip Generation rates show residents of townhomes, condominiums and apartments make less trips in general. Drawing destinations closer together, providing infrastructure, and using design characteristics to encourage walking will allow citizens to walk for a portion of their daily trips. These changes will also result in shorter average vehicle trip lengths and lower daily VMTs, as quantified in a Virginia context in the Jefferson Area Eastern Planning Initiative.

The analysis presented in this technical memorandum demonstrates the potential transportation benefits of UDAs and rests on a number of assumptions of population and employment growth, future development location and design, and likeness to the Jefferson Area EPI study. While the specifics of these assumptions may occur differently in the future, the analysis uses the most accurate forecasts and professional judgment to quantify the potential transportation benefits of Albemarle County's UDAs.

APPENDIX C.
TND Implementation Ordinances

ATTACHMENT #1

DRAFT PUD-TND DISTRICT for Zoning Ordinance with Submission Requirements

Addition to Article III – Proposed as new section in Division 1. Special Districts

Sec. 10-37. PUD-TND Planned Unit Development-Traditional Neighborhood Development District

(1) Purpose. The purpose of the Planned Unit Development - Traditional Neighborhood Development District (PUD-TND) is to provide opportunities for the development of new neighborhoods that feature a mix of land uses and building types that are closely linked by a network of streets, sidewalks, formal and informal open spaces and trails that create an environment that is both pedestrian and transit friendly, and similar to historic small towns and neighborhoods established in Virginia and Montgomery County. The objective of the PUD-TND is to promote:

a. Compact development with defined edges and a distinct neighborhood center;
b. Human scale buildings and streets that are pedestrian and transit oriented;
c. A mix of uses, including residential, commercial, civic, and open space uses ~~in~~ located close to one another within the neighborhood to reduce traffic congestion, reduce travel demand and dependence on automobiles;
d. A mix of housing styles, types, and sizes to accommodate households of all ages, sizes, and incomes;
e. A system of relatively narrow, interconnected streets with sidewalks, bikeways, and transit that offer multiple routes for motorists, pedestrians, and bicyclists and provides for the connection of those streets to existing and future developments;
f. Public transit as a viable alternative to the automobile by organizing appropriate building densities
g. Preservation and adaptive use of existing buildings with historical significance or architectural features that enhance the traditional visual character of the community;
h. Preservation of significant environmental features and incorporation of such features into the design of new neighborhoods;
i. Design and development consistent with the County's comprehensive plan.

The illustrations below are advisory only and are intended to show general intent of this District. Refer to the Code standards below for the specific standards for this section.

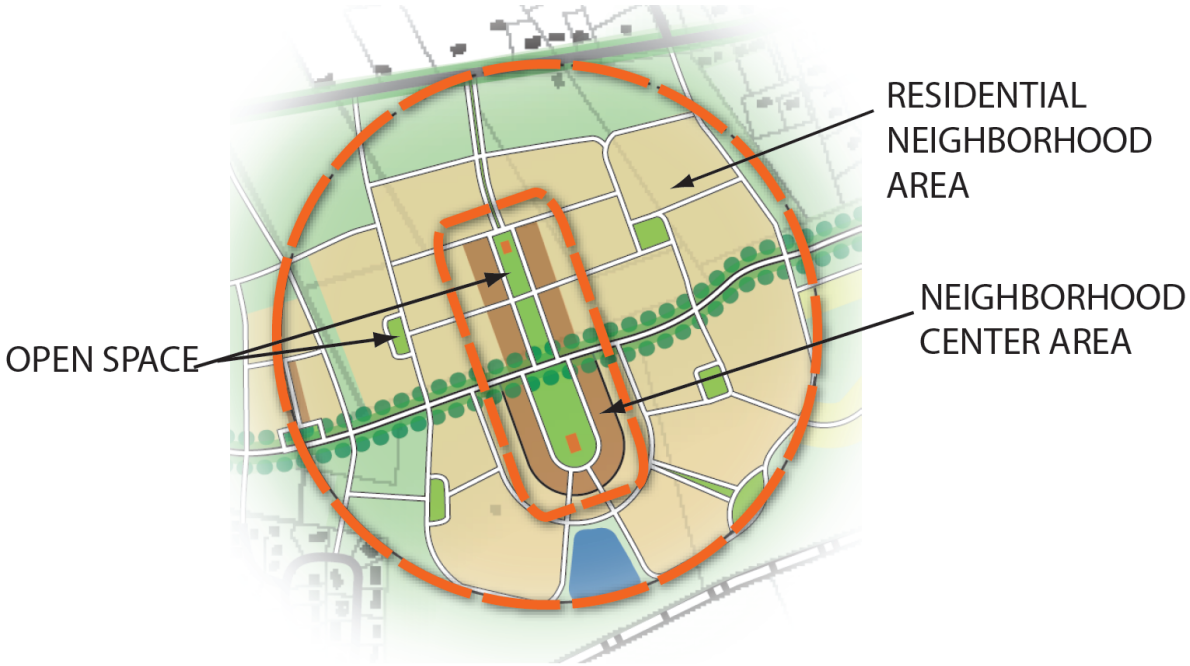
(2) *Qualifying lands.* Lands qualifying for inclusion in the district shall be limited to tracts within areas mapped as Urban Development Areas, Urban Expansion Areas, Villages and Village Expansion Areas as designated in the Comprehensive Plan and that are served by, or planned for, public sewer and water service. Additionally, the applicant must demonstrate to the satisfaction of the Board of Supervisors that there is sufficient available sewer and water capacity to accommodate the proposed development at full build out and/or provide a plan demonstrating that such improvements will be phased to accommodate projected development as it occurs (see also rezoning and submission requirements Sec 10-54).

(3) *Area Requirements.* The minimum area required to qualify for a traditional neighborhood development shall be forty (40) contiguous acres of land (this is an area encompassed within ¼ mile and approximately the distance at which studies have shown that a significant percentage of people will leave their cars parked and walk between destinations). The tract of land to be developed shall be under single ownership, or shall be the subject of an application filed jointly in accordance with an approved plan. Parcels over 200 acres shall be developed as multiple neighborhoods each with an individual neighborhood center subject to all the provisions of this subsection.

(4) *Mix of Uses.* A mix of land uses is required to achieve the proximity of activities necessary to create a walkable neighborhood. A PUD-TND shall consist of a mix of residential uses and unit types, a neighborhood center and open space subject to compliance with an approved development plan that shall identify the following required subareas:

a. Neighborhood Center
b. Residential Neighborhood
c. Open Space (which may be located in either Neighborhood Centers or Residential Neighborhoods)

The illustration below is advisory only and is intended to show the intent of the subareas of this District. Refer to the Code standards for the specific standards in this section.



(5) *TND Subarea Standards and Uses.*

(5) (i) *Neighborhood Center:* Each PUD-TND neighborhood shall have a core made up primarily of commercial, residential, civic or institutional, and open space uses.

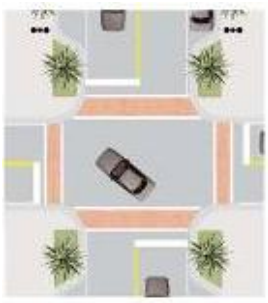
(a) Neighborhood Center Requirements

1. The neighborhood center shall be no less than 10% and no more than 30% of the total PUD-TND district area and shall include the four different categories of land uses set forth in (b) below: Residential, Commercial, Civic or Institutional and Open Space.

2. A minimum of five percent (5%) and a maximum of thirty percent (30%) of the net development area of the Neighborhood Center shall be designated for a combination of office, commercial and/or service uses. Individual buildings shall not exceed 20,000 square feet in total size, or 10,000 square feet per floor without approval of a special use permit (see Section _____). Clear pedestrian pathways shall be provided between buildings on the same lot and between buildings on adjacent lots to ensure a continuous pedestrian pathway throughout the center;

3. Crosswalks shall be incorporated within the project, at intersections where new streets are proposed, within parking lots, or other needed pedestrian connections subject to VDOT approval. Crosswalks shall be designed to be an amenity to the development, e.g. heavy painted lines, pavers, edges, and other methods of emphasizing pedestrian use, including bulb-outs and other pedestrian designs to shorten walking distances across open pavement.

Medians may be used in appropriate areas to encourage walking and to act as a refuge for crossing pedestrians;



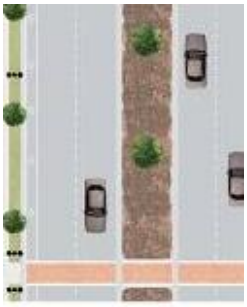


Figure 5. Bulb-outs and crosswalks. **Figure . Crosswalk and Median Refuge.**

4. The timing of construction of the non-residential portions of the Neighborhood Center shall be left to the discretion of the applicant(s) as long as the approved concept plan reserves an area for such uses and provided not more than seventy five (75) percent of the total approved residential units (for the entire PUD-TND) may be built prior to construction of at least fifty (50) percent of the approved non-residential floor area of the Neighborhood Center.

(b). Permitted Neighborhood Center Uses by Category:

1. Commercial uses.

a. Retail Sales and Services including, convenience stores and general stores without fuel sales
b. Restaurants and outdoor seating associated with Restaurants provided that all outdoor dining areas maintain at least 5 feet of unobstructed sidewalk width between the limits of the outdoor seating area and the roadway edge of the sidewalk.
c. Financial Institutions
d. Hotels and Motels
e. Office, administrative, business or professional.
f. Medical Care Facility
g. Day Care Center
h. Funeral Home
i. Conference or training center
j. Public or private parking structures, areas, and lots that are accessory to any permitted or permissible commercial, residential, civic, institutional or open space use.
k. Church
l. Laundromat

2. Residential uses.

a. Single-family attached dwellings, including duplexes, townhouses, row houses;
b. Multifamily dwellings, including senior housing;
c. Residential units located on upper floors above commercial uses;
Live/work units that combine a residence and the resident's workplace;
e. Nursing Home, Congregate Care Facility, and assisted living facilities.

3. Civic or institutional uses.

a. Municipal offices, fire stations, libraries, museums, community meeting facilities, community centers, and post offices;
b. Transit shelters;
c. Church;
d. School
e. Civic club

4. Open Space Uses

a. Square
b. Plaza
c. Park
d. Green
e. Ballfields and playgrounds

(b) Neighborhood Center Uses permitted by special use permit. Any of the following uses may be allowed in conjunction with a permitted commercial use subject to approval of a special use permit filed as part of the initial development plan at the time of rezoning; however, the board of supervisors may impose conditions on such uses even if approved as part of the initial development plan.

1. Drive-through windows serving or associated with permitted uses provided such facilities are located at the rear of the principal structure and do not conflict with pedestrian travel ways. In no case shall the drive through lane or window abut or face a public street.

2. Outdoor storage, display and/or sales serving or associated with a by-right permitted use, if any portion of the use would be visible from a travelway.

3. Individual buildings over 20,000 total square feet in size, or greater than 10,000 square feet floorplate.

4. Fuel sales with pumps located at the rear of the associated retail structure and which do not conflict with pedestrian travel ways or interrupt street frontage. In no case shall the gas pump canopy abut a public street.

(c) *Additional Provisions for Neighborhood Center Uses:*

(a) Ground floor residential is not permitted in Mixed Use Buildings.

(b) Notwithstanding other buffer, landscaping and screening requirements of this chapter, outside storage areas for materials, equipment or trash are accessory uses, may not exceed forty (40) percent of ground floor building area, must be located in side or rear yards adjacent to the principal building, and must be screened from view of adjacent streets or adjacent land.

(c) Outdoor seating areas must have a minimum sidewalk width of 5 ft. between the limits of the outdoor seating area and the roadway edge of the sidewalk

(5) (ii) *Residential Neighborhood:* The primary Subarea of the PUD-TND shall be a neighborhood or series of neighborhoods that provide a mix of housing types with the majority of such housing units located within walking distance of the Neighborhood Core and public open space.

(a) Residential Neighborhood Requirements

1. No more than 90% of the net development area of a PUD-TND shall be residential (inclusive of any residential portion of the Neighborhood Center).

2. Each PUD-TND Residential Neighborhood shall include a minimum of two different housing types and no more than 70% of the total number of units in a neighborhood shall be any one type (sfd, multi family, townhouses, etc)—see page 6(b).

3. Multi-family and single family attached housing shall generally be located closest to the core of the community and within one-quarter (1/4) mile of the Neighborhood Center, and may be permitted farther from the Neighborhood Center if necessary to provide a transition between the neighborhood and abutting off-site high density housing areas, non-residential areas, or major transportation corridors.

(b.). Permitted Residential Neighborhood Uses:

1. Single-family detached dwellings;
2. Single-family attached dwellings, including duplexes, townhouses, row houses;
3. Multifamily dwellings
4. Accessory dwelling units associated with single family dwellings;
5. Home occupation
6. Open Space
7. Accessory parking structures, lots or areas associated with permitted multifamily or open space uses

(c) Residential Neighborhood Uses permitted by special use permit. Any of the following uses may be allowed in conjunction with a permitted Residential Neighborhood use subject to approval of a special use permit filed as part of the initial development plan at the time of rezoning; however, the board of supervisors may impose conditions on such uses even if approved as part of the initial development plan:

1. Home business

(5)(iii) Open Space: Open space is one of the central organizing features within a PUD-TND and shall be distributed throughout the development and accessible to all residents. Open space shall include formal squares, plazas, and greens and less formal parks, recreation areas, greenbelts, and natural areas. Large outdoor recreation areas should be located at the periphery of neighborhoods rather than central locations.

(a) Open Space Requirements

1. A minimum of thirty (30) percent of the gross site area of the PUD-TND shall be common open space uses, and a minimum of 15% shall be usable open space. Usable open space shall be of usable size, shape, location, and topography for formal parks, plazas, greens or squares; or for active recreational use. This open space requirement may be met by open space areas designated within the Neighborhood Center and Residential Neighborhood subareas.

2. Each Neighborhood Center Subarea shall have a minimum of 2% of the area of the Neighborhood Center in common open space, provided that the total amount of such area shall be no smaller than one (1) acre total. All of the open space area located within the Neighborhood Center must be used for parks, squares, or greens.

3. A minimum of fifty (50) percent of the common open space located in the Residential Neighborhood area must be suitable for active recreational usage such as playgrounds, ballfields, bike paths, and trails. Suitable active open space must be of usable size, shape, location, and topography.

4. A square, green or plaza shall not be less than eight thousand (8,000) square feet in size and should not exceed 1 acre.

5. Common open space shall not include existing and/or proposed street rights-of-way, parking areas as required or established under a county ordinance, or driveways.

6. Common open space shall be designed to allow all residential areas within the PUD-TND development pedestrian access to the open space, and no residential dwelling unit in the PUD-TND shall be located more than eight hundred (800) linear feet from accessible common open space. This requirement may be waived during the site plan approval process in instances of unusual parcel shapes, the provision of ample private open space, or other mitigating factors.

(b) Permitted Open Space Uses:

1. Natural areas including environmental corridors, greenways, protected natural areas and reserves
2. Parks, squares, greens and plazas
3. Streams, ponds, and other water bodies;
4. Stormwater detention/retention facilities.
5. Accessory parking areas or lots located within public parks or publicly accessible natural areas
6. Recreational facilities, such as ballfields, playgrounds

(*c) Ownership and Maintenance*

1. Membership in a Property Owners Association (POA) established by the Master Developer shall be mandatory for all property owners within the TND, and shall be required as a covenant in all deeds to property in the TND granted after Concept Plan approval. A TND may have a residential Association and a commercial Association.
2. Initially, the Developer shall maintain control of the Association until such time as two-thirds (2/3) of the lots in the TND have been sold, or as otherwise set forth in its Articles or Bylaws.
3. Common elements including, but not limited to, open space, recreation, plazas, roads, parking, sewer, water, and stormwater management facilities which will not be publicly owned, shall be subject to a form of ownership established in private agreements acceptable to the County, upon recommendation of the County's attorney.
4. The Master Developer shall prepare documents which provide at a minimum that the POA shall accept title to any open space or Civic Lots which may be deeded to them, and shall provide for the maintenance of any common area improvements, private streets or sidewalks, rights-of-way, Civic Buildings, utilities, open space or Civic Lots or other property owned by the owners association. The documents shall establish voting and use rights and shall provide for the collection of dues, levies or assessments to cover expenses including, but not limited to, tax liabilities, maintenance, insurance, and municipal or state assessments. The property owner's association shall have the authority to acquire a lien upon the property of any of its members in order to secure collection of any amounts due.
5. The County shall be authorized to maintain the common elements and assess the private ownership accordingly if private ownership fails to function as required in any private agreements.

(6) *Development Density:* The permitted maximum and minimum development densities in the PUD-TND shall conform to density guidelines established in the Comprehensive Plan as follows:

(a) Residential Densities:

1. In areas designated in the Comprehensive Plan as Urban Expansion, village or village expansion areas, gross residential densities shall not exceed three (3) dwelling units per acre.

2. In areas designated in the Comprehensive Plan as Urban Development Areas or urban expansion areas, gross residential densities shall not exceed six (6) dwelling units per acre.

3. Notwithstanding 1 and 2 above, residential densities by housing type shall not exceed four single-family detached dwellings, eight townhouses (duplexes and row houses included), or 15 multi-family units per net residential acre.

(b) Non-Residential Densities:

1. In areas designated in the Comprehensive Plan as village or village expansion areas, non-residential gross floor area ratios shall not exceed 0.25 F.A.R

2. In areas designated in the Comprehensive Plan as Urban Development Areas or Urban Expansion Areas, non-residential gross floor area ratios shall not exceed 0.40 F.A.R

(c) Calculating Density for Mixed Use Buildings:

The residential component of mixed use buildings shall not be counted toward the maximum non-residential floor area permitted, but shall be included in overall density totals as residential units. Multi-family residential uses up to 20 units per net acre maximum shall be permitted if included on the upper floors of a building with ground floor commercial use.

(7) Lot and Building Requirements

(7) (i) Residential lot and building standards

(a) *Minimum lot area for residential uses.*

Single-family detached dwellings: Five thousand (5,000) square feet.

Duplex dwellings: Three thousand (3,000) square feet;

Single-family attached dwellings:
Fifteen hundred (1,500) square feet; Maximum of eight (8.0) single-family attached dwelling units connected together in one (1) group of units.

Multi-family structures:
Eight thousand five hundred (8,500) square feet;

(d) *Minimum lot width for residential uses.*

Single-family detached dwellings: Fifty (50) feet.

Duplex dwellings: Forty five (45) feet.

Single-family attached dwellings: Eighteen (18) feet.

Multi-family structures: Ninety (90) feet

(e) *Maximum lot coverage.* Seventy (70) percent.

(f) *Required yards for residential uses.*

1. Front.

Single-family detached and duplex dwellings:
Minimum: six (6) feet in the Neighborhood Center; ten (10) feet in Residential Neighborhoods

Maximum: Fifteen (15) in the Neighborhood Center; twenty-five (25) feet in Residential Neighborhoods, except no maximum setback for any residential lot of twenty thousand (20,000) square feet or greater.

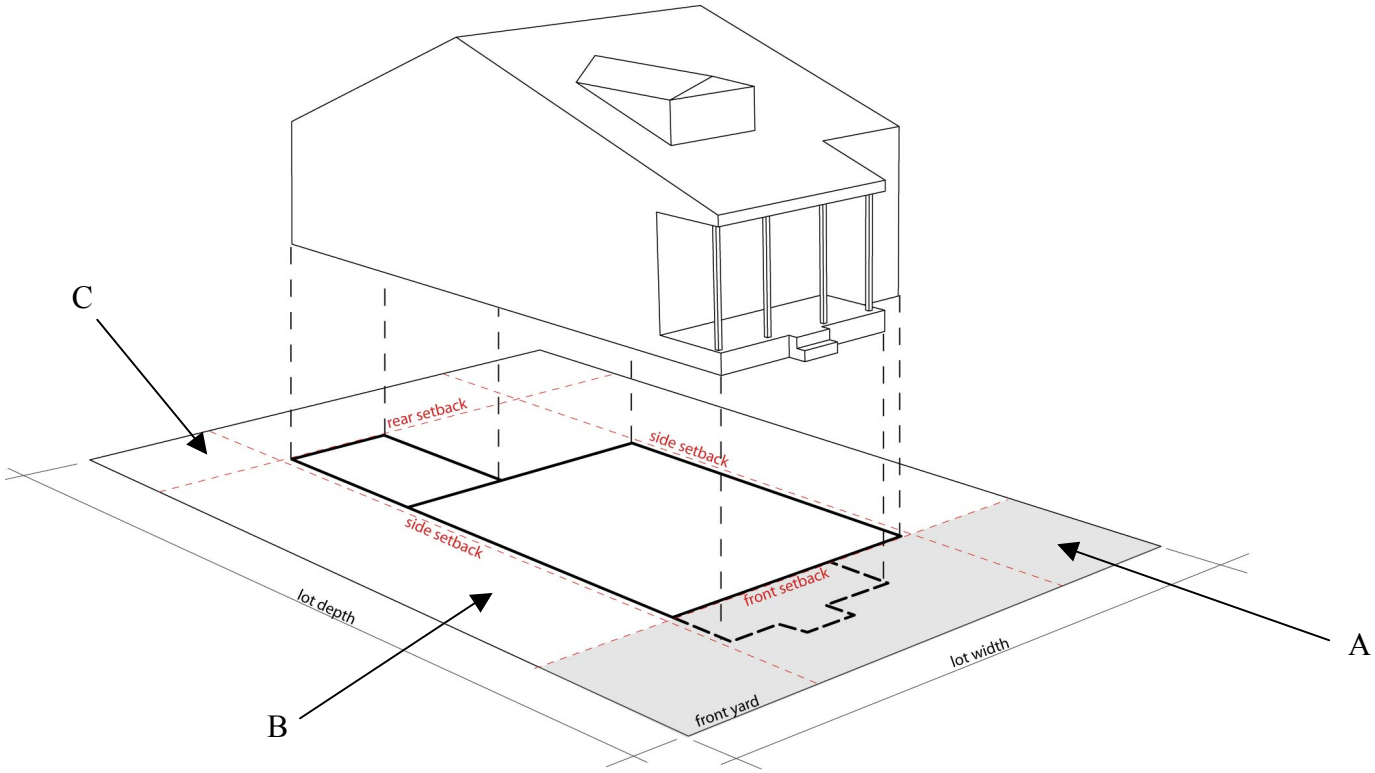
Single-family attached and multi-family dwellings:
Minimum: six (6) feet in Neighborhood Center; ten (10) feet in the Neighborhood Residential area.
Maximum: Fifteen (15) feet.

2. Side.

Single-family detached and duplex dwellings:
Minimum: Ten (10)
Maximum: None.
Single-family attached and multi-family dwellings:
Minimum: Five (5) feet and not less than fifteen (15) feet for both sides combined.
Maximum: None.

3. Rear.

Single-family detached and duplex dwellings:
Minimum: Twenty-five (25) feet.
Maximum: None.
Single-family attached and multi-family dwellings:
Minimum: Twenty-five (25) feet.



Maximum: None.

Required Yards for Single Family Detached/Duplex

A	Front	6'min. - 15' max. Neighborhood Core Areas
		10'min - 25' max Residential Neighborhood Areas* No max setback for residential lot 20,000 SF or greater
B	Side	10' min.
C	Rear	25' min.

Figure 1. Illustration for Single Family Detached/Duplex

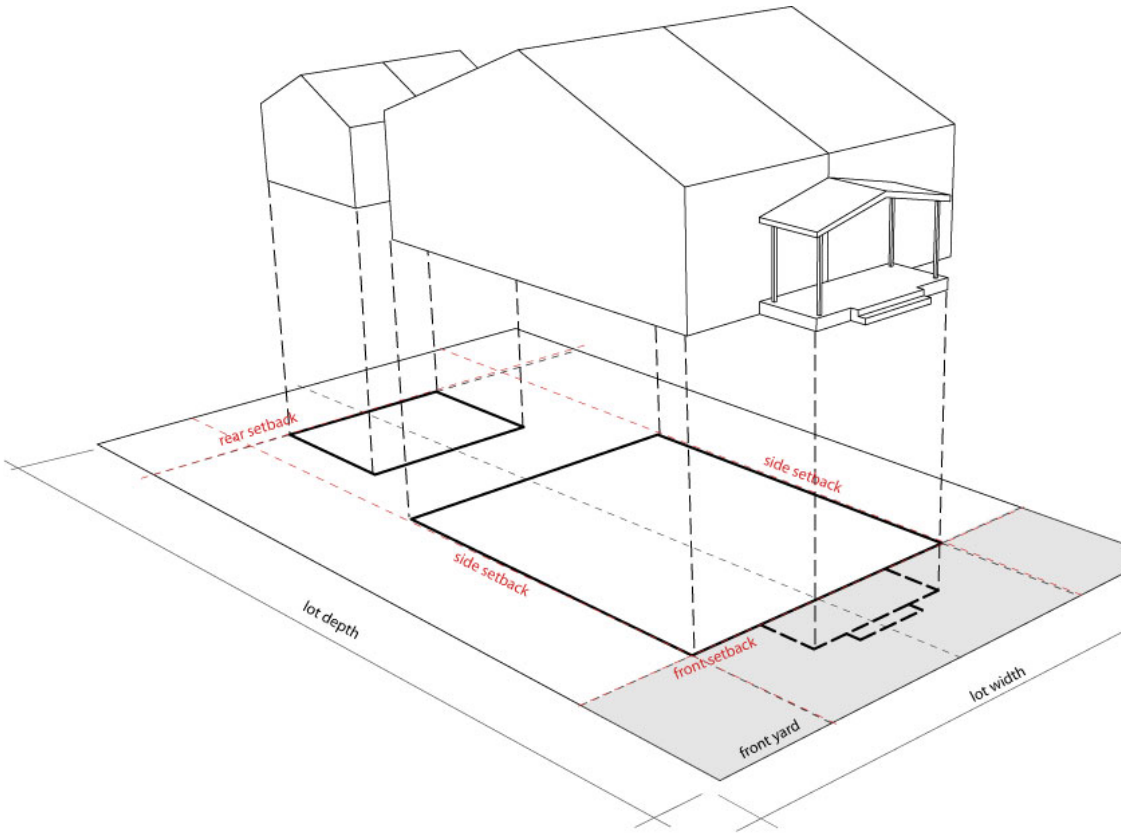


Figure 2. Illustration for Single Family Attached

Required Yards for Single Family Attached/Multifamily		
A	Front	6'min. - 15' max. Neighborhood Core Areas
		10'min – 15' max Residential Neighborhood Areas*
B	Side	5' min. and not less than 15' for both sides combines
C	Rear	25' min.

4. Accessory buildings and garages.

Not closer than five (5) feet to a side or rear lot line; not permitted in front yards. Garages serving single-family detached dwellings and accessed from an alley at the rear of a lot shall be set back a minimum of nine (9) feet from the rear lot line. Garages servicing single-family dwellings and accessed from a street frontage shall be set back a minimum of eighteen (18) feet from the front lot line of the dwelling.

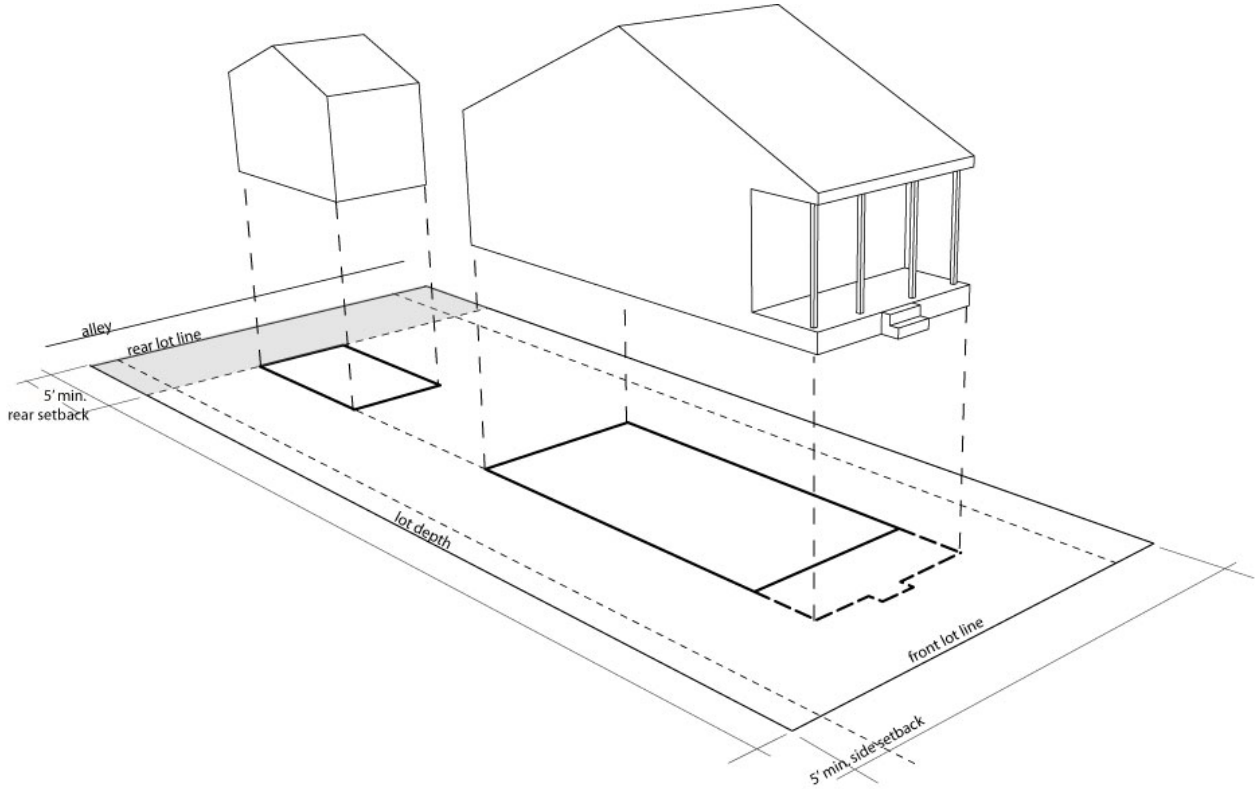


Figure 3. Minimum Setbacks for Accessory Buildings

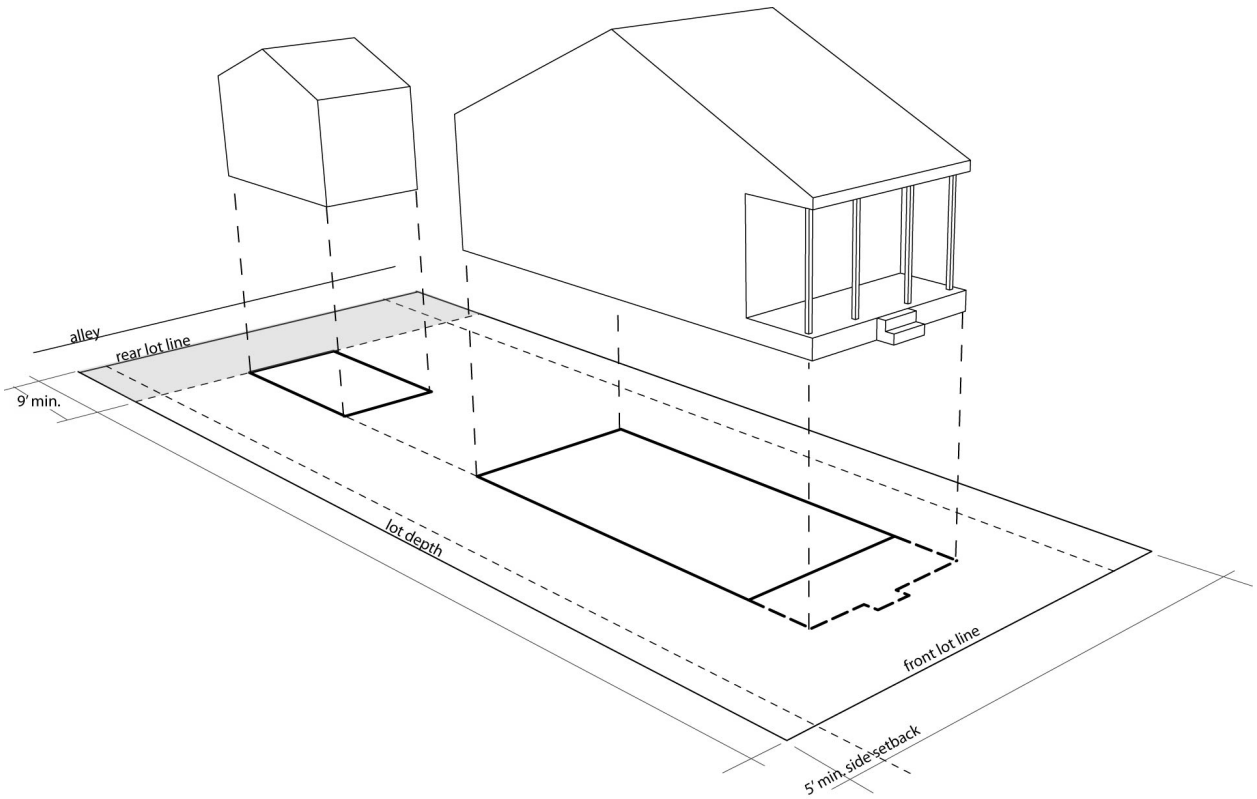


Figure 4. Minimum Setbacks for Garages Accessed from Rear

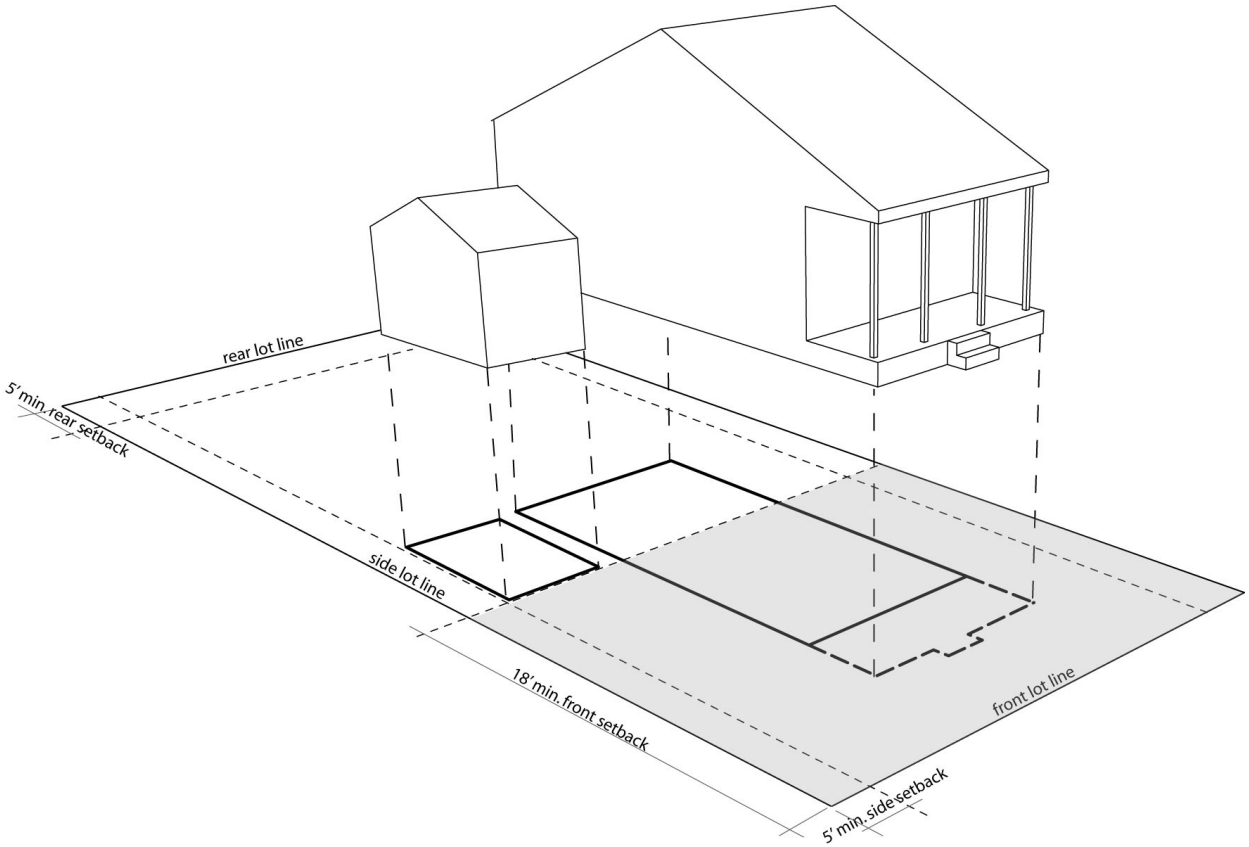


Figure 5. Minimum Setbacks for Garages Accessed from Street Frontage

(g) *Separation of structures.* Groups of single-family attached dwellings and multi-family structures shall be separated from each other by a minimum of fifteen (15) feet.

(7) (ii) Non-residential and mixed use lot and building standards

.

(a) *Minimum lot area for commercial uses:* Eight thousand five hundred (8,500) square feet.

(b) *Minimum lot width for commercial uses.* Forty (40) feet at the minimum front setback line.

(c) *Maximum lot coverage for commercial uses.* Seventy (70) percent. The areas of contiguous lots may be combined for the purpose of calculating impervious surface requirements.

(d) *Required yards for commercial uses.*

1. *Front.*

Minimum: None. A sidewalk of at least eight (8) feet shall be provided along all lot frontages in which the setback is less than fifteen (15) feet.

Maximum: None; however, all building setbacks shall be designed so as to achieve the purpose and intent of the district to create streets that are framed by buildings and thus comfortable for pedestrians.

2. *Side.*

Minimum: None.
Maximum: None; however, all building setbacks shall be designed so as to achieve the purpose and intent of the district to create streets that are framed by buildings and thus comfortable for pedestrians.

3. *Rear.*

Minimum: Thirty-five (35) feet when served by a rear alley; no rear setback required when the rear of the lot also functions as a primary access point for pedestrian traffic.
Maximum: None; however, all building setbacks shall be designed so as to achieve the purpose and intent of the district to create streets that are framed by buildings and thus comfortable for pedestrians.

4. *Accessory buildings.* Not closer than ten (10) feet to a side or rear lot line; not permitted in front yards.

8. *Building Height*

(a) Maximum building height. New structures within a PUD-TND shall be no more than 35 feet [3 stories] for single-family residential or duplex uses, or 50 feet [4 stories] for non-residential, multifamily residential, or mixed used structures.

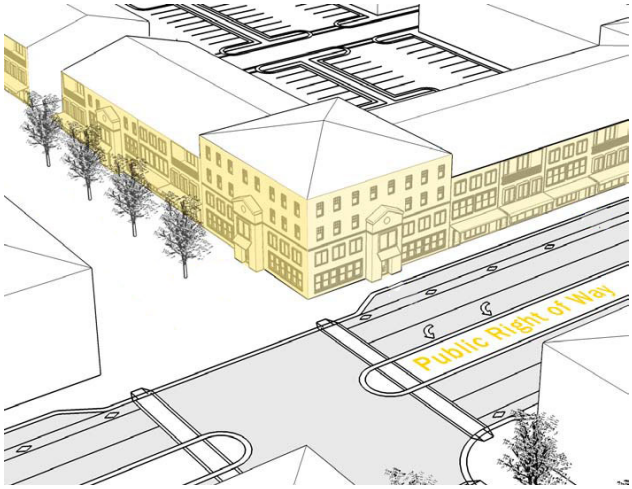
(b) Minimum Building Heights. New Structures located in the PUD-TND Neighborhood Center subarea shall not be less than 2 stories in height unless a waiver is granted by the Board of Supervisors at the time of Rezoning approval.

9. Building Design/Orientation

The illustrations provided in this section are advisory only. Refer to the Code standards for the specific prescriptions of this section.

(a) The architectural features, materials, and the articulation of a facade of a building shall be continued on all sides visible from a public street.

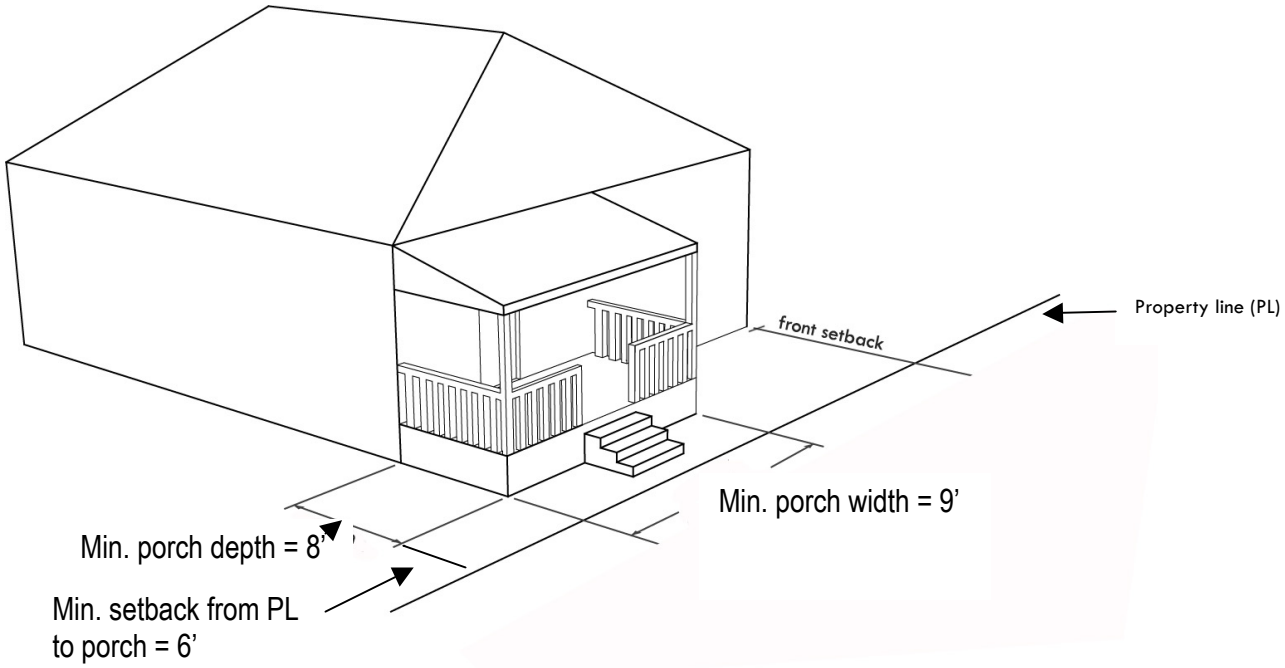
The illustration below is advisory only and is intended to show the intent of the continuation of articulation of a building facade. Refer to the Code standards for the specific standards in this section.



(b) The front facade of the principal building on any lot in a PUD-TND Traditional Neighborhood Development shall face onto a public or private street, plaza, square or green.

(c) Unless a waiver is granted by the Board of Supervisors at the time of rezoning, the front facade of any building shall not be oriented toward a parking lot.

(d) Porches, roof overhangs, hooded front doors or other similar architectural elements shall define the front entrance to all residences structures in the Residential Neighborhood subarea. Front or sideyard porches of at least eight (8) feet in depth and nine (9) feet in width shall be provided on all single family dwelling units within the Residential Neighborhood subarea. All lots with porches shall be denoted on the preliminary plat sufficiently to meet the standards specified herein. Such features may intrude into required setback areas. Notwithstanding any other provisions (Sec. 10-41), the minimum setback from the front property line to the porch shall be no less than 6 feet.



(e) For non-residential buildings, a minimum of 50 percent of the front facade on the ground floor shall be transparent, consisting of window or door openings allowing views into and out of the habitable interior space.

(f) New structures on opposite sides of the same street shall be of similar mass, scale and general architectural character. This provision shall not apply to buildings opposite civic uses.

10. Streets, Alleys, Sidewalks, Street Trees, Street Furnishing and Utilities.

(a) *Grid network.* The transportation system in the PUD-TND districts shall be generally in the form of a grid of interconnected streets, alleys and paths, modified as necessary to accommodate topography and parcel shape. Cul-de-sacs shall not exceed ten (10) percent of the total length of streets in the traditional neighborhood district. Alleys are exempt from this calculation.

(b) *Block size.* Street layouts must provide for rectilinear or curvilinear blocks that are in the range of 200-400 feet deep by 300-600 feet long, measured along the interior edge of the street right-of-way, except in locations where a street must cross areas of steep slopes in excess of ten (10) percent natural grade. In such cases, the Board of Supervisors may approve block perimeter that exceed one of these dimensions so as to reduce the number of streets constructed perpendicular to the steep slopes, and may be curved to follow the topography.

(c) *Street design.* Street sections in PUD-TND districts shall be designed to serve multiple purposes, including movement of motor vehicle traffic, public transit, pedestrian and bicycle movement, areas for public interaction, definition of public space and sense of place, and areas for placement of street trees, street furniture and landscaping. Streets shall be designed to balance the needs of all users and promote efficient and safe movement of all modes of transportation.

1. Sidewalks shall be provided on both sides of the street in Neighborhood Center and Residential Neighborhood Subareas and separated from the roadway by a planting strip and/or designated parallel parking. In the Neighborhood Center, sidewalks along the public right-of-way shall be a minimum of 10 feet in width. Where outdoor restaurant seating or similar uses are provided on the sidewalk, sidewalks shall be a minimum of 16 feet in width. In all cases, a minimum of five (5) feet clear zone shall be provided. If a planting strip is provided, it shall be a minimum of 6 feet in width.

2. Pedestrian and/or bicycle routes, lanes, or paths shall be provided to connect all uses and reduce motor vehicle use. Street design shall provide for the safety of pedestrians and bicyclists. Separate bicycle lanes shall be a minimum of four (4) feet in width.

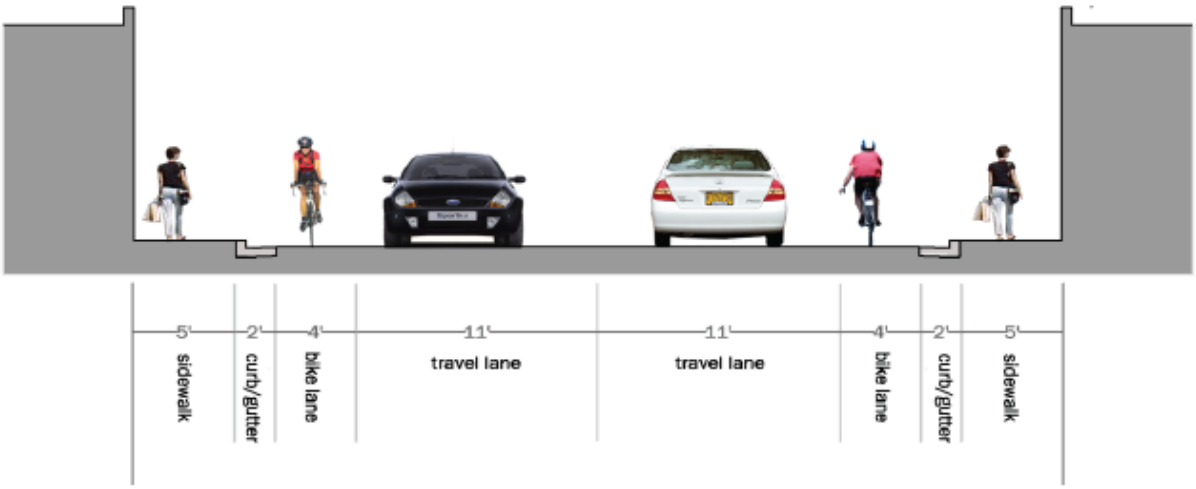


Figure 6. Illustrative diagram showing how bicycle and pedestrian facilities can be accomodated safely within a roadway.

3. Streetscape or pedestrian amenities, such as street trees, bulb-outs, benches, landscape elements, and public art shall be provided to contribute to the area's streetscape environment.

(d) Lot Access. All lots shall front on a public or private street or on a square or plaza. Alleys shall serve only the rear or sides of lots or uses.

(e) Private Street/Alleys. Privately owned and maintained streets or alleys may be permitted in a PUD-TND district if approved by the Board of Supervisors. Such private streets and alleys are permitted to serve multiple lots and uses. Private streets and alleys shall be maintained by the property owners association. Approval will be based upon review of an access plan that shall include construction specifications, as well as a maintenance plan or agreement. In addition, privately owned and maintained streets may be approved provided:

1) All parking is off-street and designated areas of off-street parking are provided that are in excess of and complementary to private driveways;

2) A plan is submitted and approved for school bus pick up and drop off areas for property owners abutting the private street;

3) A plan is submitted and approved for emergency access, snow clearance and postal delivery for all property owners abutting the private street;

4) The private streets are developed to a pavement section equal to VDOT standard for the projected traffic volume and to a geometric standard meeting county requirements.

5) The minimum width of the streets is eighteen (18) feet or wider exclusive of any on-street parking based on the projected vehicle trips per day for the streets. Dead end alleys are not permitted unless approved by the Board of Supervisors through a waiver approved at the time of rezoning, but in no circumstances shall an alley have a dead end length of over 100'. Dead-end alleys shall have hammerhead turnarounds.

6) The right-of-way for all private streets shall be dedicated to the PUD-TND homeowners association; and

7) Deeds for property abutting the private street must state that the street is private and will not be maintained by the state or county. If the property owners association officially petitions to dedicate the necessary right-of-way to the state or county it must be at no cost to the state or county and the association shall pay the full cost to bring the street up to state standards.

(f) Street Trees: Canopy Street trees shall be planted on both sides of the street and shall be spaced according to species and to the standards established in the landscape section of this ordinance (10-43). Where applicable, street trees shall be placed within the roadway median according to the standards established in Sec. 10-43 unless VDOT standards would prohibit otherwise. No understory trees shall be used as street trees. A consistent variety and species of street tree shall be maintained by street, but adjacent streets shall diversify species as a precaution against blight. Street trees planted within the Neighborhood Center area and other areas subject to heavy foot traffic, shall be protected using design measures (such as tree grates) to protect the tree root system. Street trees shall be planted along all streets at an average center to center spacing based on the mature spread of the particular street tree.

(g) Pedestrian scale lighting. Pedestrian scale decorative street lights (10' to 15' in height) shall be installed with a maximum average spacing of 75 feet on center on each side of the street and travel lanes within all areas of the district.

1. In order to minimize light pollution, light shall be directed downward to the immediate area being lighted and away from any living quarters.
2. Street lights shall be dark sky compatible. Lighting shall be designed and installed to be fully shielded (full cutoff) and shall have a maximum lamp wattage of 250 watts HID (or lumen equivalent) for commercial lighting, 100 watts incandescent, and 26 watts compact fluorescent for residential lighting (or approximately 1,600 lumens). In residential areas,

light should be shielded such that the lamp itself or the lamp image is not directly visible outside the property perimeter.

3. Floodlights or directional lights (maximum 100-watt metal halide bulbs) may be used to illuminate alleys, parking garages and working (maintenance) areas, but must be shielded or aimed in such a way that they do not shine into other lots, the street, or direct light out of the TND.
4. Floodlighting shall not be used to illuminate building walls (i.e. lights should not be placed on the ground so that a beam of light is directed upward).
5. Site lighting shall be of a design and height and shall be located so as to illuminate only the lot.
6. No flashing, traveling, animated, or intermittent lighting shall be visible from the exterior of any building whether such lighting is of temporary or long-term duration.

(h) *Street furnishings* shall include but not be limited to decorative street signs, benches, trash receptacles, water fountain and other appropriate decorative pedestrian oriented features in the Neighborhood Center subarea

(i) *Utilities.* –Unless a waiver is granted by the Board of Supervisors at the time of rezoning, underground utilities (and associated pedestals, cabinets, junction boxes and transformers) including electric, cable TV, telephone and natural gas service shall be located to the rear of properties in alley ROWs or the ROW of minor streets and not along the streetscape frontage.

11. *Parking.* Except as otherwise provided by this subsection, parking requirements for all uses shall be in accordance with the Parking Standards of this Ordinance.

(a) On street parking is required where a particular land use will generate regular guest or customer parking use. Occasional on-street parking (such as within a single family area) can be accommodated without additional pavement width or delineation.

(b) On-street parking shall be provided on streets abutting squares, small parks or other open spaces in the Neighborhood Center.

(c) Parking lots with over 24 spaces and parking garages shall be located to the rear of buildings and shall not abut any public street.

(d) Adjacent parking lots shall have vehicular connections from an alley or private street.

(e) Parking for retail and service uses in the Neighborhood Center shall not require on-site parking provided that: (1) the required parking, in accordance with the Parking Standards of this Ordinance, is available within a six-hundred-foot radius of the activity; (2) the total floor space for the individual uses does not exceed twenty-five hundred (2500) square feet of gross floor area; and (3) such uses are restricted to Retail and multi-family areas. On-street parking located within 600 feet may count toward any minimum parking requirements.

(f) Parking areas for shared or community use should be encouraged and shared parking reductions will be considered in accordance with section 10-44.

(g) Loading areas shall adjoin alleys or parking areas to the rear of the Principal Building unless otherwise approved on the TND plan.

12. Landscaping and Buffering. Except as otherwise provided by this subsection, landscaping requirements for all uses shall be in accordance with the Landscaping and Screening Standards of this Ordinance.

Additional Definitions for possible inclusion either in this section or in the definitions section of the Ordinance:

Definitions. For purposes of this section, the following special definitions are provided:

(1) Alley: A private right-of-way, not less than eighteen (18) feet nor that provides secondary and/or service access for vehicles to the side or rear of abutting properties having principal frontage on another street or on a plaza, square or green.

(2) Natural Area/Preserve: Preserve means open space that preserves or protects endangered species, a critical environmental feature, or, other natural feature. Access to a Preserve may be controlled to limit impacts on the environment. Development of the Preserve is generally limited to trails, educational signs, and similar improvements.

(3) Square/Plaza: Square/Plaza means open space usually at the intersection of important streets, set aside for civic purposes and commercial activity, including parking, its landscape consisting of durable pavement and formal tree plantings. A Square/Plaza is usually bordered by civic or private buildings. Plazas may range from very active places with adjacent complimentary uses such as restaurants and cafes, to quiet areas with only seating, formal landscape plantings, and amenities such as fountains or public art.

(4) Park: Park means an open space, available for recreation, its landscape consisting of paved paths and trails, open lawn, trees, open shelters, or recreational facilities. Facilities may range from simple picnic tables, benches, or a playground in a small park, to a recreation center, swimming pool, or sport field in a larger park. Other facilities may include playgrounds, shelters, sport courts, drinking fountains, parking lots, or restrooms. Park grounds are usually grassy and maintained on a regular basis for recreational activity, but may include some natural, or formally landscaped areas.

(5) Green: Green means an open space available for unstructured recreation, its landscaping consisting of grassy areas and trees. A Green should be designed for passive and unstructured active recreation. Improvements to the green may consist of paths, benches, landscaping, and other improvements.

Additional PUD-TND Submission Requirements - this would go in section 10-54

Additional Development Plan Information required for PUD-TND applications.
The applicant shall submit a development plan of sufficient detail to demonstrate to the county that the proposal meets all size and dimensional requirements, which shall show:

(a) The location and extent of and allocation of land to the following areas:
1 The Neighborhood Center Subarea
2. Residential Neighborhood Subareas
3. Open Space Areas

(b) The general location of all streets, alleys and parking areas in each sub-area.

(c) The maximum gross and net densities, as defined herein, including dwelling unit types and lot sizes, of residential uses in each area of the development and for the entire development.

(d) The maximum gross square feet of non-residential uses in each area of the development and for the entire development along with an indication of the location of mixed use structures.

(e) The minimum area of civic uses, including parks, greens, squares and other public sites.

(f) The general design and layout of streets, utilities, and stormwater management facilities, including:

1. Drawings of typical street cross-sections
2. Schematic sections through the buildings that front the streets
3. Detailed concept plan at 1 inch = 200 feet showing the general configuration of building footprints (residential buildings can be shown with typical prototypes and lot configurations for each dwelling type and street condition)
4. Conceptual design for parking areas and streetscape features
5. Conceptual design of the stormwater management system
6. Conceptual layout of proposed lot pattern for subdivision
7. Conceptual layout of streets, sidewalks, trails, bicycle facilities
8. A survey of the overall project perimeter boundary.

(g) Natural and other open space areas.

(h) Design guidelines for typical lots, buildings and structures; including and indication of which residential structures will have porches.

(i) Adjacent land uses and adjacent zoning.

(j) Vicinity maps at no less than 1 inch = 2,000 feet scale.

(k) A conceptual phasing plan showing the location, sequence, and relative timing of development of land uses, streets and utilities, including:

1. Location, acreage, number, and unit type of residential dwellings for each phase
2. Location, number and type of non-residential acreage and building square feet for each phase
3. Location, amount and type of streets for each phase
4. Location and size of pedestrian and bicycle pathways
5. Location, amount of sewer and water facilities for each phase
6. Location, size and type of stormwater management facilities for each phase
7. And, if the property is located in the for Expansion Area Overlay District (177 Corridor) Route 177 corridor, an assessment of Level of Service Standards and Adequate Public facilties as outlined in the Comprehensive Plan.
8. Proposed landscaping

All of the above features may be adjusted by the applicant during the course of site plan and subdivision approvals, and construction, but must be in substantial conformance to the approved conceptual phasing plan, unless a zoning map amendment is requested and approved, subject to the procedures of section ___of this chapter.

FINAL DRAFT TND-Infill Zoning District

Addition to Article III

Sec. 10-38. **Traditional Neighborhood Development Infill District**

Purpose: The Traditional Neighborhood Development Infill (TND-I) district is intended to enhance and complement existing communities and villages by integrating new uses and structures into the existing community fabric, encouraging reuse and revitalization of existing structures, strengthening connections within communities to improve walkability and expand traditional, human scale, pedestrian oriented neighborhoods, and provide a strong orientation to transit service. This district provides flexible development standards for infill parcels so that properties can be developed in a way that is compatible with adjacent properties in historic communities, to help create a "complete" walkable and transit-friendly community with housing, jobs, services, civic uses and open space. The district is intended to implement specific comprehensive plan recommendations for the County's Villages, Village Expansion Areas, ~~and~~ Urban Expansion Areas and Urban Development Areas to promote the redevelopment of older, historic areas.

(1) The objectives of the TND-Infill District are to:

a. Build upon the historic development patterns in existing village and community centers to create attractive, walkable neighborhoods;
b. Encourage adaptive reuse of abandoned, vacant or underutilized buildings or structures where appropriate;
c. Allow for a mix of new land uses that are appropriate to both the needs of the community and the scale of surrounding neighborhoods so that residents can walk, ride a bicycle, or take transit for many trips between home, work, shopping, and school;
d. Provide incentives to develop larger parcels at higher densities and to consolidate smaller parcels to encourage coordinated development and fewer access points on public roads.
e. Make public transit a viable alternative to the automobile by organizing appropriate building densities
f. Encourage a high level of design quality throughout the district
g. Stimulate economic investment in older established communities.

The illustration below is advisory only and is intended to show the intent of infill development for this District. Refer to the Code standards for the specific standards in this section.

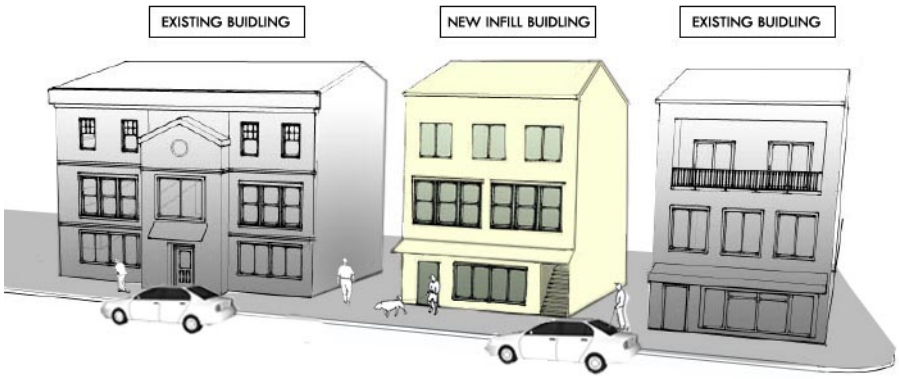


Figure 1. Example showing how intent of infill development in the TND-I District.

(2) *Qualifying lands.* Lands qualifying for inclusion in the TND-I district shall be tracts located in areas mapped as Urban Development Areas, Urban Expansion Areas, Villages and Village Expansion Areas in the Comprehensive Plan and that are generally served by, or planned for, public sewer and water service. If the proposed development will require public sewer and water service, the applicant must demonstrate to the satisfaction of the Board of Supervisors that there is sufficient available sewer and water capacity to accommodate the proposed development at full build out and/or provide a plan demonstrating that such improvements will be phased to accommodate projected development as it occurs (see also rezoning and submission requirements Sec 10-54).

(3) *Area Requirements*. The area required for a Traditional Neighborhood Infill TND-I district shall not be more than ten (10) acres since this district is targeted at undeveloped or underdeveloped lots in established communities rather than creating new communities. The tract of land to be developed shall be under single ownership, or shall be the subject of an application filed jointly and subject to a single concept plan.

(4) *Mix of Uses.* A mix of uses is encouraged in Villages, Village Expansion Areas, Urban Development Areas and Urban Expansion Areas. However, the land uses proposed for any individual tract subject to development under the provisions of the TND-I district shall be evaluated to ensure that the proposed use(s) are in substantial conformance with specific Comprehensive Plan policies and recommendations applicable to the site. Mixed Use structures or sites are permitted but only for a combination of neighborhood commercial uses and residential uses.

The illustration below is advisory only and is intended to show the intent of a Mixed Use Structure in this District. Refer to the Code standards for the specific standards in this section.

Figure 7. Example showing how uses can be mixed vertically within an individual structure.

(5) Development Density: The permitted maximum and minimum development densities in the TND-I district shall conform to density guidelines established in the Comprehensive Plan as follows:

1. In areas designated in the Comprehensive Plan as, Village, or Village Expansion areas, gross residential densities shall not exceed three (3) dwelling units per acre. In areas designated in the Comprehensive Plan as Urban Expansion Areas, and Urban Development Areas gross residential densities shall not exceed twelve (12) dwelling units per acre.

2. In areas designated in the Comprehensive Plan as, Village, or Village expansion areas, non-residential gross floor area ratios shall not exceed 0.25 F.A.R In areas designated in the Comprehensive Plan as Urban Expansion Areas, Urban Development Areas non-residential gross floor area ratios shall not exceed 0.40 F.A.R.

3. For non-residential or mixed use development less than 1 acre, higher densities may be approved by the Board of Supervisors to promote redevelopment.

3. Accessory dwelling units (as defined in Sec. 10-41) shall not be included in the calculation of residential density.

(6) Permitted Traditional Neighborhood Infill District Uses by Category:

1. Commercial uses.

a. Retail Sales and Services, no larger than 10,000 square feet in size

b. Convenience stores and general stores without fuel sales

c. Restaurants and outdoor seating associated with Restaurants subject to the provisions of Sec. 11.d, below

d. Financial Services

e. Office, administrative, business or professional, less than 20,000 square feet in size, and no more than 10,000 square feet per floor plate.

f. Day Care Center

g. Parking areas that are accessory to any permitted or permissible commercial, residential, civic, institutional or open space use.

h. Funeral Home

i. Medical Care Facility

j. Mixed Use Buildings (integrated horizontally or vertically) which include residential and commercial uses.

k. Laundromat

l. Printing Services

2. Residential uses.

a. Single-family detached and attached dwellings, including duplexes, townhouses, row houses;

b. Accessory dwelling units (as defined in Sec. 10-41) associated with single family dwellings;

d. Live/work units that combine a residence and the resident's workplace

e. Home occupation

3. Civic or institutional uses.

a. Municipal offices, fire stations, libraries, museums, community meeting facilities, community centers, and post offices;

b. Transit shelters;

c. Civic club

d. Church

d. Open Space

(7) Uses permitted by special use permit. Any of the following uses permitted by special exception may be approved as part of the initial development plan at the time of rezoning; however, the board of supervisors may impose conditions on such uses even if approved as part of the initial development plan.

a. Retail Sales and Services, above 10,000 square feet and no larger than 20,000 square feet in size

a. Multifamily dwellings, including senior housing;

b. Nursing Home, Congregate Care Facility, and assisted living facilities.

c. Farm Market

d. Hotels and Motels

e. Conference or training center

f. Home Business

g. School

h. Drive-through windows serving or associated with permitted uses provided such facilities are located at the rear or side of the structure and do not conflict with pedestrian travel ways. In no case shall the drive through lane or window abut or face a public street.

i. Transition House

(8) Lot and Setback Standards:

(8)(i) Residential lot and building standards

(a) *Lot standards for residential uses.*

Single-family detached dwellings: Minimum Five thousand (5,000) square feet, Maximum Ten Thousand (10,000) square feet.

Single-family attached dwellings:
Minimum Fifteen hundred (1,500) square feet; Maximum of eight (8) single-family attached dwelling units connected together in one (1) group of units

Duplex dwellings: Minimum three thousand (3,000) square feet

Multi-family structures:
Eight thousand five hundred (8,500) square feet;

(b) *Minimum lot width for residential uses.*

Single-family detached dwellings: Forty (40) feet.

Duplex dwellings: Eighty (80) feet.

Single-family attached dwellings: Eighteen (18) feet.

Multi-family structures: Eighty (80) feet

(c) Maximum lot coverage. Eighty-five (85) percent.

(d) Required yards for residential uses.

1. Front: Front yard setbacks for new residential uses shall be established based on the setbacks of existing residential uses on the same block as follows:

a. The average of the front yard setbacks of new residential dwellings shall not vary more than three (3) feet from the average front yard setbacks of the existing residential dwellings located on either side of the proposed lot.

b. The average front setback of existing residential dwellings shall be established based on the 3 existing lots on each side of the lot in question, along the same block face as the lot in question. In cases where the 3 existing lots extend more than 300 feet from the proposed lot, the average setbacks shall only be calculated within 300 feet of the proposed lot.

c. If any of the 3 existing lots on each side of the proposed lot are more than twice the size of the proposed lot, they shall not be used to calculate average existing setbacks

d. In cases where there are no existing residential dwellings on each side of the proposed lot, the front setback shall be no less than ten (10) feet and no more than twenty (20) feet.

e. In no case shall the front setback less than ten (10) feet. Notwithstanding any other provisions (Sec 10-41), the minimum setback from the front property line to the porch shall be no less than six (6) feet.

f. In the case of a corner lot, the required front yard will be determined by the prevailing building pattern, and shall be established using the average setbacks of 3 existing lots located directly adjacent to and along the same block face from the lot in question following the provisions outlined above.

2. Side: Side yard setbacks for new residential uses shall be established based on the setbacks of existing residential uses on the same block as follows:

a. The average of the side yard setbacks of new residential dwellings shall not vary more than two (2) feet from the average side yard setbacks of the existing residential dwellings located on either side of the proposed lot.

b. The average side setback of existing residential dwellings shall be established based on the 3 existing lots on each side of the lot in question, along the same block face as the lot in question. In cases where the 3 existing lots extend more than 300 feet from the proposed lot, the average setbacks shall only be calculated within 300 feet of the proposed lot.

c. If any of the 3 existing lots on each side of the proposed lot are more than twice the size of the proposed lot, they shall not be used to calculate average existing setbacks

d. In cases where there are no existing residential dwellings on each side of the proposed lot, the side setback shall be no less than eight (8) feet.

e. In no case shall the side setback less than eight (8) feet.

3. Rear. The Rear Yard Setback shall be not less than 20% of the total lot depth, except that the rear yard shall in no case be no less than fifteen (15) feet.

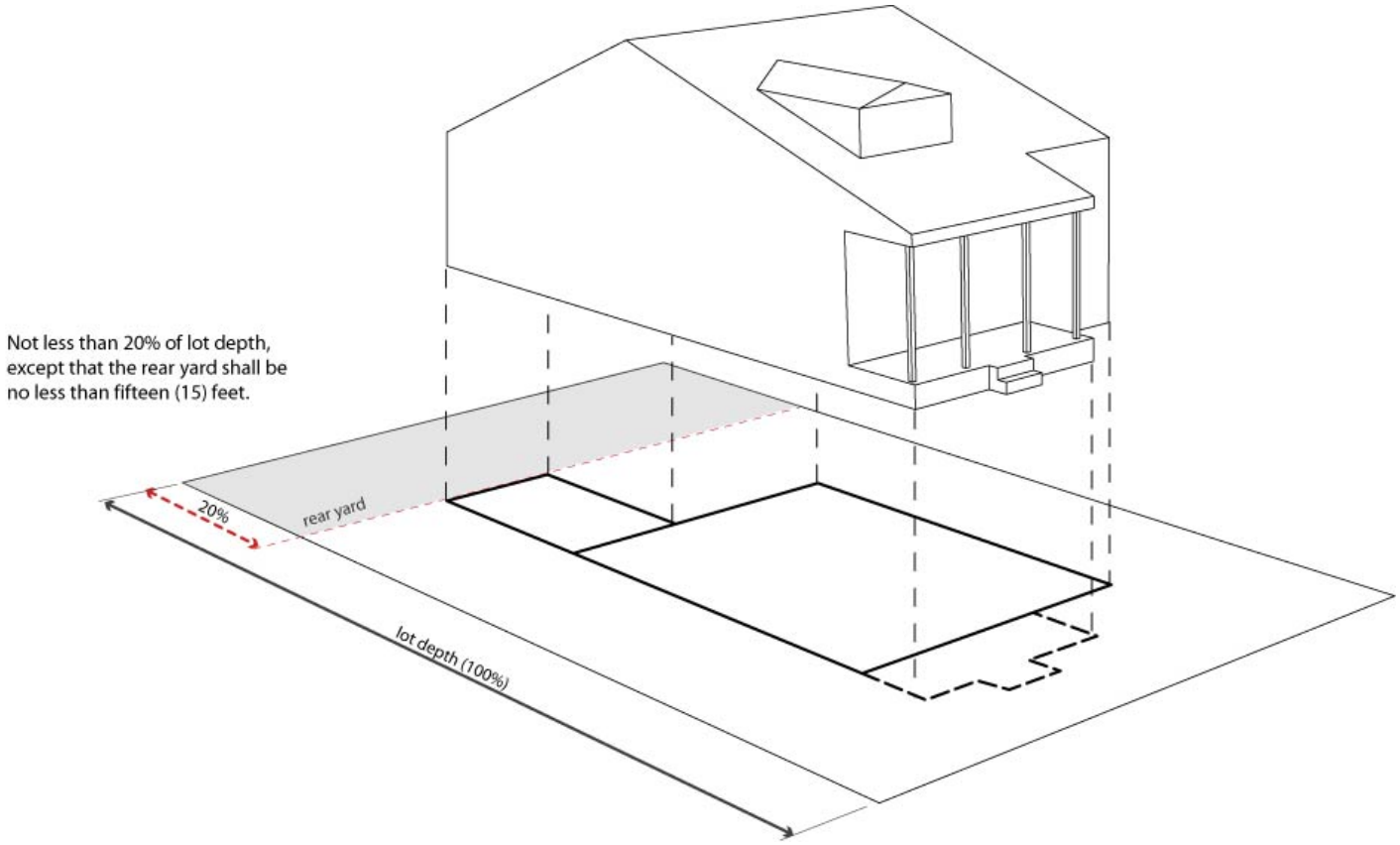


Figure 3. Calculating Rear Yard Setbacks.

4. Required Setback for accessory buildings and garages shall be not closer than five (5) feet to a side or rear lot line; accessory buildings and garages shall not permitted in front yards.

8(ii). Lot standards for Non-Residential Uses and Mixed Use Buildings.

(a) *Lot standards for Non-residential Uses and Mixed Use Buildings.*

Minimum Lot Size: Five thousand (5,000) square feet.

(b) *Minimum Lot Width for Non-residential Uses and Mixed Use Buildings:* forty (40) feet.

(c) *Maximum lot coverage.* Ninety (90) percent.

(d) *Required yards for commercial uses.*

1. *Front.*

Minimum: None. A minimum eight (8) foot wide sidewalk shall be provided along all lot frontages in which the setback is less than fifteen (15) feet.
Maximum: None; however, all building setbacks shall be designed so as to achieve the purpose and intent of the district to create streets that are framed by buildings and thus comfortable for pedestrians.

2. *Side.*

Minimum: None, unless adjacent to a residential structure in which case a minimum setback of ten (10) feet' shall be required.
Maximum: None; however, all building setbacks shall be designed so as to achieve the purpose and intent of the district to create streets that are framed by buildings and thus comfortable for pedestrians.

3. *Rear.*

Minimum: None
Maximum: None; however, all building setbacks shall be designed so as to achieve the purpose and intent of the district to create streets that are framed by buildings and thus comfortable for pedestrians.

4. *Accessory buildings.* Required Setback for accessory buildings and garages shall be not closer than five (5) feet to a side or rear lot line; accessory buildings and garages are not permitted in front yards.

8(iii). Modification of lot size, lot width standards, setbacks, and yard requirements. Minimum requirements for lot size, setbacks, yards and other lot standards shall conform with subsection 8 of the TND- I districts, unless otherwise specifically modified by the approved concept development plan at the time of zoning approval. Modifications may be approved by the Board of Supervisors at the time of concept plan approval, provided that they do not:

1. Impair safety from the standpoint of fire and rescue access to properties;
2. Increase danger or probability of accidents involving vehicles and/or pedestrians;
3. Be done with the major purpose to decrease development costs;
4. Be done when the effect is to decrease privacy, adequacy of light and air, or buffering beyond base district regulations' effects; and
5. Result in a modification greater than 20% of the existing requirement.

(9) Lot Access. Lots shall be accessed from a road in the Virginia Department of Transportation (VDOT) system or from a hard-surfaced private street designed by a professional engineer to meet current VDOT subdivision street requirements (Sec. 8-152 of the County Code). Where parking is located to the rear of a building, parking areas may be accessed via an alley.

(10) Building Height

(a) Maximum Building Height. New single family and single family attached (including duplexes and townhouses) shall be no more than 35 feet [3 stories], or 45 feet [4 stories] for non-residential, multifamily residential, or mixed used structures.

(b) Minimum Building Heights. New Non-Residential, Multi-Family and Mixed Use Buildings shall not be less than 2 stories unless a waiver is granted by the Board of Supervisors at the time of rezoning approval.

(11) Additional Provisions for Non-Residential Uses:

(a) Ground floor residential is not permitted in Mixed Use Buildings.
(b) The footprint of the ground floor of a non-residential building, mixed use or multi-family building shall not exceed 10,000 square feet.
(c) Notwithstanding other buffer, landscaping and screening requirements of this chapter, outside storage areas for materials, equipment or trash are accessory uses, may not exceed forty (40) percent of building area, must be located in side or rear yards adjacent to building, and must be screened from view of adjacent streets or adjacent land.
(d) Where outdoor seating areas are proposed, a minimum sidewalk width of five (5) feet must be maintained between the limits of the outdoor seating area and the roadway edge of the sidewalk.

(12) Site and Building Design:

(a) Architectural Standards

All development (residential and non-residential) shall be of a compatible design with residences located on the same block and shall follow these design standards:

1. Building materials shall be of siding, brick, stone or other materials that are similar in color and otherwise in common with other buildings located on the same block face.

2. Buildings shall provide offsets, projections, and or recessed entries located at least every 30 feet along a facade facing a public street.

3. Building size, height, bulk, mass, scale shall be similar in height and size or articulated and subdivided into massing that is more or less proportional to other structures in the area, and maintains the existing architectural rhythm along the same block face as the proposed development.

4. Buildings shall use at least three of the following design elements along the facades facing public streets, provided that the design elements do not conflict with the provisions of Section 10-41(7):

a) dormers

b) gables (pitch not less than 4:12)

c) recessed entries

d) covered porch entries

e) cupolas

f) pillars or posts

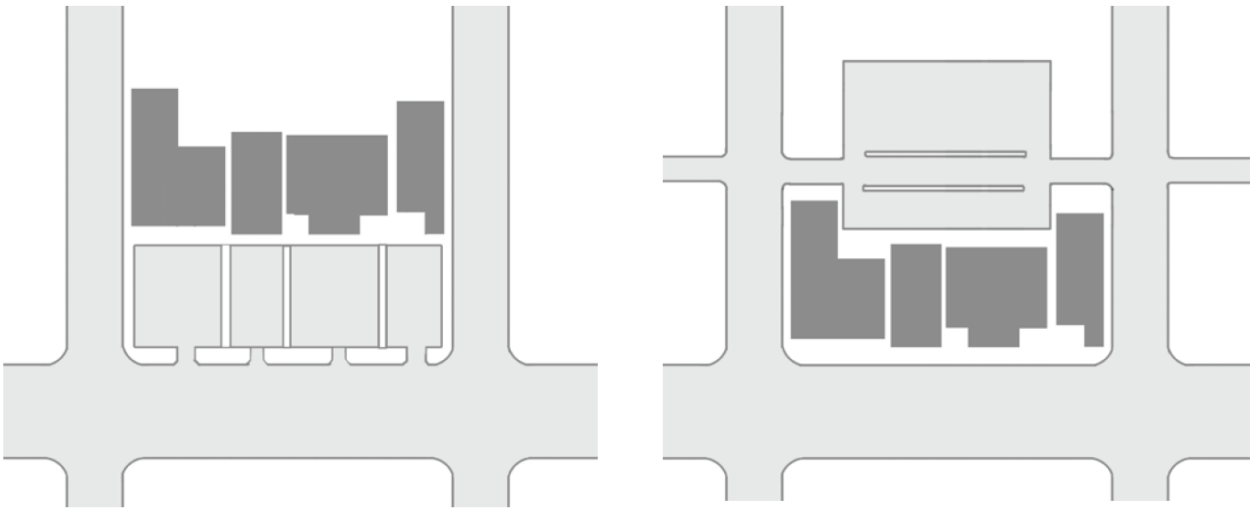
g) bay or bow window (minimum 12 - inch projection)

h) eaves (minimum 6 - inch projection)

i) off-sets in building face or roof (minimum 16-inches)

(b) Site Design – Non-Residential, Mixed Use and Multi-Family Units

1) Parking areas shall be located to the rear of non-residential, mixed use or multifamily buildings;



Not permitted: parking areas in front of non-residential, mixed use or multi-family buildings

Required: parking areas to the rear of non-residential, mixed use or multi-family buildings

Figure 4. Location of Parking Areas.

2) Street level frontage of commercial buildings shall be devoted to entrances, shop windows or other displays;

3) Clear pedestrian pathways shall be provided between buildings on the same lot and between buildings on adjacent lots to ensure a continuous pedestrian pathway throughout the district;

4) Crosswalks shall be incorporated within the project, at intersections where new streets are proposed, within parking lots, or other needed pedestrian connections as approved by the County, VDOT or the County's designee. Crosswalks shall be designed to be an amenity to the development, e.g. heavy painted lines, pavers, edges, and other methods of emphasizing pedestrian use. Bulb-outs and other pedestrian designs may be used to shorten walking distances across open pavement. Medians may be used in appropriate areas to encourage walking and to act as a refuge for crossing pedestrians;

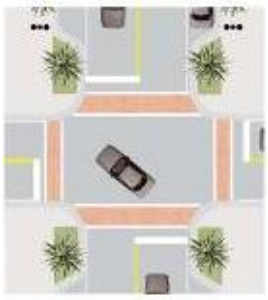


Figure 5. Bulb-outs and crosswalks.

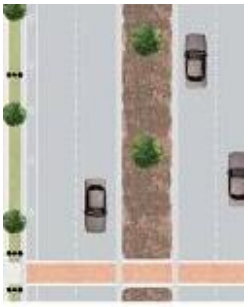


Figure . Crosswalk and Median Refuge.

5) Where residential neighborhoods abut commercial, office or mixed use developments, appropriate transitional features shall be used and may include landscaping, open space or parks, or streets with clearly designed pedestrian features;

Figure 7. Example of landscaping as a transitional feature between residential and commercial developments.

6) Primary entrances to proposed and existing buildings are situated on pedestrian amenities (e.g., sidewalks, plazas or open space) with a minimum width of 10 feet;

7) Adequate access for loading and emergency vehicles is maintained on one side of the building; and

8) For corner lots, the front of the lot will be determined by the prevailing building pattern, and the front façade of proposed development shall be located along the street frontage that has the majority of front facades within the block on which the subject property is located.

(c) Parking Standards

1) Parking and loading spaces shall be provided as required in section 10-44 except that on-street as well as off-street parking spaces may be counted toward satisfying the requirements.

2) On-street parking spaces assigned to a building or use shall be those spaces that abut the lot containing that building or use. All required handicapped parking spaces shall be provided off-street.

3) Parking requirements provided in section 10-44 may further be reduced upon approval by the zoning administrator of an acceptable mass transportation or alternative transportation plan that adequately documents a reduced need for parking by demonstrating that potential visitors to the site, including residents, employees and customers will be using mass transportation or alternative transportation to visit the site.

4) Required off-street parking spaces may be provided cooperatively for two (2) or more uses, subject to arrangements that will assure the permanent availability of such spaces to the satisfaction of the administrator. The amount of such combined space shall equal the sum of the amounts required for the separate uses, provided, however, that the administrator may reduce the total number of spaces if the administrator determines that some or all of the spaces may serve two (2) or more uses by reason of the daily hours of operation or seasonal activity of such uses. Shared parking shall be permitted upon approval by the zoning administrator of a shared parking plan prepared and submitted by the applicant. Upon approval, such a shared parking plan shall result in a reduction in the total amount of required parking, in an amount determined at the time of approval of the rezoning application or by the zoning administrator.

5) Off-street parking and loading spaces shall be located behind principal structures and may be served directly or indirectly by alleys.

6) Parking lots or garages must provide not less than one bicycle parking space for every ten (10) motor vehicle parking spaces.

(13) Additional Submittal Requirements:

(a). In addition to all county submittal requirements outlined in this ordinance, an applicant wishing to rezone to this district will be required to submit a property survey, as prepared by a Licensed Surveyor, showing clearly and accurately all property lines, easements, encumbrances and all existing structures on the property. The survey must have been completed within five (5) years of the time of the application for rezoning, or since any modification to the property, whichever is sooner. If no such survey exists, the required fees for the rezoning application may be reduced by the Zoning Administrator to offset a portion of the cost of the property survey.

Zoning Ordinance Update

Martinsville
A CITY WITHOUT LIMITS

Final:

Traditional Neighborhood Development

TND OVERLAY DISTRICT

COX

The Cox Company • Martinsville Planning Team

Traditional Neighborhood Development Overlay District, TND-O

A. Purpose and Intent

The TND Overlay District (TND-O) provides the regulatory framework upon which the City may consider by-right applications for development plans and subdivision plats for Traditional Neighborhood Developments (TND) or other mixed-use forms of land use in the City's designated Urban Development Areas (UDAs) and other Uptown locations. The overlay approach encourages Applicants to utilize the TND-O District as a by-right approach to develop mixed uses at more compact densities. The principal aim of any TND application should be to contribute to the City's goal to expand and enhance its urban core areas, including both residential and non-residential neighborhoods in order to best serve existing and future Martinsville residents and businesses.

The TND-O District should be employed when a more flexible and creative approach is deemed to best serve the goals and objectives of the Comprehensive Plan. The TND-O District is intended to better define the mix, scale, character, form and intensity of any given development or redevelopment proposal than that which could be otherwise governed by the application of the existing underlying zoning districts. The TND-O District encourages design flexibility to avoid the *one size fits all* configuration of the underlying districts and places an emphasis on the physical form of the built environment. While single use projects may be permitted on smaller parcels, the principal TND goal is to create a mix of uses with flexible approaches to organizing building, streets, density and complementary civic spaces.

The geographical areas that are permitted for a by-right TND-O District application are delineated by the Official Zoning Map. In order to respect the Uptown and other city-center land use patterns (as well as the Comprehensive Plan's policies for future urban development), the Official Zoning Map may recognize four distinct geographical Sub-Areas within the TND-O District. Three primary TND Sub-Areas--**Core, Transitional, and Residential**--may be established to uniquely differentiate areas for new development as well as infill and redevelopment uses but which emphasize one class of uses over another. A fourth potential Sub-Area--**Economic Development**--should be employed to delineate certain land uses--such as large-scale industry and big box retail--that are not commonly located within traditional neighborhood developments and the city center.

Requests for approvals of new development and redevelopment projects within the TND-O District shall be initiated by the Applicant. Applications for by-right TND-O uses shall be accepted on properties for which adequate public facilities are available or where adequate public facilities and infrastructure can be provided by the Applicant. The review and approval of an Application Plan and its corresponding Code of Development shall be guided by the principles for Traditional Neighborhood Development in the Comprehensive Plan and as further outlined herein. In a fashion similar to the City's current site plan and subdivision process, the Applicant shall be responsible for submission of an Application Plan and Code of Development that fully addressed the proposed development along with supporting regulations, guidelines, and conditions that satisfy the requirements of the overlay district.

The Application Plan for a TND project shall demonstrate a strong physical interrelationship to contiguous parcels and neighborhoods, individual buildings, civic spaces, infrastructure, and landscaping that creates a *sense of place and community.* Individual buildings should be defined by varying scale and architectural stylings. Except where constrained by geographical location, parcel size, terrain features, and environmental conditions, each TND project shall have a mix of uses. Vertically integrated uses (*e.g.* the placement of residential or other uses above office and retail uses) are encouraged in the mixed-use components of a TND project.

By-right land use applications in the TND-O District shall be evaluated on the basis of how well the project demonstrates compatibility with the above mentioned purpose and intent as well as adherence to the following traditional neighborhood development principles:

1. **Appropriate Location and TND Densities:** Establish viable areas for residential and commercial land uses in the City at a compact, but pedestrian, scale, with densities appropriate for TND growth, that are located either within or close to existing developed areas and community facilities.

2. **Mix of Uses:** Establish a blended mix of residential and non-residential land uses within the UDAs that reflect TND planning objectives, enhance the quality of life of those who live there, and best serve the demographic demands of future Martinsville residents.

3. **Variety of Housing**: Create a variety of housing types to meet the the range of projected family income distributions of both existing residents and future residential growth.

4. **TND Lot Types and Geometry:** Encourage better spatial organization through the reduction of front and side yard building setbacks and smaller lot sizes.

5. **Pedestrian and Vehicle Compatibility:** Incorporate a network of pedestrian-friendly road and street designs for projects where new or upgraded streets are to be introduced.

6. **Design Standards and Criteria for TND Streets:** Reduce subdivision street widths and turning radii at street intersections, and provide contemporary standards for street landscaping, pedestrian improvements, and pavement design.

7. **Neighborhood Connectivity:** Establish interconnectivity between streets and pedestrian networks within the TND project.

8. **Local and Regional Transportation Connectivity:** Promote the interconnection of new local streets with existing local streets and the City's existing collectors and thoroughfares.

9. **Environmental Preservation:** Ensure the preservation of Martinsville's sensitive environmental areas and open space in conjunction with the TND planning process.

10. **Adequate Public Infrastructure:** Demonstrate (a) the availability and adequacy of public water and sewer systems and other requisite public infrastructure, or (b) the ability to concurrently provide for these systems and infrastructure.

11. **Phasing of Development:** Plan for the phasing of TND development within the UDAs that is consistent with the City and Region's anticipated population and employment growth as well as public facilities and infrastructure capacity.

B. TND Overlay Sub-Areas

The TND-O District, as depicted on the City's Official Zoning Map, may be further mapped to distinguish among four distinct geographical areas--know of Sub-Areas--internal to the City's designated Urban Development Areas. The Sub-Areas shall be be characterized on the basis of the unique set of land use parameters that establish their own neighborhood identity. Each Sub-Area within the larger overlay district may be defined by its individual land use character, mix of uses, land use intensity, and development scale. The Sub-Areas that are most commonly associated with traditional neighborhood development are the **Core, Transitional, and Residential Sub-Areas**. A fourth Sub-Area--**Economic Development**--may be recognized to delineate areas within the UDAs that contain existing strip commercial, retail centers, business offices, manufacturing , warehousing, and other employment uses that are not customarily located within traditional neighborhood developments. The regulations for each Sub-Area incorporate a separate set of by-right and special permit uses.

1. **Core Sub-Area:** The Core Sub-Areas shall be the primary location for the urban-scaled commercial and business uses within the designated UDA and other Uptown areas. The Core Sub-Areas in the City encourage a mix of uses that are to be organized into an inviting destination point for civic life and business activities. With relatively few large undeveloped parcels these UDA locations, infill and redevelopment activities will anchor much of the future land use activities within the City's Core Sub-Districts. However, the remaining larger, undeveloped land within the UDAs should be subject to more extensive review by the City.

With a focus on cultivating and expanding compact "main street" forms of development in the City, Core Sub-Area development proposals should promote projects that encourage for a range of retail, services, restaurant, office, lodging, institutional, and civic uses. A Core Sub-Area is not intended as appropriate for the location of big box, power center, industrial, or other large-footprint commercial buildings that should otherwise be considered for the Economic Development Sub-Area.

TND projects incorporating compact residential dwellings (multifamily, townhouse, and small SFD lots) are recommended for the Core Sub-Area. New and redevelopment proposals should be planned as pedestrian-friendly mixed-use areas with a street system that provides vehicular and pedestrian interconnectivity with the adjoining residential and transitional neighborhoods. Building frontages should define the public streetscape, with on-street parking, utilities, and landscaping located within the public right of way.

TND development proposals for the Core Sub-Area shall be reviewed for consistency with the adopted traditional neighborhood development goals for the UDA as well as for other relevant policies of the Comprehensive Plan.

2. **Transitional Sub-Area:** The Transitional Sub-Area should be designated in locations to better accommodate small infill and redevelopment projects. It is intended to promote a graduated mix of lower intensity uses in areas that separate (*ie*. buffer) the Core Sub-Area from the lower density, stable residential neighborhoods in and around the UDAs. Respecting existing, stable land uses and neighborhoods in the Sub-Area, the by-right use of the overlay provisions should be applied to create more compatible redevelopment and infill development. Residential uses within the Transitional Sub-Area should be within a five to ten minute walking-distance of a Core Sub-Area.

As with the Core Sub-Area, lot sizes, frontages, setbacks and building formats should be scaled to complement neighborhood streetscapes and to stimulate neighborhood interaction. For projects of sufficient size *(> 2-acres)*, a mix of TND lot types should be provided. Light commercial uses and shops are permitted but individual uses should complement, not compete, with those in the village centers. A variety of residential uses and lot types are permitted in the Transitional Sub-Area along with community centers, churches, live-work residential, restaurants, and neighborhood-scaled shops (refer to *Section F: Lot and Yard Types*).

Where feasible, right of way improvements should include sidewalks, landscaping, street lights, drainage improvements, and on-street parking where public road frontage is impacted. This should also apply to individual infill lots. To preserve the capacity of on-street parking, public street access to front loaded parking pads and garages is discouraged in new residential projects while off-street parking should be relegated to the rear of individual residential lots. Single family and attached residential off-street parking and garages should be accessed by alleys, where feasible.

All development proposals for the Transitional Sub-Area shall be reviewed for consistency with the adopted traditional neighborhood development goals and policies of the Comprehensive Plan. During the application process, close coordination between the Applicant and City Staff will be required to determine these relationships.

3. **Residential Sub-Area:** The Residential Sub-Area provides for infill and limited redevelopment opportunities at residential densities that are lower than those found in the Core and Transitional areas. The Residential Sub-Area is intended to envelope stable neighborhoods where larger scale, near-term or intermediate-term redevelopment activities are neither anticipated nor desired. With few remaining large vacant parcels, new residences in this Sub-Area shall adhere to TND principles. To optimally serve the predicted level of demographic growth and marketplace characteristics, the Residential Sub-Area could encourage larger-scale projects at selected locations with a mix of lot sizes, frontages, setbacks, and housing types. Where public and private interests intersect, mixed housing types and lot types are recommended, with guidelines for the mix established with the Applicant's site plan.

Interconnected neighborhood street patterns with pedestrian improvements are a priority in the Residential Sub-Areas, and cul-de-sacs should be avoided except in cases where severe terrain limitations restrict their use. Rear alleys that access off-street parking for individual lots are encouraged but not required. Where public street access to private, off-street parking is provided, frontage driveways should be shared between adjoining lots, and private garages should be located to the rear of the principal structure. All new streets should be public and constructed to appropriate VDOT standards.

While smaller infill projects may not be of sufficient size to create ample open spaces, the Applicant and City should work together to ensure that plans are in place for neighborhood playgrounds, greens, and parks that are central and accessible to Sub-Area neighborhoods. Development proposals for the Residential Sub-Area shall be reviewed for consistency with the adopted traditional neighborhood development goals and policies of the Comprehensive Plan.

4. **Economic Development Sub-Area:** The Economic Development Sub-Area recognizes that certain existing land uses with higher densities and more intense community impacts may be appropriate for inclusion in the Martinsville's UDAs. This Sub-Area may be applied to locations for both existing land uses and future new or redevelopment projects in locations where TND development would be otherwise infeasible at present. The Economic Development Sub-Area should recognize those large-scale commercial and industrial uses of a scale, orientation, and impact not typically found in traditional neighborhood developments, but which, otherwise, hold the real potential to be shaped to fulfill the City's long-range redevelopment objectives.

   While this Sub-Area can be viewed today as a "grandfather" zone for existing uses, the long range potential remains for adaptation to TND forms of development. The majority of the land in the Uptown area and along the City's entry corridors is zoned to commercial or some other conventional zoning district. Many of the existing commercial uses that have been in existence for well over a generation are located on properties that could be eventually redeveloped at substantially higher densities. In addition to existing retail and business establishments, the scattered mix of shopping centers, industrial, or non-retail employment uses will need encouragement and assistance from both the City and the marketplace to redevelop to TND standards. Development proposals for the Economic Development Sub-Area shall be reviewed for consistency with both the traditional neighborhood development goals and the Economic Development policies of the Comprehensive Plan.

C. TND-O District Area Requirements

1. TND-O District size: There is no minimum or maximum size for a TND-O District project. The proposed size and configuration of the TND-O District project shall be described by a current boundary plat prepared by the Applicant that establishes the metes and bounds and acreage.

2. TND Sub-Area size: For projects that impact two or more of the City's designated TND-O District Sub-Areas, the size and configuration of the Core, Transitional, Residential, or Economic Development Sub-Areas shall be depicted on an Application Plan. The exhibit shall describe the boundary and acreage for the properties are located within multiple Sub-Areas.

3. Requests by an Applicant for modification to the geographical expansion of an approved project within a TND-O District constitutes a major change and shall require a new application (refer to *Section I.8* hereinafter).

D. Permitted Land Uses, Special Permit Uses, and Land Use Categories

1. Permitted uses to be included in the TND-O District shall be defined by the Applicant's Code of Development, provided that the City, at its sole discretion, may establish certain prohibited or restricted uses.

2. The Code of Development shall identify permitted uses and special permit uses within each Sub-Area. The permitted uses shall be defined in terms of the specific uses as provided in ***Table 1*** hereinafter.

Table 1:

Martinsville TND-O District

Permitted, Special Permit and Non-Permitted Uses

Use Group	TND Sub-Areas / Land Uses	Core	Transitional	Residential	Econ. Dev.	Use Group
Category 1: Residential	Single family detached residential	P	P	P	NP	Category 1: Residential
	Townhouse/attached residential	P	P	P	NP	
	Multifamily residential	P	P	SP	NP	
	Live-work (townhouse) residential	P	P	SP	NP	
	Residential in mixed use building	P	P	NP	SP	
	Assisted living facility	P	P	NP	NP	
	Nursing home	P	P	NP	NP	
	Accessory apartment or dwelling	SP	SP	SP	SP	
	Bed and breakfast establishments	SP	SP	SP	NP	
	Child or adult day care facilities	P	SP	NP	SP	
	Neighborhood greens, parks or playgrounds	P	P	P	NP	
	Community gardens	SP	SP	SP	SP	
	Home occupation uses	SP	SP	SP	NP	
	Other: TBD per Code of Development	SP	SP	SP	NP	
	Other: TBD per Code of Development	SP	SP	SP	NP	
	Other: TBD per Code of Development	SP	SP	SP	NP	
Category 2: Commercial, Office, and Lodging	Retail sales establishments	P	P	NP	SP	Category 2: Commercial, Office, and Lodging
	Personal service establishments	P	P	NP	SP	
	Professional and medical offices	P	P	NP	P	
	General offices	P	P	NP	P	
	Financial service establishments	P	P	NP	P	
	Artisan shops and sales establishments	P	P	NP	P	
	Studios for art, dance, or music	P	P	NP	P	
	Hotels and motels	P	SP	NP	P	
	Restaurants and eating establishments	P	P	NP	P	
	Vertical mix of Category 1 and 2 uses	P	P	NP	SP	
	Commercial education facilities	P	SP	NP	SP	
	Commercial fitness and health clubs	P	P	NP	SP	
	Child or adult day care facilities	P	SP	NP	SP	
	Hospitals and medical clinics	P	SP	NP	SP	
	Funeral homes	P	SP	NP	SP	
	Gas stations and vehicular service	SP	SP	NP	SP	
	Outdoor storage, display, and sales	SP	SP	NP	SP	
	Drive-thru facilities	SP	SP	NP	SP	
	Special events, festivals, and outdoor displays	SP	SP	NP	SP	
	Temporary Wayside Stands	SP	SP	NP	SP	
	Category 2 uses > 10,000, < 20,000 sq. ft. on ground floor per establishment	SP	SP	NP	P	
	Category 2 uses > 20,000 sq. ft. on ground floor per establishment	NP	NP	NP	SP	
	Other: TBD per Code of Development	SP	SP	NP	SP	
	Other: TBD per Code of Development	SP	SP	NP	SP	
	Other: TBD per Code of Development	SP	SP	NP	SP	

Table 1:

Martinsville TND-O District

Permitted, Special Permit and Non-Permitted Uses

Use Group	TND Sub-Areas / Land Uses	Core	Transitional	Residential	Econ. Dev.	Use Group
Category 3: Public and Quasi-Public	**Places of workship**	P	P	SP	SP	Category 3: Public and Quasi-Public
	Community centers	P	P	SP	SP	
	Cemeteries	SP	SP	NP	SP	
	Museums and galleries	P	P	NP	P	
	Government offices (federal, state, local)	P	P	NP	P	
	Public schools and colleges	P	SP	SP	SP	
	Private schools and colleges	P	SP	SP	SP	
	Public safety facilities	P	P	SP	P	
	Public parks and recreation facilites	P	P	SP	P	
	Recycling facilities	P	SP	SP	P	
	Other: TBD per Code of Development	SP	SP	SP	SP	
	Other: TBD per Code of Development	SP	SP	SP	SP	
	Other: TBD per Code of Development	SP	SP	SP	SP	
Category 4: Economic Development	**Research and development facilities**	SP	NP	NP	P	Category 4: Economic Development
	Manufacturing and assembly establishments	SP	NP	NP	P	
	Warehousing and storage facilities	SP	NP	NP	P	
	Wholesale sales and distribution facilities	SP	NP	NP	P	
	Machinery and equipment sales	SP	NP	NP	P	
	Repair service facilities (non-vehicular)	SP	NP	NP	P	
	Repair service facilities (vehicular)	SP	NP	NP	P	
	Category 4 uses > 10,000 sq. ft. on ground floor per establishment	SP	NP	NP	P	
	Outdoor storage, display, or sales	SP	NP	NP	SP	
	Other: TBD per Code of Development	SP	SP	SP	SP	
	Other: TBD per Code of Development	SP	SP	SP	SP	
	Other: TBD per Code of Development	SP	SP	SP	SP	
Category 5: Uses Specifically Excluded	*to be added to this table in the final COD for each excluded use*	NP	NP	NP	NP	Category 5: Uses Specifically Excluded
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	
		NP	NP	NP	NP	

E. Development Density and Yields

1. The TND-O District regulates both minimum and maximum development densities. The Applicant may submit proposals for TND-O District land use densities that are contained within the stipulated maximum and minimum. The total minimum and maximum development yields for individual land uses within a TND-O District project shall be established by the Code of Development.

2. Density regulations applicable to each Sub-Area shall apply to new development, redevelopment and infill development uses.

3. Minimum Density: Development densities for the land uses proposed for each Sub-Area project shall achieve a minimum density of at least the levels for the individual land uses as indicated in ***Table 2*** hereinafter or as shall otherwise be established by the Code of Development.

4. Maximum Density: Development densities for the land uses proposed for each Sub-Area project shall not exceed the levels for the individual land uses as indicated in ***Table 2*** hereinafter or as shall otherwise be established by the Code of Development.

5. The Applicant shall demonstrate in the project's Code of Development the appropriateness of the level of minimum and maximum densities proposed for each land use.

6. Upon request of the Applicant, the Planning Commission, at its sole discretion, may reduce the minimum required density for individual uses within a TND-O District project, provided that the revised minimum density for each land use shall be incorporated into the Application Plan. It shall be the responsibility of the applicant to demonstrate the justification for the reduction in density.

7. Upon request of the Applicant, the Planning Commission, at its sole discretion, may increase the maximum required for individual uses within a TND-O District project, provided that the revised maximum density for each land use shall be incorporated into the Application Plan. It shall be the responsibility of the applicant to demonstrate the justification for the increase in density.

8. The allowable range of land use yields within a TND-O District project shall be calculated based on the Qualifying Area (or Net Acreage) of the individual Sub-Area. The calculation of minimum and maximum yield for individual uses to be located in each project shall be based on the application of the minimum and maximum density for each use *(see **Tables 2 and 3** hereinafter)* to an adjusted Qualifying Area that reduces the gross area of the TND by the total of the non-qualifying land components within the Sub-Area.

   The **Qualifying Area (or Net Acreage) = (Gross Acreage) - (Acreage of the sum of the Non-Qualifying land components.)** The land components that comprise the Non-Qualifying land area include:

   a. existing rights of way and easements,

   b. existing land uses that are to remain on the property,

   c. areas deemed unbuildable due to geological, soils, or other environmental deficiencies,

Table 2:

Development Density: Maximum and Minimum Density for TND-O Sub-Districts

Martinsville TND-O Zoning District

Use Group	TND Sub-Districts / Land Uses	Core Density Minimum	Core Density Maximum	Core units	Transitional Density Minimum	Transitional Density Maximum	Transitional units	Residential Density Minimum	Residential Density Maximum	Residential units	Economic Development Density Minimum	Economic Development Density Maximum	Economic Development units	Use Group
Category 1: Residential	**Single family detached residential**	4	6	units/acre	4	6	units/acre	4	6	units/acre	NP	NP	units/acre	Category 1: Residential
	Townhouse/attached residential	6	14	units/acre	6	12	units/acre	6	10	units/acre	NP	NP	units/acre	
	Multifamily residential	14	36	units/acre	12	24	units/acre	8	24	units/acre	NP	NP	units/acre	
	Live-work residential (attached)	6	12	units/acre	6	8	units/acre	NP	NP	units/acre	NP	NP	units/acre	
	Residential in mixed use building	per COD	per COD	units/lot	per COD	per COD	units/lot	NP	NP	units/lot	NP	NP	units/lot	
	Assisted living facility	per COD	per COD	units/lot	per COD	per COD	units/lot	NP	NP	units/lot	NP	NP	units/lot	
	Nursing home	per COD	per COD	units/lot	per COD	per COD	units/lot	NP	NP	units/lot	NP	NP	units/lot	
	Accessory apartment or dwelling	0	1	units/lot	0	1	units/lot	0	1	units/lot	0	1	units/lot	
	Bed and breakfast establishments	per COD	per COD	beds/unit	per COD	per COD	beds/unit	NP	NP	beds/unit	NP	NP	beds/unit	
	Child or adult day care facilities	per COD	per COD	occupancy/unit	per COD	per COD	occupancy/unit	NP	NP	occupancy/unit	NP	NP	occupancy/unit	
	Other: TBD per Code of Development	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	
	Other: TBD per Code of Development	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	
	Other: TBD per Code of Development	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	per COD	
Category 2: Commercial, Office, and Lodging	**Retail sales establishments**	0.4	4.0	FAR	0.4	2.0	FAR	NP	NP	FAR	0.2	4.0	FAR	Category 2: Commercial, Office, and Lodging
	Personal service establishments	0.4	4.0	FAR	0.4	2.0	FAR	NP	NP	FAR	0.2	4.0	FAR	
	Professional and medical offices	0.4	4.0	FAR	0.4	2.0	FAR	NP	NP	FAR	0.2	4.0	FAR	
	General offices	0.4	4.0	FAR	0.4	2.0	FAR	NP	NP	FAR	0.2	4.0	FAR	
	Financial service establishments	0.4	4.0	FAR	0.4	2.0	FAR	NP	NP	FAR	0.2	4.0	FAR	
	Artisan shops and sales establishments	0.4	4.0	FAR	0.4	2.0	FAR	NP	NP	FAR	0.2	4.0	FAR	
	Studios for art, dance, or music	0.4	4.0	FAR	0.4	2.0	FAR	NP	NP	FAR	0.2	4.0	FAR	
	Hotels and motels	per COD	per COD	units/lot	per COD	per COD	units/lot	NP	NP	units/lot	per COD	per COD	units/lot	
	Restaurants and eating establishments	per COD	per COD	occupancy/unit	per COD	per COD	occupancy/unit	NP	NP	occupancy/unit	per COD	per COD	occupancy/unit	
	Vertical mix of Category 1 and 2 uses	per COD	per COD	per COD	per COD	per COD	per COD	NP	NP	per COD	per COD	per COD	per COD	
	Commercial education facilities	per COD	per COD	sf gfa/lot	per COD	per COD	sf gfa/lot	NP	NP	sf gfa/lot	per COD	per COD	sf gfa/lot	
	Commercial fitness and health clubs	per COD	per COD	sf gfa/lot	per COD	per COD	sf gfa/lot	NP	NP	sf gfa/lot	per COD	per COD	sf gfa/lot	
	Child or adult day care facilities	per COD	per COD	occupancy/unit	per COD	per COD	occupancy/unit	NP	NP	occupancy/unit	per COD	per COD	occupancy/unit	
	Hospitals and medical clinics	per COD	per COD	occupancy/unit	per COD	per COD	occupancy/unit	NP	NP	occupancy/unit	per COD	per COD	occupancy/unit	
	Funeral homes	per COD	per COD	sf gfa/lot	per COD	per COD	sf gfa/lot	NP	NP	sf gfa/lot	per COD	per COD	sf gfa/lot	
	Gas stations and vehicular service	per COD	per COD	sf gfa/lot	per COD	per COD	sf gfa/lot	NP	NP	sf gfa/lot	per COD	per COD	sf gfa/lot	
	Category 2 uses > 10,000 sq. ft. on ground floor per establishment	per COD	per COD	FAR	per COD	per COD	FAR	NP	NP	FAR	per COD	per COD	FAR	
	Drive-thru facilities	per COD	per COD	per COD	per COD	per COD	per COD	NP	NP	per COD	per COD	per COD	per COD	
	Other: TBD per Code of Development	per COD	per COD	per COD	per COD	per COD	per COD	NP	NP	per COD	per COD	per COD	per COD	
	Other: TBD per Code of Development	per COD	per COD	per COD	per COD	per COD	per COD	NP	NP	per COD	per COD	per COD	per COD	
	Other: TBD per Code of Development	per COD	per COD	per COD	per COD	per COD	per COD	NP	NP	per COD	per COD	per COD	per COD	

Table 2:

Development Density: Maximum and Minimum Density for TND-O Sub-Districts

Martinsville TND-O Zoning District

Use Group	TND Sub-Districts	Core			Transitional			Residential			Economic Development			Use Group
	Land Uses	Density			Density			Density			Density			
		Minimum	Maximum	units	Minimum	Maximum	units	Minimum	Maximum	units	Minimum	Maximum	units	
Category 3: Public and Quasi-Public	**Places of worship**	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	Category 3: Public and Quasi-Public
	Community centers	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Cemeteries	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Museums and galleries	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Government offices (federal, state, local)	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Public schools and colleges	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Private schools and colleges	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Public safety facilities	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Public parks and recreation facilites	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Recycling facilities	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Other: TBD per Code of Development	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Other: TBD per Code of Development	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Other: TBD per Code of Development	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
Category 4: Economic Development	**Research and development facilities**	**0.4**	**4.0**	*FAR*	**NP**	**NP**	***NP***	**NP**	**NP**	*FAR*	**0.4**	**1.0**	*FAR*	Category 4: Economic Development
	Manufacturing and assembly facilities	**NP**	**NP**	*FAR*	**NP**	**NP**	***NP***	**NP**	**NP**	*FAR*	**0.4**	**1.0**	*FAR*	
	Warehousing and storage facilities	**0.4**	**1.0**	*FAR*	**NP**	**NP**	***NP***	**NP**	**NP**	*FAR*	**0.4**	**1.0**	*FAR*	
	Wholesale and distribution facilities	**0.4**	**1.0**	*FAR*	**NP**	**NP**	***NP***	**NP**	**NP**	*FAR*	**0.4**	**1.0**	*FAR*	
	Repair service facilities (non-vehicular)	**0.4**	**1.0**	*FAR*	**NP**	**NP**	***NP***	**NP**	**NP**	*FAR*	**0.4**	**1.0**	*FAR*	
	Repair service facilities (vehicular)	**0.4**	**1.0**	*FAR*	**NP**	**NP**	***NP***	**NP**	**NP**	*FAR*	**0.4**	**1.0**	*FAR*	
	Category 4 uses > 10,000 sq. ft. on ground floor per establishment	**0.4**	per **COD**	*FAR*	**NP**	**NP**	***NP***	**NP**	**NP**	*FAR*	**0.4**	**1.0**	*FAR*	
	Outdoor storage, display, or sales	per **COD**	per **COD**	*per COD*	**NP**	**NP**	***NP***	**NP**	**NP**	***NP***	per **COD**	per **COD**	*per COD*	
	Other: TBD per Code of Development	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Other: TBD per Code of Development	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
	Other: TBD per Code of Development	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	per **COD**	per **COD**	*per COD*	
Category 5: Uses Specifically Excluded	*to be added to this table in the final COD for each excluded use*													Category 5: Uses Specifically Excluded

d. wetlands and floodplains (FEMA 100-year floodplain),

e. existing ponds, stormwater management facilities and water features that are not defined by wetlands or floodplains, and

f. terrain with slopes in excess of thirty percent (30%).

*(See **Appendix A**: **Density Calculation Work Sheet** for an illustrative example employing the Qualifying Acreage approach to calculate minimum and maximum densities within the TND-O District.)*

F. Lot and Yard Types: Size, Lot Dimensions, and Height Regulations

1. Lot types: ***Table 3: Lot Types and Lot Development Standards*** provides a matrix of representative lot types that are permitted in the TND-O District.

   a. Lots for small detached residential dwellings:
      (1) Cottage Lot
      (2) Village Lot

   b. Lots for medium detached residential dwellings
      (1) Neighborhood Lot #1
      (2) Neighborhood Lot #2

   c. Lots for attached and multifamily residential dwellings:
      (1) Townhouse Lot #1
      (2) Townhouse Lot #2
      (3) Multifamily Lot

   d. Lots for commercial and live-work commercial buildings:
      (1) Commercial Lot
      (2) Live-work Lot

   e. Lots for Economic Development and special permit buildings: established by Code of Development.

2. Lot development standards: ***Table 3*** establishes the regulations and guidelines for the size and dimensions of individual lot types as permitted within the individual TND Sub-Areas. ***Table 4: TND-O District Residential Lot Mix Work Sheet*** establishes the mix of lot types that are to be contained within each Sub-Area.

   a. Lot dimensions
   b. Lot area
   c. Yard and setback regulations
   d. Lot coverage and frontage

3. Supplemental notes for Lot Types and Lot Development Standards: In (1) - (9) below, the notes refer to footnotes (1) - (9) as cited in ***Table 3***.

(1) This table is regulatory except where noted by asterisk (*) as guidelines. Guidelines for variations to the indicated dimensions and percentages shall be approved by the Planning Director.

(2) Lot dimensions are provided in the matrix for interior lots. For corner lots, lot width and side yards shall be increased by 5' in addition to the prescribed dimensions.

(3) For attached dwellings, town homes and multifamily buildings, the indicated side yard regulations apply only to end units.

(4) Rear setback applies to principal structure only. Garages and/or accessory units may have zero setback when an alley is present. A minimum of 5′ setback is required in the absence of an alley.

(5) Lot frontage percentage represents the the ratio between the building width and corresponding width of the lot on which the building is located.

(6) Lot coverage ratio guideline applies to maximum percentage of building coverage. Lot areas for townhouses and multifamily units exclude areas for required off-street parking. Ratio for townhouses applied to internal units; end unit ratios not governed.

(7) The Code of Development shall include a Lot Mix Matrix for the planned distribution of lot types that are permitted within a TND-O District project. (See *Appendix A* for illustrative example and density calculation work sheet.)

(8) The lot dimensions, lot area, yard and setback regulations, and lot frontage regulations shall be established with the Code of Development.

(9) The Applicant shall submit a supplement to the Lot Types and Lot Development Standards matrix to identify, define, and regulate any additional land uses and lot types that are to be incorporated into the Code of Development. Additional uses and lot types shall be approved by the Planning Commission.

(***Appendix B: TND Lot Types*** provides illustrations of lot types and building configurations.)

4. Building heights for individual uses:

Building heights shall be identified and established by the Code of Development for each land use or combination of land uses within a TND-O District project, and, further, building heights shall be subject to the following minimum and maximum height limits as outlined in ***Table 5*** hereinbelow:

Table 3:

Lot Types and Lot Development Standards: TND-O District

Lot Group	Building Lot Type	Lot Dimensions: Width min.	Lot Dimensions: Width max.	Lot Dimensions: Depth min.	Lot: Area min. *(1)	Lot: Area max.	Yard and Setback Regulations: Front min.	Front max.	Side (2) (3) min.	Side max.	Rear (4)	Lot Frontage: Percentage min. *(1)	Lot Frontage: Percentage max.	Lot Coverage: Ratio max. *(1) (6)	TND Sub-District: Permitted (7)	Lot Group
1. Small Detached	**Cottage Lot**	34'	38'	80'	3000 sf	4000 sf	10'	15'	5'	8'	15'	60%	80%	60%	**Core, Transitional, Residential**	1. Small Detached
	Village Lot	38'	42'	85'	3500 sf	5000 sf	10'	15'	5'	9'	15'	60%	75%	60%	**Transitional, Residential**	
2. Medium Detached	**Neighborhood Lot 1**	42'	48'	90'	4000 sf	5000 sf	10'	15'	5'	10'	15'	60%	80%	60%	**Transitional, Residential**	2. Medium Detached
	Neighborhood Lot 2	48'	60'	90'	5000 sf	7000 sf	12'	25'	8'	12'	15'	60%	70%	60%	**Transitional, Residential**	
	Suburban Lot	60'	100'	100'	6000 sf	12,000 sf	15'	30'	10'	15'	15'	50%	70%	50%	**Residential**	
	Other Detached Lot: tbd/COD *(9)	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					regulated per COD		per COD	**Core, Transitional, Residential**	
3. Attached & Multifamily	**Townhouse Lot 1**	16'	24'	85'	1400 sf	2500 sf	10'	15'	5'	12'	15'	100%	100%	80%	**Core, Transitional, Residential**	3. Attached & Multifamily
	Townhouse Lot 2	20'	30'	90'	1800 sf	3000 sf	12'	20'	5'	12'	15'	100%	100%	80%	**Core, Transitional, Residential**	
	Multifamily Lot	regulated per COD with conditions *(8)					12'	25'	10'	15'	15'	per COD	100%	80%	**Core, Transitional**	
	Other Attached Lot: tbd/COD *(9)	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					regulated per COD		per COD	**Core, Transitional**	
4. Commercial	**Live-Work Lot**	18'	32'	85'	1530 sf	3000 sf	5'	15'	5'	12'	15'	60%	60%	80%	**Core, Transitional**	4. Commercial
	Commercial & Mixed Use Lot	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					60%	60%	100%	**Core, Transitional**	
5. Economic Development & Special Uses	**ED or Special Use #1:** tbd/COD *(9)	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					regulated per COD		per COD	regulated per COD	5. Economic Development & Special Uses
	ED or Special Use #2: tbd/COD *(9)	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					regulated per COD		per COD	regulated per COD	
	ED or Special Use #3: tbd/COD *(9)	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					regulated per COD		per COD	regulated per COD	
	ED or Special Use #4: tbd/COD *(9)	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					regulated per COD		per COD	regulated per COD	
	ED or Special Use #5: tbd/COD *(9)	regulated per COD with conditions *(8)					regulated per COD with conditions *(8)					regulated per COD		per COD	regulated per COD	
	ED or Special Use #6: tbd/COD *(9)	regulated per COD with conditions					regulated per COD with conditions *(8)					regulated per COD		per COD	regulated per COD	

Footnote Reference: See Section G.3.(1)-(9) of the TND Zoning District text for footnotes indicated by an asterisk (*) hereinabove.

Table 4:

Residential Lot Mix Work Sheet by TND-O Sub-Districts

Lot Group	TND Sub-Districts	Core Sub-District			Transitional Sub-District			Residential Sub-District			TND District Totals		Notes	Lot Group
	Residential Lot Types	Lot Mix Approx. range (%)	Residential Yield (# units) Minimum	Maximum	Lot Mix Approx. range (%)	Residential Yield (# units) Minimum	Maximum	Lot Mix Approx. range (%)	Residential Yield (# units) Minimum	Maximum	Residential Yield (# units) Minimum	Maximum		
1. Small Detached	**Cottage Lot**													1. Small Detached
	Village Lot													
	Other Detached Lot: tbd/COD													
2. Medium Detached	**Neighborhood Lot 1**													2. Medium Detached
	Neighborhood Lot 2													
	Suburban Lot													
	Other Detached Lot: tbd/COD													
3. Attached & Multifamily	**Townhouse Lot 1**													3. Attached & Multifamily
	Townhouse Lot 2													
	Multifamily Lot													
	Other Attached Lot: tbd/COD													
4. Commercial	**Live-Work Lot**													4. Commercial
	Residential Mixed Use Lot													
	Totals: Residential Units by Sub-Districts	**100%**			**100%**			**100%**						

NOTES:

1. Minimum and maximum residential lot and unit yield for each Sub-District shall be regulatory.
2. Minimum and maximum residential lot and unit mix for each Sub-District shall be a guideline
3. TND District minimum and maximum lot mix and unit yield shall be regulatory.

Table 5:

Core (Village Center) Sub-Area	Minimum	Maximum
Retail commercial	*24′*	*48′*
Commercial office and service	*24′*	*60′*
Vertically mixed retail and office	*24′*	*60′*
Vertically mixed retail/office and residential	*30′*	*60′*
Hotels and motels	*30′*	*72′*
Live-work residential	*30′*	*48′*
Residential, townhouse and attached	*30′*	*48′*
Residential, multifamily	*36′*	*60′*
Special permit uses and all other uses	*per COD*	*per COD*

Transitional Sub-Area	Minimum	Maximum
Retail commercial	*24′*	*36′*
Commercial office and service	*24′*	*36′*
Vertically mixed retail and office	*24′*	*36′*
Vertically mixed retail/office and residential	*30′*	*48′*
Hotels and motels	*30′*	*48′*
Live-work residential	*30′*	*48′*
Residential, single family detached	*30′*	*48′*
Residential, townhouse and attached	*30′*	*48′*
Residential, multifamily	*36′*	*48′*
Special permit uses and all other uses	*per COD*	*per COD*

Residential Sub-Area	Minimum	Maximum
Live-work residential	*30′*	*48′*
Residential, single family detached	*30′*	*48′*
Residential, townhouse and attached	*30′*	*48′*
Residential, multifamily	*30′*	*48′*
Special permit uses and all other uses	*per COD*	*per COD*

Economic Development Sub-Area	Minimum	Maximum
Special permit uses and all other uses	*per COD*	*per COD*

5. Upon request by the Applicant, the Planning Commission may increase or decrease the regulations for building heights, yards, and lots for individual uses within a TND-O District project, provided that the revised regulations shall be established for each land use or lot and incorporated into the Code of Development. It shall be the responsibility of the Applicant to demonstrate the justification for the requested adjustments to these regulations.

G. Civic Space, Parks, Open Space, and Recreation Areas

1. TND-O District projects with a gross area of ten (10) acres or greater shall provide usable and centrally located civic space, parks, common open space, or recreation areas that are accessible to residents, visitors, and workers within the TND-O District. Civic space, public parks, common open space, or recreation areas shall be strategically located and designed to provide recreational opportunities for the neighborhood as well as relate to the physiographic character and accessibility to the entire TND.

2. For TND-O District projects with a gross area of ten (10) acres or greater, these areas shall be sized, located, and improved to a level that satisfies the needs of the residents of the project, provided that a minimum of fifteen percent (15%) of the total Qualifying Area of the TND shall be allocated to these areas. (See *Section E.7* for definition of Qualifying Area.) The Application Plan and Code of Development shall establish the type, mix, arrangement, and quality of the planned on-site improvements for civic space, parks, common open space, recreation areas, buffer areas, and protected natural areas.

3. For TND-O District projects with a gross area of ten (10) acres or greater, the location, mix, type, quality and phasing of civic space, parks, common open space, recreation areas, buffer areas, and protected natural areas shall be consistent with the Comprehensive Plan or other criteria established by the City. These areas shall be delineated on the Application Plan and may include greens, squares, plazas, community centers, club houses, trails, pocket parks, or community gardens.

4. For TND-O District projects with a gross area of ten (10) acres or greater, the areas of property designated for civic space, parks, common open space, recreation areas, buffer areas, and protected natural areas shall be (a) subject to approval of the Planning Commission, and (b) permanently set aside for the sole benefit, use, and enjoyment of occupants of the TND-O District through covenant, deed restriction, or similar legal instrument; or, if agreed to by the Planning Commission, the civic space, parks, common open space, recreation areas, buffer areas, or protected natural areas may be conveyed to a governmental agency for the use of the general public.

5. Land within the TND that is designated to remain private for any of these areas and improvements shall be owned and maintained by a property owners' association or homeowners association.

6. Upon request of the Applicant, the Planning Commission, at its sole discretion, (a) may decrease or eliminate certain requirements for open space and recreation land and improvements in a TND-O District project, provided that the revised regulations shall be established and conditioned by the Code of Development, or (b) elect for the Applicant to contribute to a pro-rata share fund, provided that the City of Martinsville has established and adopted a parks and recreation master plan for the City and pro-rata sharing funding policy for the UDAs.

7. Any City parks and recreation master plan shall address the specific regional needs, specific improvements, and funding policy for the development of civic space, parks, open space, and recreation areas that inure to the benefit of all citizens within the TND-O District. The amount of the pro-rata share contribution shall be updated and recalculated on an annual basis by the City.

8. For projects that are less than ten (10) acres in gross area, the Applicant shall contribute to a pro-rata share fund as may be established by the City Council in a parks and recreation master plan for the City. In the absence of an adopted City parks and recreation master plan and pro-rata share funding policy for the UDAs, there shall be no contribution requirement on an Applicant for projects less than ten (10) acres.

9. The amount of the pro-rata share contribution shall be updated and recalculated on an annual basis by the City.

H. Application Plan and Code of Development: Application Requirements

1. **TND Application Plan:** The Application Plan establishes the size, location, and configuration for the TND-O District project and other internal planning areas (parks, open space, dedicated areas, etc.). It provides preliminary site plan detail for the project's transportation network, land use scheme, and other key components of development of the property, including but not limited to the requirements of Sections C. - F. hereinabove and the following. The Application Plan supplants the requirement for a preliminary site plan and preliminary subdivision plat. Upon approval of the Application Plan, a final plat and plan shall be required.

   a. Existing conditions plan depicting existing land uses, existing road and utilities, dedicated rights of ways and easements, historic and cultural features, tree coverage, and sensitive environmental areas of the property, including 100-year floodplain, wetlands, slopes > 30%, unbuildable areas, and other features as may be required by the Planning Director.

   b. Certified boundary plat, deed description, tax map reference and zoning district designation of the property (or properties) subject to the TND District zoning application, zoning district designations and ownership of adjoining properties, and topographic mapping (minimum 1″= 50′ horizontal scale and 2′ contour intervals, or at a scale and interval as otherwise approved by the Planning Director).

   c. Graphic plan exhibit depicting the internal layout and organization of Sub-Areas; to include the number, size, location, and boundary for each of the Sub-Areas (to be prepared at a minimum 1″=50′ horizontal scale or at a scale as otherwise approved by the Planning Director).

   d. Graphic plan depicting the proposed location, size and amenities to be provided in public and private open spaces, buffer areas, public parks, environmental preservation areas, and recreation areas.

   e. Overlay plan exhibit depicting the projected development phasing plan.

   f. Illustrative master plan exhibit depicting the general location of planned mix of uses and lot types for uses to be allocated within each Sub-District (to be prepared at a minimum 1″=100′ horizontal scale or at a scale as otherwise approved by the Planning Director).

2. **Development Code:** Sections *H. 2-6* comprise the Applicant's **Code of Development**. Section H.2 incorporates a narrative report and graphic exhibits that codifies the key components of the project proposed and that establishes the governing land use regulations, criteria, and guidelines, to address the following:

   a. The Applicant shall prepare a statement of compatibility of the proposed project with the City's TND-O District and Comprehensive Plan land use policies.

   b. Lot Types and Lot Development Standards matrix (*Table 4*), to incorporate supplemental standards as may be required by additional proposed land uses and lot types.

   c. Table of proposed by-right land uses, special permit uses, and specific land use exclusions applicable to use.

   d. Graphic representation of proposed generalized building forms, types and densities.

   e. Residential Lot Mix Work Sheet *(Table 4)*, to address proposed mix of residential lot types within the project, to include documentation for proposed lot variations and special conditions.

   f. Narrative and graphic exhibits to support justification, qualifications, and conditions related to special permit uses.

   g. Statement of minimum and maximum density, to include submission of Density Calculation Worksheet for the Sub-Areas (See *Appendix A* for illustrative example and density calculation work sheet.)

   h. Parking impact study, if required, to assess parking area and loading requirements.

   i. Documentation and plan demonstrating compliance with VDOT State Secondary Street Acceptance Requirements.

   j. A signage plan which establishes a uniform sign theme with graphic representation of the design character, style, number, size, height, and number of signs to be permitted with the project. Signs shall share a common style, as to size, shape, and material. Where signs otherwise vary in requirements with the existing City sign ordinance, the Applicant shall provide justification for the proposed variation. Upon approval of the Application Plan and Code of Development, the signage plan will regulate all signs within the TND-O District in lieu of the City's sign ordinance.

   k. Projection of planned project's infrastructure demands on public water, sewer and other facilities and infrastructure, and an assessment of availability and adequacy of existing public infrastructure and facilities.

3. **Street Classification Plan:** For any TND-O District project that proposes to construct new streets (public or private), a regulating street classification plan shall graphically address and depict the street system, street types, and streetscape design criteria for the types of vehicular and pedestrian access improvements within

the project:

a. Regulating plan for the alignment and classification of the project's street system, identifying interior and frontage streets, and including designation of street types, block lengths and geometry, alley locations, and pedestrian improvements within each project.

b. Graphic standards to illustrate plan and street cross sectional views, including right of way or easements specifications, for individual streets types (including alleys and pedestrian improvements).

c. Design guidelines for public hardscape, landscaping, street lighting, and placement of utility, storm drainage, and related infrastructure, including easement requirements and regulations.

4. **Building Form and Landscape Design Guidelines:** Documentation and graphics to describe the proposed characteristics of building design and landscape architectural improvements for the TND-O District project:

a. Graphic representation of proposed architectural themes.

b. Building form and styles, to address building scale, architectural proportions, and heights for uses within the project.

c. Landscape design guidelines to depict proposed landscape treatment of streets, neighborhoods, civic spaces, open areas, parking areas, and other activity centers within the project.

5. **Schematic Infrastructure Plans:** Schematic plans shall be prepared of sufficient alignment and design detail to demonstrate the feasibility and functionality of the project to the satisfaction of the City to address the following:

a. Storm drainage, stormwater management facilities, and LID and best management practices.

b. Sanitary sewer.

c. Domestic water.

d. Site grading (proposed finished grades at minimum 2′ contour intervals and 1″ = 50′ horizontal scale, or at a scale and interval as otherwise approved by the Planning Director).

e. Easement specifications and requirements for each public utility and facility, to include coordination requirements and agreements that may be needed by and between utility providers and the City.

6. **Traffic Impact Analysis:**

a. The City and Applicant shall determine whether or not the subject TND-O District project shall require a traffic impact statement to be prepared consistent with VDOT 527 regulations.

b. If a 527 traffic impact analysis is required by VDOT regulations, the Applicant shall prepare and submit a Pre-Scope of Work Meeting Form to the City on or before the date of formal submission of the zoning district amendment application. The Pre-Scope form shall be processed, reviewed by and between the City, VDOT and the Applicant in accord with adopted regulations and procedures.

c. If a 527 Traffic Impact Analysis is not required by VDOT regulations, the Planning Director may require an abbreviated traffic study. The Applicant shall meet with the Planning Director to determine the required scope for a traffic analysis for the TND project. The Planning Director shall approve the elements to be addressed in the study scope. The traffic analysis shall be submitted with the zoning amendment application. Minimum requirements may include the following:

(1) Existing traffic counts (AM and PM peak hour) at intersections to be identified by the City.

(2) Trip generation estimates for the planned land uses within the proposed development, employing ITE methodologies.

(3) Trip distribution and assignments to the existing road network of traffic projected for the development at full-buildout.

(4) Estimates of background traffic growth on impacted streets and highways.

(5) Analysis of future conditions, to include level of service calculations for impacted intersections.

(6) Signal warrants analysis.

(7) Statement of recommended transportation improvements.

I. Additional Application Requirements and Agreements

1. The Applicant shall identify and establish standards for TND utility and infrastructure design and easement requirements. The Applicant shall also identify and establish procedures to pursue any required waivers and modification of existing City zoning, subdivision, and design standards related thereto, as applicable to implement the proposed project.

2. The Applicant shall establish agreements for public ownership, management, and maintenance of properties within the project to be dedicated to public use, including parks, civic areas, open space, stormwater management facilities, and recreational facilities, where applicable, and establish rules for common property ownership and maintenance, if applicable.

3. The Applicant, in conjunction with the City, shall establish design criteria and use conditions for each land use subject to special use permit approval.

4. The Applicant shall provide written request and adequate documentation in support of any amendment, waiver or modification associated with the TND Application Plan.

5. If all or any portion of the property is to have land or improvements that are to be dedicated to a property owner(s)' association, the Applicant shall identify the property or improvements subject to dedication and shall submit draft articles of incorporation, by laws, and related operating documents for City review.

J. TND Application and Review Process:

1. Pre-Application Meeting: The Applicant shall schedule a meeting with the Planning Director for an introductory work session to discuss the key elements and impacts of the proposed project. The Planning Director and other City agency representatives shall provide guidance on (a) application requirements, (b) timeframe for processing of the Application Plan, (c) Comprehensive Plan considerations, (d) identification issues related to public infrastructure and facilities, and (e) other matters as may be uniquely related to the Applicant's property. At this meeting, the Applicant shall present a sketch plan that depicts the following: (a) general boundary and location of property subject to rezoning application, (b) land area to be contained within the TND-O District, (c) conceptual plan for the project, (d) planned mix of land uses and densities, and (e) general approach for the provision of adequate transportation, infrastructure and community facilities.

2. TND Application Package Submission Meeting: The Applicant shall schedule a meeting with the Planning Director to submit and initially review the contents of the Application Plan for completeness. Within five (5) working days of the completion of the meeting, the Planning Director shall notify the Applicant in writing if the application package meets the City's expectations for completeness. If the Application Plan package does not meet expectations, the Planning Director shall provide written notification to the Applicant of the additional requirements necessary to establish a complete application. Once an application has been deemed a formal "complete application" by the Planning Director, the application package shall be distributed for formal review in accord with City policy. An incomplete application will not be reviewed.

3. Staff Review Meeting #1: The Planning Director shall notify the Applicant upon completion by City staff and relevant agencies of the first review of the Application Plan. Written comments shall be provided to the Applicant at the first staff review meeting. The Applicant shall revise and resubmit materials as necessary to satisfy City comments.

4. Staff Review Meeting #2 (if required): The Planning Director shall notify the Applicant upon completion of the second review by City staff and relevant agencies of the Application Plan. The Applicant shall revise and resubmit materials as necessary to satisfy City comments.

5. Planning Commission Work Session: A work session with the Planning Commission may be requested by either the Applicant or the Planning Director at any time subsequent to Staff Review Meeting #1.

6. Planning Commission Public Meeting: One or more public meetings may be conducted by the Planning Commission to review and take formal action on the Applicant's project.

7. Public notifications and work sessions: The City may determine it is in the public interest to schedule a work session at any time during the application process.

8. Changes and modifications to an approved Application Plan and Code of Development: Any subsequent changes and modifications to the approved Application Plan, the Code of Development, or other elements related to the original conditions for approval of the TND-O District project shall be submitted by the Applicant to the Planning Director. The Planning Director shall determine whether the requested change is a major or minor change. Major changes shall require approval by the Planning Commission. Minor changes shall require approval by the Planning Director, who, at his/her discretion, may obtain recommendations from the Planning Commission. The City, at its discretion, may establish policies for major and minor changes.

K. Waivers, Variances and Modifications for TND Application Plans

1. The Applicant shall clearly identify and document all waivers, variances and modifications to existing City codes, ordinances, and development standards that may be required to implement the proposed Application Plan.

2. Documentation to be submitted with Application Plan shall (a) address the justification for each requested waiver, modification, or development standard, and (b) recommend alternative substitute proposals, including design and construction standards, where applicable. Graphic exhibits shall clearly depict areas and locations where the waiver, variance, or modifications impacts the proposed project.

3. The Planning Commission, upon its consideration of the recommendation of the Planning Director, may, at is sole discretion, act to approve, modify, or deny each requested waiver, variance, or modification.

4. No approval or modification shall be granted by the Planning Commission for any waiver, variance, or modification in the absence of an adequate and sufficient substitute, including design and construction details and standards, where applicable. Where a waiver, variance, or modification is approved by the Planning Commission, the accepted substitute shall become a binding condition of the Application Plan approval.

5. The City recognizes an approved TND Application Plan as having fulfilled its requirements for a preliminary subdivision plan or preliminary site plan. Upon such recognition, the Applicant may proceed with the preparation of final plats and plans in accord with the approved Application Plan.

6. Appeals to decisions of the Planning Commission related to this chapter may be made to the City Council, provided that such appeal is filed in writing within thirty (30) calendar days of such decision.

TND Pre-Application Meeting Work Sheet

The City of Martinsville, Virginia

Martinsville
A CITY WITHOUT LIMITS

PROJECT NAME:

OWNER:

ATTENDEES:

PRE-APPLICATION MEETING DATE:

Application Package Requirements	Required YES	Required NO	Notes
TND Application Plan			
1 Existing Land Use Conditions Plan			
2 Certified Boundary Plat			
3 Topographic and As-Built Mapping			
4 TND-District Sub-Area Plan			
5 Open Space, Parks, and Recreation Plan			
6 Development Phasing Plan			
7 Illustrative Master Plan			
8 Adjoining Property Owners			
9 Other: (per Planning Director)			
Development Code			
1 Statement of Comp Plan Compatibility			
2 Lot and Development Standards Matrix			
3 Land Use Table: By-Right and Special Permit Uses			
4 Building and Lot Type Graphics			
5 Residential Lot Mix Work Sheet			
6 Density Calculation Work Sheet			
7 Parking Impact and Shared Parking Analysis			
8 Compliance with VDOT SSARs			
9 Signage and Site Lighting Plan			
10 Documentation of Adequate Public Facilities			
11 Utility Demand Analysis: Water & Sewer			
12 Other: (per Planning Director)			
Street Classification Plan			
1 Regulating Plan for Streets			
2 Proposed TND Street Types			
3 Standards for Street Lights			
4 Standards for Public Infrastructure			
5 Standards for Pedestrian Improvements			
6 Other: (per Planning Director)			

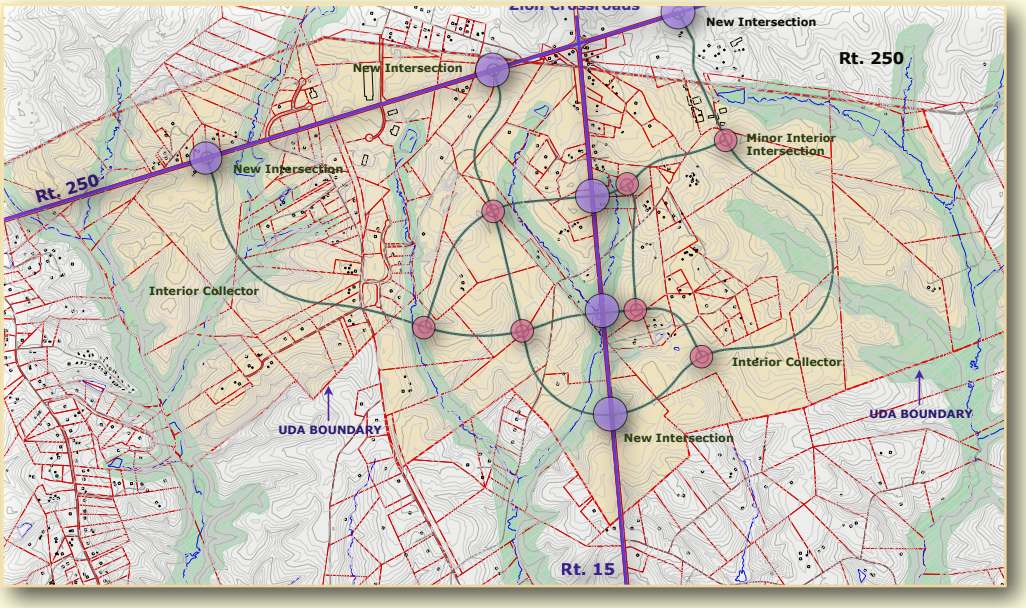
TND Pre-Application Meeting Work Sheet

The City of Martinsville, Virginia

Martinsville
A CITY WITHOUT LIMITS

Application Package Requirements	Required YES	Required NO	Notes
Building and Landscape Design Guidelines			
1 Proposed Architectural Themes and Building Styles			
2 Proposed Building Heights and Block Massing			
3 Landscape Design Guidelines			
4 Other: (per Planning Director)			
Schematic Infrastructure Plans			
1 Storm Drainage			
2 Stormwater Management			
3 Best Management Practices			
4 Sanitary Sewer			
5 Domestic Water			
6 Site Grading			
7 Infrastructure Easement Specifications			
8 Other: (per Planning Director)			
Traffic Impact Analysis			
1 Determination of 527 TIA Requirement			
2 VDOT Pre-Scope Meeting Schedule			
3 Optional TIA Requirements			
4 Other: (per Planning Director)			
Additional Application Requirements			
1 Justification for Waviers and Modifications Requested			
2 Common Property Ownership Agreements			
3 Justification for Alternative Design Criteria			
4 Proffer Statement			
5 Other: (per Planning Director)			
TND Application and Review Process			
1 Pre-Application Meeting			
2 Application Package Submission Meeting			
3 Staff Review Meeting #1			
4 Staff Review Meeting #2			
5 Planning Commission Work Session			
6 Planning Commision Public Meeting			
7 City Council Work Session			
8 City Council Public Meeting			
9 Other: (per Planning Director)			

Zion Crossroads Development Area
Fluvanna County
Zoning Text Amendment



Revisions to the:

Planning Unit Development Ordinance (PUD)
Zion Crossroads TND

Section 22; Article 14

prepared by: The Cox Company • Charlottesville, Virginia

AN ORDINANCE TO AMEND AND RE-ENACT PORTIONS OF CHAPTER 22, ARTICLE 14 "PLANNED UNIT DEVELOPMENT DISTRICT (PUD)" OF THE FLUVANNA COUNTY CODE

BE IT ORDAINED BY THE FLUVANNA BOARD OF SUPERVISORS, pursuant to Virginia Code Sections 15.2-2285, that the Fluvanna County Code be, and it is hereby, amended, by the revisions thereto of Section 22-14, as follows:

Article 14. PLANNED UNIT DEVELOPMENT DISTRICT (PUD)

Sec. 22-14-1. Statement of Intent

Planned unit developments *(PUDs)* are intended to promote the efficient use of land by allowing flexibility in design standards and variety in densities and land uses to preserve the rural areas of the county. Development of such districts shall be in accordance with an approved *PUD Application Package* ~~master plan~~ which should provide a variety and range of uses and densities in designated areas of the site.

Planned unit developments should be located within the designated growth areas of the county as set forth in the comprehensive plan, and should implement the goals of each Community Planning Area. Planned *unit* developments should provide unified development that incorporates new urbanism *and traditional neighborhood development* principles, which includes a mix of residential and commercial uses, an interconnected system of internal roads, pedestrian sidewalks and walkways and well planned access points along existing roadways. In addition to a mix of residential and commercial uses, planned developments should also provide a mix and variety of housing types.

The PUD District is intended to the applied to privately initiated zoning map amendments for land located within the County's Community Planning Areas (CPAs) and the designated Zion Crossroads Urban Development Area (UDA). The Zion Crossroad UDA is located internal to the Zion Crossroads Community Planning Area, as depicted on the Future Land Use Map, as amended. The County's designated CPAs and UDA include:

a. Zion Crossroads Community Planning Area
b. Zion Crossroads Urban Development Area
c. Rivanna Community Planning Area
d. Palmyra Community Planning Area
e. Fork Union Community Planning Area
f. Columbia Community Planning Area
g. Scottsville Community Planning Area

Sec. 22-14-2. Procedure for Rezoning

(1) Prior to submitting an official rezoning application *for a PUD,* the applicant shall schedule a pre-application meeting with the Planning Director ~~and staff~~ *for an introductory work session to discuss the key elements and impacts of the* proposed *project* ~~rezoning request~~. *The Planning Director and other County agency representatives may provide specific guidance on (a) application requirements, (b) timeframe for processing of the zoning map amendment application, (c) Comprehensive Plan compliance considerations, (d) identification issues related to public infrastructure and facilities, and (e) other matters as may be uniquely related to the applicant's property. At this meeting, the applicant shall present a preliminary sketch plan and other exhibits that depict the following: (a) general boundary and location of property subject to the PUD rezoning application, (b) land area to be contained within the PUD District, (c) graphic representation of the arrangement of interior sub-areas, (d) planned mix of land uses and densities, and (e) general approach to addressing transportation, infrastructure and community facilities.*

(2) After the pre-application meeting with staff, the applicant shall submit an application for rezoning with the Fluvanna County Planning Department. The *PUD Application Package* ~~application~~ shall consist of ~~four~~ *the following* primary sections: a narrative, an existing conditions map, a *PUD Application Plan* ~~master plan~~*, a transportation plan, street design guidelines, lot development criteria, community design guidelines,* and a traffic impact analysis.

(i) *PUD Application Package* Narrative

a. A general statement of objectives to be achieved by the ~~planned~~ *PUD* district including a description of the character of the proposed development and the market for which the development is oriented;

b. A list of all adjacent property owners;

c. Site *and lot* development standards, including but not limited to *mix of land uses,* density *for individual residential land uses*, floor area ratios *for non-residential uses, building* setbacks *and yard regulations*, maximum heights, *maximum project density*, and lot coverage;

d. Proposed utilities and implementation plan; *including documentation of adequate public facilities.*

e. Phased implementation plan;

f. Comprehensive signage plan;

g. Descriptions of any architectural and community design guidelines including but not limited to *a code of development,* building designs, orientations, styles, lighting, etc.;

h. Specific proffers *and conditions* (if proposed).

(ii) Existing Conditions Map

a. Topography, including *the identification of* steep slopes (>20%), *to be prepared with minimum 2' contour elevations and 100' horizontal scale, and current boundary survey of the property subject to the PUD district;*

b. Water features, including existing stream buffers and stormwater or erosion control measures;

c. Roadways;

d. Structures;

e. Tree lines;

f. Major utilities;

g. Significant environmental features*, including unsuitable soils for land development purposes, wetlands, and FEMA designated 100-year floodplains*;

h. Existing and proposed ownership of the site along with all adjacent property owners;

i. Zoning of the site and adjacent properties.

j. *Locations of public improvements and facilities, including rights of way and easements, as may be recognized by the Comprehensive Plan, the Future Land Use Map, the Official Map, or State transportation plans, as may be applicable.*

(iii) *PUD Application Package* ~~Master Plan~~

The *PUD Application Package shall include a PUD Application Plan (master plan)* ~~preliminary master plan shall~~ *to be prepared to a horizontal scale of 1"=100' or as otherwise may be approved by the Planning Director to be* of sufficient clarity and scale to accurately identify the location, nature, and character of the proposed planned unit development (PUD) district. At a minimum, the *PUD Application Plan* ~~preliminary master plan~~ shall include the following:

a. Proposed *PUD master plan* layout ~~of~~ *and supporting land use documentation (tables, charts, etc.) for all proposed land uses within* the PUD district*,* including the general location of uses, types of uses, *mix of uses, lot types,* density range of uses, and floor area ratio ranges;

b. Methods of access from existing state maintained roads to proposed areas of development;

c. General ~~road~~ *street* alignments and parking areas*, including proposed street sections and standards*;

d. General alignments of sidewalks, bicycle and pedestrian facilities;

e. ~~A general utility plan~~ *Schematic utility plans,* indicating the *infrastructure and* facilities to serve the development, including but not limited to: *water,*

sewer and storm drainage improvements, ~~lines,~~ pump stations, treatment facilities, offsite improvements as needed, electrical substations, etc.;

f. A general plan showing the location and acreage of the active and passive recreation spaces, parks, *civic areas,* and other public open areas;

g. A general overall landscaping layout that includes methods of screening and buffering from adjacent properties and existing public right-of-ways*,* as well as stream buffers;

h. A general stormwater management *and best management practices master* plan that includes how negative impacts to nearby streams, wetlands, surface water, and groundwater resources as a result of development would be avoided and mitigated;

i. Phased development areas. Subsequent subdivision plats and site plans should be closely correlated with master plan phases.

j. *A schematic grading plan for the area of the PUD property proposed for development, with finished grades to be prepared at a 5' contour interval.*

k. *Documentation and plan demonstrating general compliance with VDOT State Secondary Street Acceptance requirements and other requirements for public streets and intersections.*

Planned Unit Development Master Plan

(iv) Traffic Impact Analysis

~~A traffic impact analysis shall be submitted with the application package and reviewed by the Virginia Department of Transportation (VDOT) prior to the Planning Commission public hearing.~~

a. *The Planning Director shall determine whether or not the subject PUD District project shall require a traffic impact statement to be prepared consistent with VDOT 527 regulations.*

b. If a 527 traffic impact analysis is required, the Applicant shall prepare and submit a Pre-Scope of Work Meeting Form to the County on or before the date of formal submission of the zoning district amendment application. The Pre-Scope form shall be processed, reviewed by and between the County, VDOT and the Applicant in accord with adopted regulations and procedures.

c. If a 527 Traffic Impact Analysis is not required, the Applicant shall meet with the Planning Director to determine the required scope for a traffic analysis for the PUD project The Planning Director shall approve the elements to be addressed in the study scope. The traffic analysis shall be submitted with the zoning amendment application. Minimum requirements may include the following:

(1) Existing traffic counts (AM and PM peak hour) at intersections to be identified by the County.

(2) Trip generation estimates for the planned land uses within the proposed development, employing ITE methodologies.

(3) Trip distribution and assignments to the existing road network of traffic projected for the development at full-buildout.

(4) Estimates of background traffic growth on impacted streets and highways.

(5) Analysis of future conditions, to include HCM level-of-service calculations for impacted intersections.

(6) Signal warrants analysis.

(7) Statement of recommended transportation improvements to provide adequate levels of service for the traffic generated by the proposed project.

(3) The *PUD* application package shall not be scheduled for consideration by the Planning Commission until the Planning Director has determined that the package is complete. Except as the Planning Director may determine otherwise in a particular case, for reasons beyond the control of the applicant, any application package which is not complete within 30 days after its submission shall be deemed to have been withdrawn and shall not be further processed. Once the Planning Director has determined the application package to be complete, the following process shall commence:

(i) The Planning Commission shall receive a public presentation on the proposed development at a regularly scheduled meeting, prior to advertising for a public hearing;

(ii) The Planning Commission may schedule one or more work sessions to discuss the proposed development;

(iii) Once a public hearing has been conducted by the Planning Commission, a recommendation shall be forwarded to the Board of Supervisors for their consideration;

(iv) The Board of Supervisors may schedule one or more work sessions to discuss the proposed development and the Planning Commission recommendation, prior to conducting their public hearing;

(v) The plan approved by the Board of Supervisors shall constitute the final master plan for the PUD district.

(4) All conditions and elements of the plan as submitted, including amendments and revisions thereto, shall be deemed to be proffers once the Board of Supervisors has approved the final master plan. All such conditions and elements shall be enforceable by the County pursuant to Section 22-17-9 of this Code.

(5) The approved final master plan shall serve as the sketch plans for the subdivision and site plan process.

(6) Prior to development of the site, a final site development plan pursuant to Article 22-23 of the zoning ordinance, shall be submitted for administrative review and approval for any business, limited industrial, or multi-family development.

(7) Additionally, if any land within the district is to be subdivided, preliminary and final subdivision plats pursuant to the subdivision regulations of Chapter 19 of the Fluvanna County Code shall be submitted for administrative review and approval prior to development of the site. Staff will determine if the submitted preliminary plats are in accordance with the approved final master plan.

(8) If staff determines that the preliminary or final subdivision plats or final site plan are not in accord with the approved final master plan, such plans will be sent to the Planning Commission for review. If the Planning Commission determines that such plans are not in accord with approved final master plan, the applicant shall then submit sketch plans for review and approval by the Planning Commission. The sketch plans shall either be in accord with the approved final master plan, or a master plan amendment shall be applied for, in which case the amendment procedure set out in the zoning ordinance shall be followed.

Sec. 22-14-3. Character of Development

The goal of the PUD district is to allow for and encourage development that incorporates new urbanism principles which includes:

(1) Pedestrian orientation;

(2) Neighborhood friendly streets and paths;

(3) Interconnected streets and transportation networks;

(4) Parks*, recreation improvements,* and open space as amenities;

(5) Neighborhood centers *and civic space;*

Planned Unit Development

(6) Buildings and spaces of appropriate scale;

(7) Relegated parking;

(8) Mixture of uses and use types;

(9) Mixture of housing types and affordability;

(10) Clear boundaries with any surrounding rural areas;

(11) Environmentally sensitive design (i.e., sustainability and energy efficiency).

(12) Adequate public facilities and infrastructure to serve the community.

An application is not necessarily required to possess every characteristic of the PUD district as delineated above in order to be approved. The size of the proposed district, its integration with surrounding districts, or other similar factors may prevent the application from possessing every characteristic.

Sec. 22-14-4. Uses Permitted By-Right

In the PUD district, all uses permitted by-right in the residential (R-1, R-2, R-3 and R-4), business (B-1 and B-C) and limited industrial (I-1) zoning districts may be permitted as enumerated in the final *PUD application package* ~~master plan~~. Uses not specified within the *PUD application package* ~~master plan~~ shall not be permitted. *(See Planning Staff for matrix for use by applicant to designate proposed by-right land uses to be included in the PUD district. The applicant's completed table shall be established as a condition of approval of the PUD Application Package.)*

Sec. 22-14-5. Uses Permitted by Special Use Permit

One or more of the uses permitted by special use permit in the residential and business zoning districts may be permitted in the PUD district, as enumerated in the final *PUD application package* ~~master plan~~, upon issuance of a special use permit by the Board of Supervisors. Uses not specified within the *PUD application package* ~~master plan~~ shall not be permitted. *(See Planning Staff for a matrix for use by applicant to designate proposed special use permit uses to be included in the PUD district. The applicant's completed table, including special conditions imposed during the zoning application process, shall become an element of the PUD application package.)*

Sec. 22-14-6. Minimum Area Required for a Planned Unit Development

(1) PUD districts shall be located on a single parcel of land or separate but contiguous parcels which are, or proposed to be, under common ownership, subject to approval of the rezoning application. The minimum area required for a PUD district shall be as follows:

(i) Zion Crossroads Community Planning Area: 20 acres

(ii) Zion Crossroads Urban Development Area (applicable to a PUD district application on designated UDA land located within the Zion Crossroads CPA): <u>*no minimum area required.*</u>

(iii) ~~ii~~ Rivanna Community Planning Area: 10 acres

(iv) ~~iii~~ Palmyra Community Planning Area: 5 acres

(v) ~~iv~~ Fork Union Community Planning Area: 5 acres

(vi) ~~v~~ Columbia Community Planning Area: 5 acres

(vii) ~~vi~~ Scottsville Community Planning Area: 5 acres

(2) Additional land area may be added to an established PUD district if it is adjacent to and forms a logical addition to the approved development. The procedure for an addition shall be the same as if an original *PUD zoning amendment* application was filed, and the requirements of this article shall apply, except the minimum acreage requirement.

Sec. 22-14-7. Open Space, *Recreation, Parks and Civic Areas*

(1) *In the Community Planning Areas,* not less than 30% of the gross area of a PUD district shall be preserved as open space*, provided that supplemental regulations for application to the Zion Crossroads UDA apply as indicated herein below. The required 30%* ~~Open~~ *open* space may include private common and public open areas; perimeter open space; buffers between various uses, densities and adjacent properties; ~~recreation areas and facilities;~~ *recreational space, neighborhood parks, civic areas;* easements; water bodies and any undisturbed land not occupied by building lots, structures, streets, ~~roads,~~ and parking lots. By way of this section, yards of individual residences shall not be considered open space.

(2) Land designated for future facilities (i.e. schools, fire and rescue stations, places of worship, daycare centers, etc.) shall not be included toward the open space.

(3) Not less than 15% of the total open space shall be provided for active and/or passive recreational activities.

Open Space

(4) Private common open areas shall be owned, maintained and operated by a property owner's association. A property owner's association document shall be prepared declaring and specifying the care and maintenance of the common areas. This document shall be reviewed and approved by the Fluvanna County Attorney prior to final approval.

(5) Upon request of the Applicant, the Planning Commission, at its sole discretion, (a) may decrease or eliminate certain requirements for open space and recreation land and improvements in a PUD District project, provided that the revised regulations shall be established and conditioned by the PUD Application Package.

(6) For PUD projects in the Zion Crossroads UDA that are less than fifteen (15) acres in gross area, the Applicant may contribute to a pro-rata share fund lieu of provision for all or a portion of the required open space. The County shall reserve and employ these funds for the purpose of community open space, park, recreation, or civic space development within the Zion Crossroads Community Planning Area.

(7) *For PUD projects in the Zion Crossroads UDA with a gross area of fifteen (15 acres) or greater, the quantity, location, mix, type, quality and phasing of open space, civic space, parks, recreation areas, buffer areas, and protected natural areas shall be consistent with the policies of the Comprehensive Plan or other criteria for traditional neighborhood development as may be established by the County. These areas shall be delineated on the PUD Application Plan and may include greens, squares, plazas, community centers, club houses, swimming facilities, outdoor recreational fields, trails, pocket parks, or community gardens.*

Sec. 22-14-8. Density

(1) The maximum ~~gross~~ residential base density permitted for *individual land uses to be located in the* PUD districts shall be as follows *in Table 1 below*:

~~(i) Zion Crossroads Community Planning Area: 10 dwelling units per acre~~

~~(ii) Rivanna Community Planning Area: 6 dwelling units per acre~~

~~(iii) Palmyra Community Planning Area: 4 dwelling units per acre~~

~~(iv) Fork Union Community Planning Area: 4 dwelling units per acre~~

~~(v) Columbia Community Planning Area: 6 dwelling units per acre~~

~~(vi) Scottsville Community Planning Area: 4 dwelling units per acre~~

(2) The allowable density for individual uses within the PUD District shall be calculated based on the Net Acreage of the land subject to the PUD zoning amendment application. The calculation of minimum and maximum yield for individual uses shall be based on the application of the minimum and maximum density for each use (see Table 1) to an adjusted Net Acreage. The Net Acreage reduces the gross area of the PUD land by the total of the non-qualifying land components within property. The Net Acreage = Gross Acreage - Non-Qualifying Area (acreage of the sum of the Non-Qualifying land components.) The components that comprise the Non-Qualifying areas include:

- *area of existing dedicated public rights of way and easements*
- *areas depicted on an adopted Official Map for future public improvements,*
- *area of existing land uses and structures, including platted lots, that are intended to remain as a part of the PUD project,*
- *areas deemed unbuildable due to geological, soils, or other environmental deficiencies,*
- *areas of wetlands and floodplains (as defined by FEMA 100-year floodplain or engineering study),*
- *area of existing ponds, stormwater management facilities, and water features that are not defined as wetlands or floodplains, and*
- *area of terrain with slopes in excess of thirty percent (30%).*

PUD District Density Regulations								
Community Planning Area	**Minimum & Maximum Density** Dwelling Units par acre for Residential – Floor Area Ration for Commercial							
	Single Family		**Townhouses**		**Multifamily**		**Commercial**	
	min.	max.	min.	max.	min.	max.	min.	max.
Zion Crossroads Community Planning Area		*6*		9		*16*		
Zion Crossroads Urban Development Area	*4*	*6*	6	9	*12*	*16*	0.4	
Rivanna Community Planning Area		*4*		6		*12*		
Palmyra Community Planning Area		*4*		6		*12*		
Fork Union Community Planning Area		*4*		6		*12*		
Columbia Community Planning Area		*4*		6		*12*		
Scottsville Community Planning Area		*4*		6		*12*		

Table 1: PUD Density Regulations

(3)~~(2)~~ An increase in the maximum ~~gross~~ residential density for a PUD district may be permitted in the following instances:

Open Space:

If 50% or more of the gross area of a PUD is preserved as open space, then a 20% increase in density may be permitted. If 75% or more of the gross area of a PUD is preserved as open space, then a 30% increase in density may be permitted.

Affordable Housing (as defined in the ~~2009~~ Comprehensive Plan):

If between 10% and 15% of the total number of dwelling units within a PUD are reserved for affordable housing, then a 20% increase in density may be permitted. If more than 15% of the total number of dwelling units within a PUD are reserved for affordable housing, then a 30% increase in density may be permitted.

Open Space and Affordable Housing:

Density bonuses may also be permitted with a combination of both open space and affordable housing. The increase in density that may be permitted shall be based on the following combinations of open space and affordable housing:

Open Space Provided	Affordable Housing Provided	Density Bonus Permitted
50%	10-15%	35%
50%	+15%	45%
75%	10-15%	40%
75%	+15%	50%

Transfer/Purchase of Development Rights:

(Reserved for future Transfer of Development Rights/Purchase of Development Rights density bonuses)

Sec. 22-14-9. Setbacks

(1) Minimum setbacks and yard regulations *for each planned land use* within the PUD district shall be specifically enumerated in *a table to be included in the PUD Application Package* ~~the master plan~~.

(2) Lots at the perimeter of the PUD district shall conform to the setback requirements of the adjoining district, or to the setback requirements of the planned district, whichever is greater.

(3) Refer to the Comprehensive Plan for illustrative examples of residential lot types for traditional neighborhood development projects.

Sec. 22-14-10. Streets

(1) Streets within the PUD district may be either public or private, but shall conform to VDOT road design standards. Private subdivision streets shall be permitted in accordance with the provisions of Sec. 19-18-1(c) of this Code.

(2) Alleys may be allowed within the PUD district provided they conform to either VDOT design standards or as otherwise prescribed in the master plan.

(3) Sidewalks shall generally be provided on both sides of any streets, public or private, within the PUD district. Sidewalks shall conform to VDOT standards.

(4) Traffic access and circulation within the PUD district shall be designed to provide safe accommodation of all users of the transportation network including pedestrians and bicyclists. Sidewalks, bicycle lanes and multi-use trails shall be

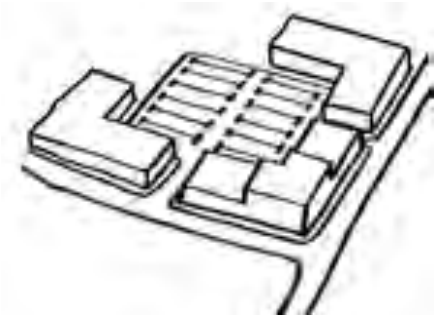
provided where appropriate. Mixed-use areas of the development shall be designed to give priority to pedestrian and bicycling traffic.

(5) Internal *streets* ~~roads~~ within the PUD district shall be permitted to intersect with existing public *streets* ~~roads~~ to the extent necessary. Such intersections shall provide reasonable access and service to uses contained within the development and shall be developed using VDOT principles of access management.

(6) Refer to the Comprehensive Plan for illustrative examples of residential streets for traditional neighborhood development projects.

Sec. 22-14-11. Parking

(1) Off-street parking facilities in mixed-use, business, industrial, and multi-family residential areas shall generally be relegated behind the front building line.



Relegated Parking

(2) On-street parking shall be permitted, where appropriate.

(3) In addition to the regulations included herein, all off-street parking shall be provided in accordance with the off-street parking and loading requirements of Article 22-26 of the zoning ordinance.

(4) *The provisions of Article 22-26 for the application of individual parking standards for projects located within the Zion Crossroads UDA may be modified at the discretion of the Planning Commission, provided that the Applicant submits a parking impact study that fully justifies the modification to the standards based on the mix of uses, the phasing of development, and other factors, including relationship of parking location to individual land uses within the project.*

Sec. 22-14-12. Height of Buildings

The height regulations for the PUD district shall be as follows:

PUD Maximum Heights						
Building Types	**Community Planning Areas**					
	Zion Crossroads	**Rivanna**	**Palmyra**	**Fork Union**	**Columbia**	**Scottsville**
Single-Family	*45* ~~35 Feet~~	*45* ~~35 Feet~~	*45* ~~35 Feet~~	*45* ~~35 Feet~~	*45* ~~35 Feet~~	*45* ~~35 Feet~~
Multi-Family	55 Feet	45 Feet	45 Feet	45 Feet	45 Feet	35 Feet
Business, Industrial and Non-Residential	75 Feet	55 Feet	45 Feet	45 Feet	55 Feet	35 Feet

(1) For purposes of this section, height shall be the vertical distance of a structure measured from the highest finished grade to the highest point of the structure.

(2) Spires, belfries, cupolas, monuments, water towers, chimneys, flues, flagpoles, television antennae and radio aerials: 60 feet from grade, unless otherwise enumerated in the master plan.

(3) Roof-mounted mechanical equipment (i.e. air conditioners, condensers, ductwork, etc.) shall not be visible at any point from ground-level. Parapet walls shall not extend more than four (4) feet above the maximum height permitted for buildings within the PUD district.

(4) Buildings with a mixture of business and residential uses are subject to the height regulations of business, industrial and non-residential buildings.

Sec. 22-14-13. Utilities

(1) All uses and structures within a PUD district shall be served by ~~either public or private~~ *both* central water and sewerage systems*, whether publicly or privately provided*.

(2) No overhead utility lines shall be permitted within a PUD district. All utility lines, including but not limited to, electric, telephone, cable television lines, etc. shall be placed underground.

(3) Telecommunications facilities are encouraged on the roofs of buildings within a PUD district to provide coverage to the district and surrounding area.

Sec. 22-14-14. Building Design and Architecture

(1) Within the multi-family residential, business, industrial, and mixed-use areas of a PUD district, building design styles shall be compatible with each other and shall exhibit consistency in terms of their exterior materials, architectural style, size, shape, scale, and massing.

(2) With the exception of detached single family dwellings, building facades shall maintain a consistent street edge. The street elevation of principal structures shall have at least one street-oriented entrance and contain the principal windows of the structure, with the exception of structures in a courtyard style.

(3) Site plans shall include drawings, renderings, or perspectives of a professional quality which illustrate the scale, massing, roof shape, window size, shape and spacing, and exterior materials of the structure.

Sec. 22-14-15. Amendment

(1) The Planning Director may approve a minor change to an approved *PUD Application Package and Application Plan* ~~final master plan for a PUD~~ at the written request of the owner of the development. For purposes of this section, a "minor change" refers to changes of location and design of buildings, structures, streets, parking, recreational facilities, open space, landscaping, utilities, or similar details which do not significantly change the character of the approved *PUD application package and PUD* master plan.

(2) If the Planning Director determines that the requested change constitutes a significant change, or something more than a minor change to the approved *zoning application package* ~~master plan~~, then the owner may seek an amendment to the *PUD Application Package and Application Plan* ~~final master plan~~ from the Board of Supervisors. The application procedure for such an amendment shall be the same as the application procedure for the original approval.

Sec. 22-14-16 Construction of Article

The provisions of this Article shall be construed in such manner as to be consistent with other provisions of this Code to the extent that such construction may be reasonably applied. To the extent that any provision of this Article shall be inconsistent with any other provision of this Code, the provisions of this Article shall be deemed to be controlling.

Note: The term "shall generally", as used in the context of this section of the ordinance, indicates that the stated requirement is expected unless there are compelling, specific, and extenuating circumstances for why it cannot be met.

APPENDIX D.
Miscellaneous

Citizens' Survey
Urban Development Area Project

A recent change in state law requires Martinsville to designate an Urban Development Area (UDA). A UDA is an area where future higher-density, mixed-use growth will be a priority. The purpose of the UDA is to concentrate future development where it can be served by existing streets and other infrastructure to limit costly infrastructure expansion in the future. The UDA will be incorporated into Martinsville's Comprehensive Plan, a document that will guide city decisions over the next 10 to 20 years.

To complete this survey, please circle the number that best reflects your attitude toward each statement. Circle #5 if you strongly agree, circle #3 if your attitude is neutral or you have no opinion, and circle #1 if you strongly disagree.

Development Questions

1. Future growth should be concentrated near existing developed areas, rather than in undeveloped areas at the edges of the City, in order to avoid the expense of extending roads and utilities.

Strongly Disagree **1** **2** **3** **4** **5** *Strongly Agree*

2. Traditional Neighborhood Development is a style of development that mimics older Virginia towns by mixing houses, stores, and offices together in the same neighborhood, and building streets that work for pedestrians as well as cars. This is a more preferred form of community development than separating residential and commercial uses into separate areas of the city.

Strongly Disagree **1** **2** **3** **4** **5** *Strongly Agree*

3. Martinsville's Uptown area is an example of the density and development style that the UDA legislation hopes for. The Uptown area is the heart of Martinsville, and the area where new growth should be most encouraged and concentrated.

Strongly Disagree **1** **2** **3** **4** **5** *Strongly Agree*

4. If not Uptown, what other area of Martinsville do you feel should be prioritized for future residential and commercial development?

5. What are the three most important issues facing Uptown (or other) in the future *(such as housing choices, employment opportunities, shopping close to home, parking)?*

a: _____

b: _____

c: _____

6. New residences, and not just commercial buildings, are a priority near Uptown (or other) and should be encouraged.

Strongly Disagree **1** **2** **3** **4** **5** *Strongly Agree*

7. In your opinion, what mix of house types (single family detached, townhomes, multi-family residences) should be developed in Martinsville? Please provide your ideal percentage mix *(percentages should total 100%)*:

Single Family Detached Homes: _____ % Multifamily/Apartment: _____ %

Townhomes: _____ % Total: 100 %

8. Where do you or your family members most frequently go for goods and services such as groceries, home improvement supplies, banking, restaurants, clothing or furniture?

9. It would be nice to have more shops, restaurants, or recreation options within walking distance of my home.

Strongly Disagree **1** **2** **3** **4** **5** *Strongly Agree*

Information About You

10. In what area of the City do you live? _____

11. What type of residence do you live in?

Single family home: _____

Town House / Duplex: _____

Apartment: _____

12. Total number of people living in your home: _____

13. Do you work in Martinsville? ____ *YES* ____ *NO*

14. If you do not work in Martinsville, where do you work? _____

Thank you for your time and opinions. Your participation is important and will help guide decisions related to growth management and land use planning in the City of Martinsville.

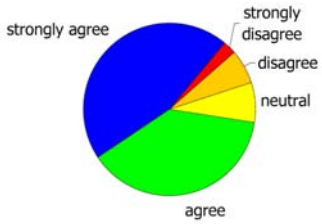
Results

Martinsville UDA Survey

The following survey was conducted by The Cox Company as part of a larger, grant-funded project to establish Urban Development Areas in Martinsville in accordance with changes in state law. The survey's overall goal was to measure citizens' opinions on higher density, mixed-use development for Martinsville's future, as well as to gauge current positions and habits. The survey was conducted online, and was open from December 14, 2010 to January 28, 2011.

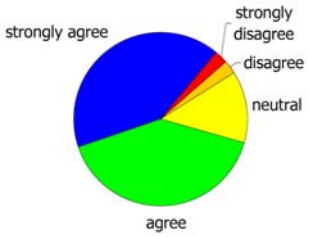
1. Future growth should be concentrated near existing developed areas, rather than in undeveloped areas at the edges of the City, in order to avoid the expense of extending roads and utilities.

Strongly Disagree	2.5%
Disagree	6.3%
Neutral	7.6%
Agree	38.0%
Strongly Agree	45.6%



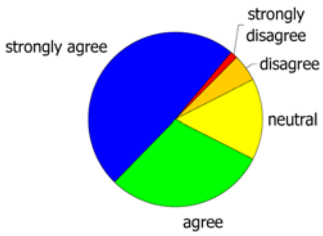
2. Traditional Neighborhood Development is a style of development that mimics older Virginia towns by mixing houses, stores, and offices together in the same neighborhood, and building streets that work for pedestrians as well as cars. This is a more preferred form of community development than separating residential and commercial uses into separate areas of the city.

Strongly Disagree	0.0%
Disagree	2.5%
Neutral	13.8%
Agree	41.3%
Strongly Agree	42.5%



3. Martinsville's Uptown area is an example of the density and development style that the UDA legislation hopes for. The Uptown area is the heart of Martinsville, and the area where new growth should be most encouraged and concentrated.

Strongly Disagree	1.3%
Disagree	5.0%
Neutral	15.0%
Agree	30.0%
Strongly Agree	48.8%



4. If not Uptown, what other area of Martinsville do you feel should be prioritized for future residential and commercial development?

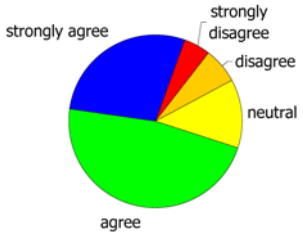
Druid Hills
Church Street area
Spruce Street area
South Martinsville near DuPont
Commonwealth Blvd
Between Liberty Fair Mall and WalMart
Memorial Blvd
West End near Fayette Street and Albert Harris School
Industrial Parks
Outlying Areas as gateways to Martinsville
Neighborhoods

5. What are the three most important issues facing Uptown (or other) in the future (such as housing choices, employment opportunities, shopping close to home, parking)?
* up to three answers were allowed per respondent

Employment
Shopping
Housing
Parking
Safety
Restaurants and dining
Shopping close to home
Landscaping and parks
Entertainment
One way streets
Trash pickup, unsightly trash, cleanliness
Streetscape and façade improvements
Attractiveness, desirability, and general atmosphere
Promotion and marketing of Uptown as a destination, including special events
Traffic
Lack of evening, weekend activity
Existing businesses and property owners not invest in improvement
Walkability and pedestrian friendly streets
Empty buildings
Business development
Older buildings that require expensive renovation
Better signage and wayfinding
The New College must expand for growth
Lack of tenets
Ease of accessibility from bypass and south side
Restoration over new development
Utility rates
Use the Phoenix CDC as a catalyst for development in Uptown
Rent too high
Businesses don't seem to be connected, no organization that represents them
Focus on green initiatives
Education and cultural growth
Commissioner of Revenue office difficult to work with
Educational attainment
Incentives for existing businesses
Incentives for new businesses to locate in Uptown
Need to concentrate on getting more professional services in Uptown (e.g. software, design firms)
Lack of specialty stores
Niche shops, bookstore, art supplies, green grocery
Having small grocers uptown for convenience of city dwellers
Major retailers, not just fringe choices

6. New residences, and not just commercial buildings, are a priority near Uptown (or other) and should be encouraged.

Strongly Disagree	5.1%
Disagree	6.4%
Neutral	12.8%
Agree	47.4%
Strongly Agree	28.2%

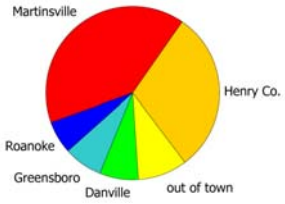


7. In your opinion, what mix of house types (single family detached, townhomes, multi-family residences) should be developed in Martinsville? Please provide your ideal percentage mix (percentages should total 100%):

	average	range
Single Family Detached	30%	0 – 98%
Townhomes	42%	1 – 100%
Multifamily / Apartment	32%	1 – 85%

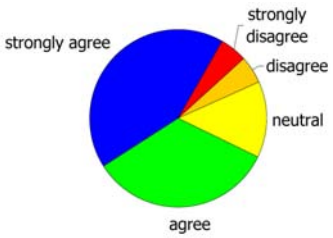
8. Where do you or your family members most frequently go for goods and services such as groceries, home improvement supplies, banking, restaurants, clothing or furniture?

Martinsville or Martinsville location	40.2%
Henry County or Henry County location	30.2%
Other or Out of Town	8.9%
Danville	7.3%
Greensboro / Winston Salem	7.3%
Roanoke	6.1%



9. It would be nice to have more shops, restaurants, or recreation options within walking distance of my home.

Strongly Disagree	5.0%
Disagree	5.0%
Neutral	13.8%
Agree	33.8%
Strongly Agree	42.5%

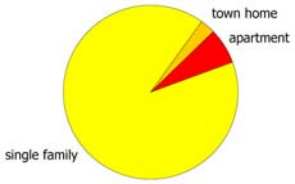


10. In what area of the City do you live?

Forest Park	Oakdale Street
County	Corn Tassel
Mulberry	Historic District
Not in the city	2nd Street west end
Druid Hills	E Church St
Collinsville	South side
Bassett	North side
Chatham Heights	Spruce Street
Chatmoss	North Carolina
East	Rives Rd
Lake Lanier	Barrows Mill Rd
Uptown	Lanier Farms
Northeast	Chatham Road
Kings Mtn. Road	Church Street Ext.

11. What type of residence do you live in?

Single Family Home	90.7%
Town House/Duplex	2.7%
Apartment	6.7%



12. Total number of people living in your home:

One	18.7%
Two	45.3%
Three	20.0%
Four	12.0%
Five	4.0%

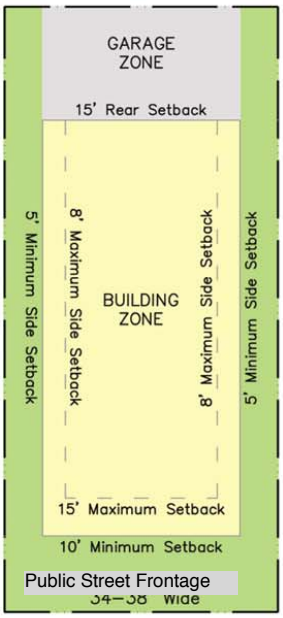
13. Do you work in Martinsville?

Yes	74.0%
No	27.3%

14. If you do not work in Martinsville, where do you work?

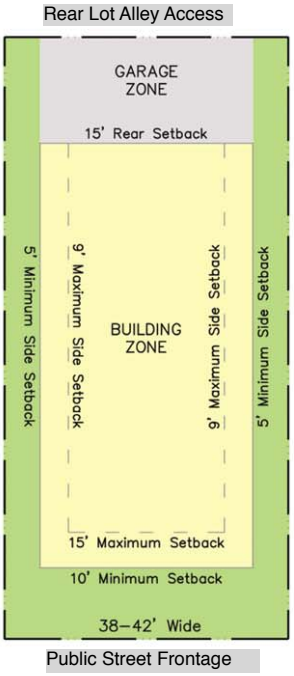
Retired
Henry County
Work from home
N/A
Greensboro
Collinsville
Pittsylvania County
Madison, NC

Cottage Lot



Cottage Lot Dimensions:

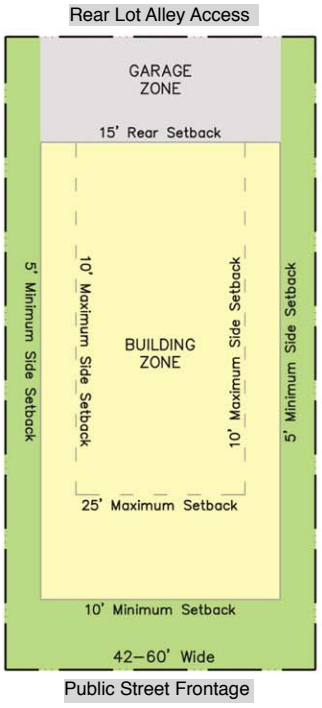
Lot Width:	*34 - 38'*
Lot Depth (min.):	*80'*
Front Yard Setback (min.):	*10'*
Front Yard Setback (max.):	*15'*
Side Yard Setbacks (min.):	*5'*
Side Yard Setbacks (max.):	*8'*
Rear Yard Setback:	*15'*



Village Lot Dimensions:

Lot Width:	*38 - 42'*
Lot Depth (min.):	*85'*
Front Yard Setback (min.):	*10'*
Front Yard Setback (max.):	*15'*
Side Yard Setbacks (min.):	*5'*
Side Yard Setbacks (max.):	*9'*
Rear Yard Setback:	*15'*

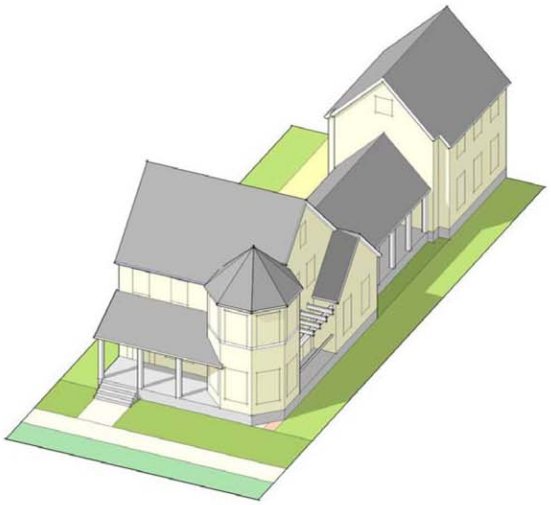
Neighborhood Lot

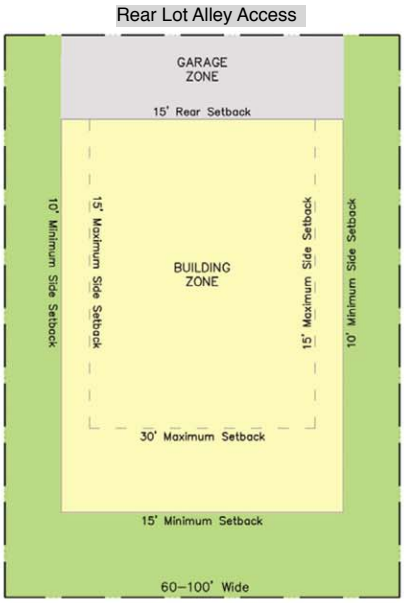


Neighborhood Lot Dimensions:

Lot Width:	*42 - 60'*
Lot Depth (min.):	*90'*
Front Yard Setback (min.):	*10'*
Front Yard Setback (max.):	*25'*
Side Yard Setbacks (min.):	*5'*
Side Yard Setbacks (max.):	*12'*
Rear Yard Setback:	*15'*

Suburban Lot

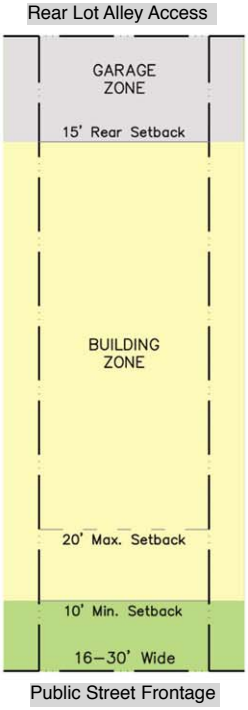




Suburban Lot Dimensions:

Lot Width:	*60 - 100'*
Lot Depth (min.):	*100'*
Front Yard Setback (min.):	*15'*
Front Yard Setback (max.):	*30'*
Side Yard Setbacks (min.):	*10'*
Side Yard Setbacks (max.):	*15'*
Rear Yard Setback:	*15'*

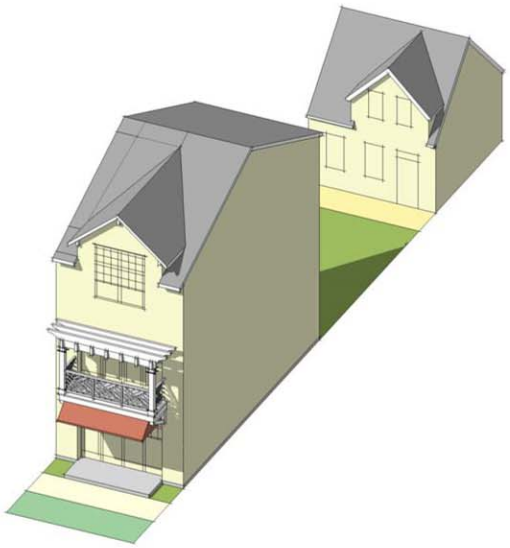
Townhouse Lot

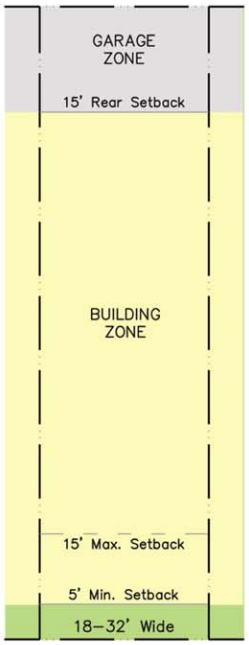


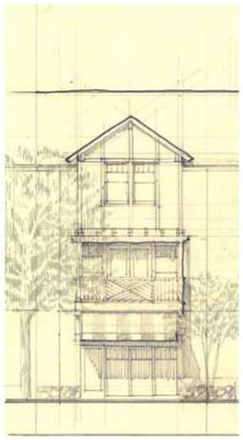
Townhouse Lot Dimensions:

Lot Width:	*16 - 30'*
Lot Depth (min.):	*90'*
Front Yard Setback (min.):	*10'*
Front Yard Setback (max.):	*20'*
Side Yard Setbacks (end unit - min.):	*5'*
Side Yard Setbacks (end unit - max.):	*12'*
Rear Yard Setback:	*15'*

Live-Work Lot

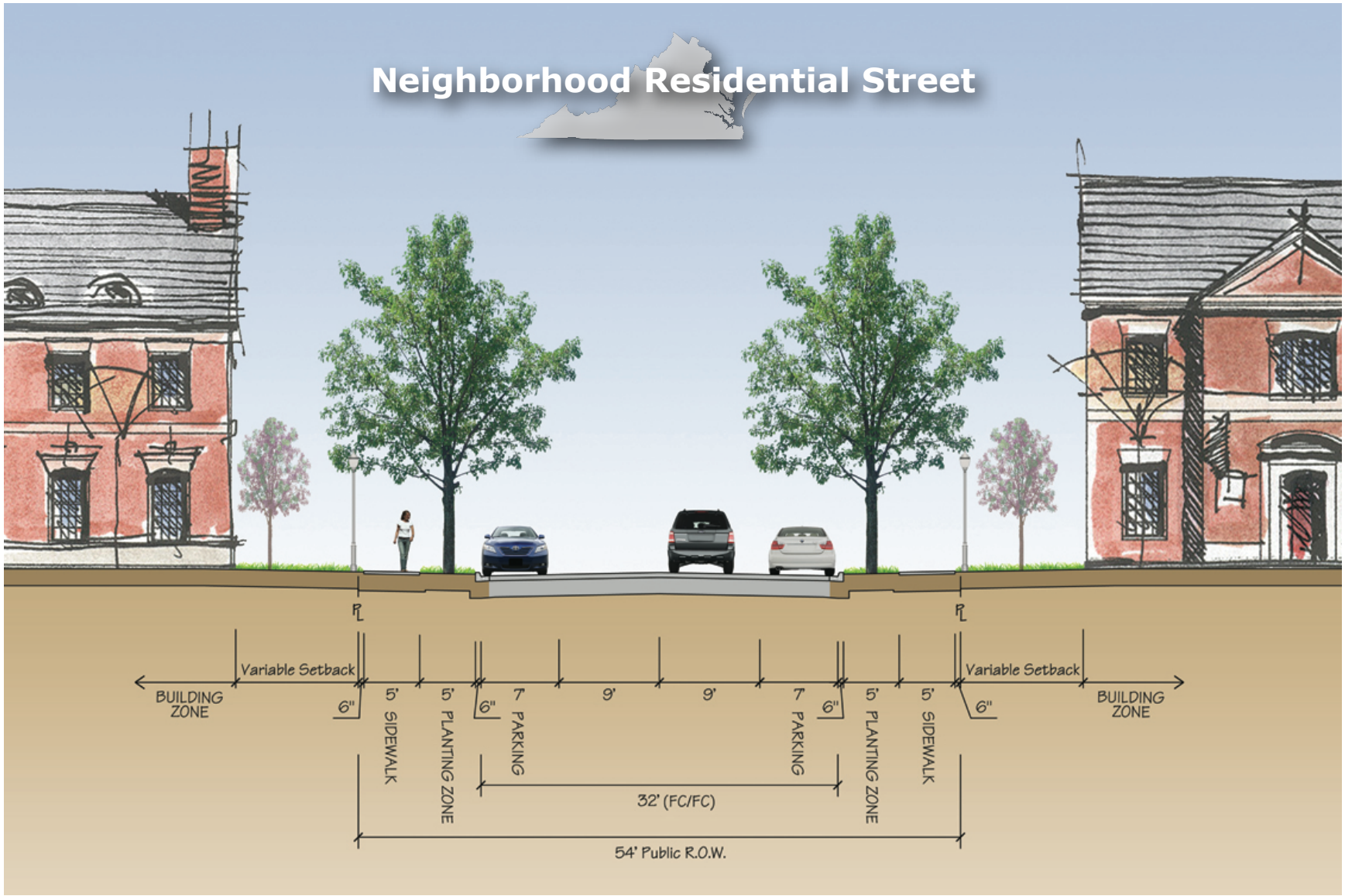




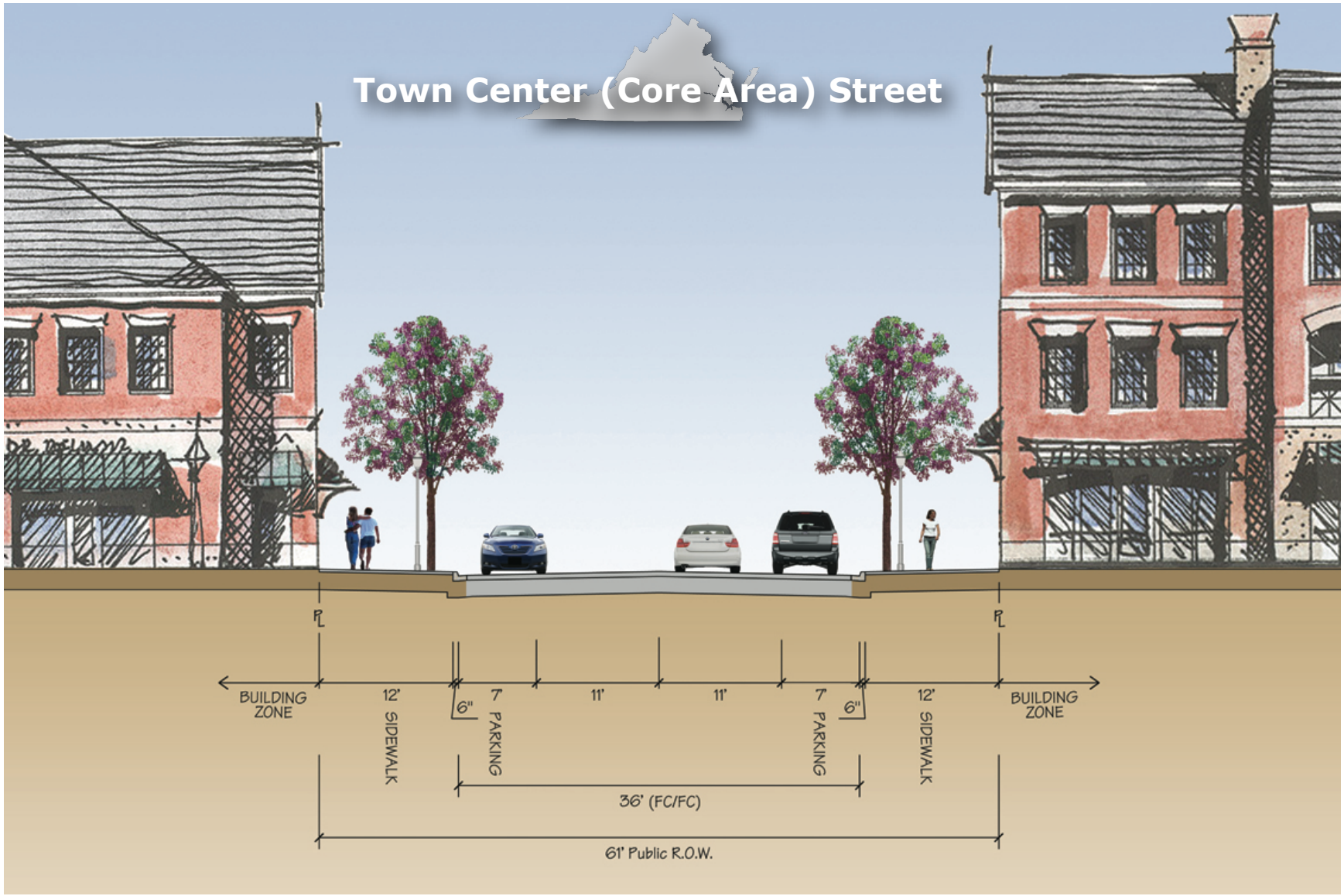


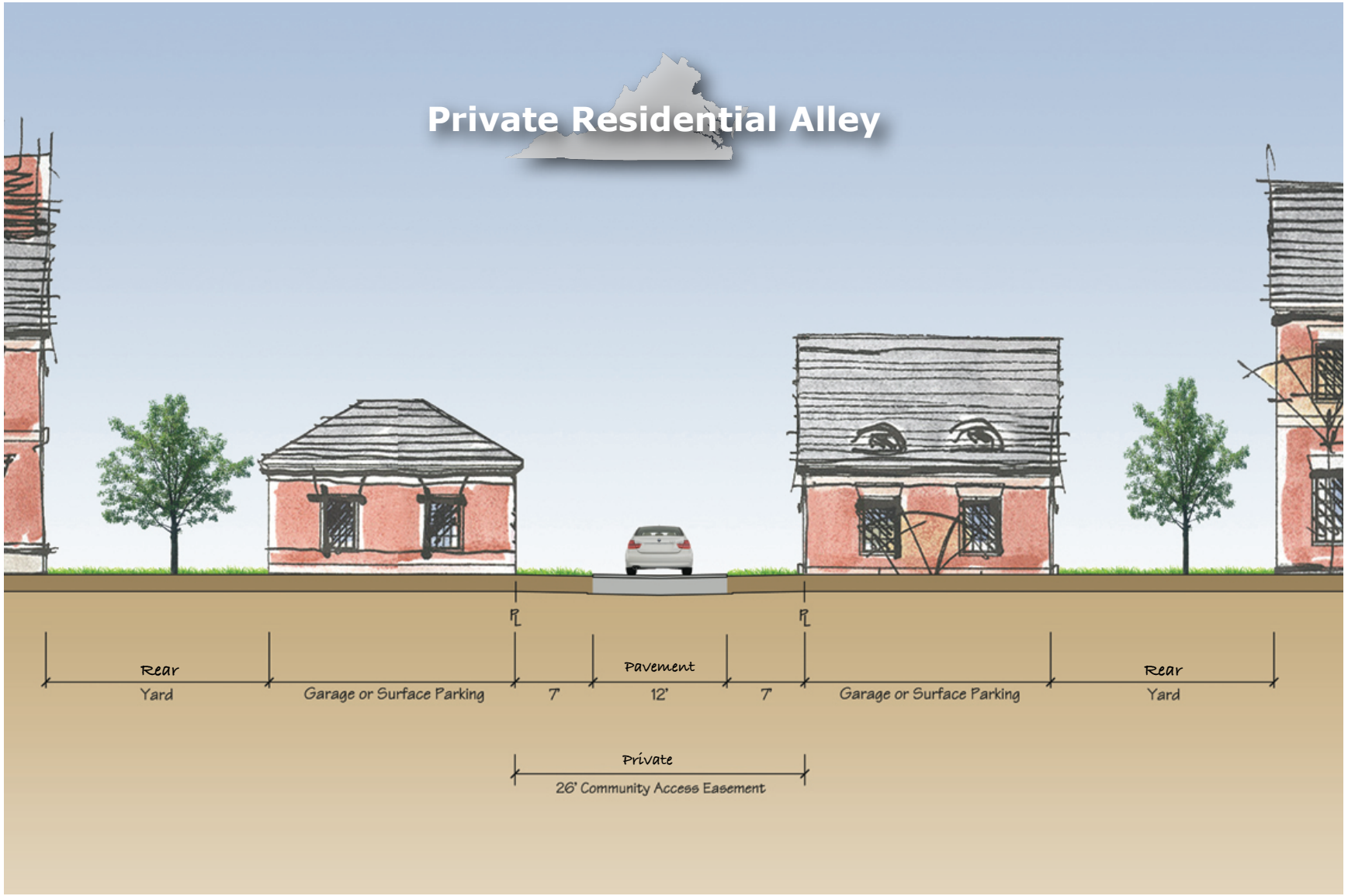
Live-Work Lot Dimensions:

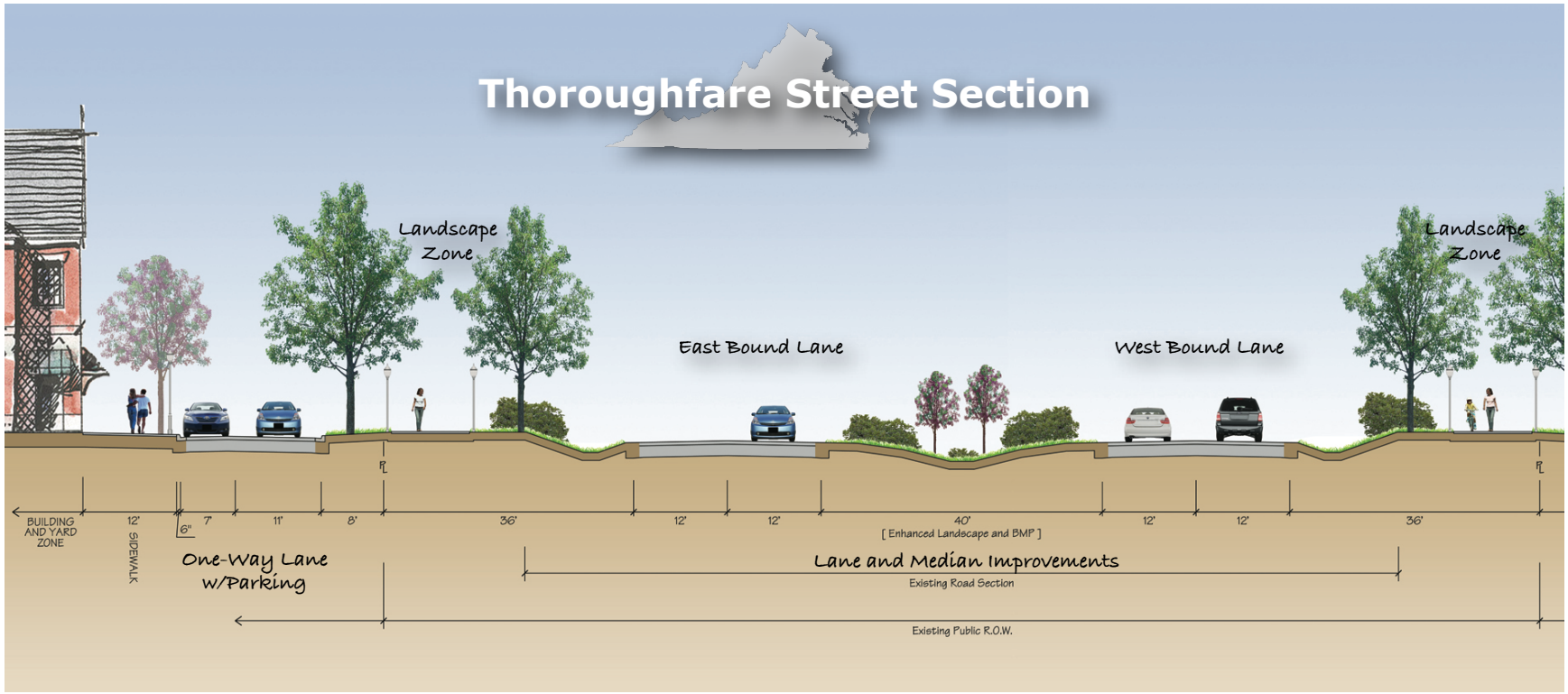
Lot Width:	*18 - 32'*
Lot Depth (min.):	*85'*
Front Yard Setback (min.):	*5'*
Front Yard Setback (max.):	*15'*
Side Yard Setbacks (end unit - min.):	*5'*
Side Yard Setbacks (end unit - max.):	*12'*
Rear Yard Setback:	*15'*


Neighborhood Residential Street
Variable Setback
BUILDING ZONE
6"
5' SIDEWALK
5' PLANTING ZONE
6"
7' PARKING
9'
9'
7' PARKING
6"
5' PLANTING ZONE
5' SIDEWALK
Variable Setback
6"
BUILDING ZONE
32' (FC/FC)
54' Public R.O.W.


One-Way Residential Street
℄
℄
Variable Setback
Variable Setback
BUILDING ZONE
BUILDING ZONE
6"
5' SIDEWALK
5' PLANTING ZONE
6"
7' PARKING
13'
6"
5' PLANTING ZONE
5' SIDEWALK
6"
20' (FC/FC)
42' Public R.O.W.


Town Center (Core Area) Street
BUILDING ZONE
12' SIDEWALK
6"
7' PARKING
11'
11'
7' PARKING
6"
12' SIDEWALK
BUILDING ZONE
36' (FC/FC)
61' Public R.O.W.


Private Residential Alley
Rear
Yard
Garage or Surface Parking
7'
Pavement
12'
7'
Garage or Surface Parking
Rear
Yard
Private
26' Community Access Easement


Thoroughfare Street Section
Landscape Zone
East Bound Lane
West Bound Lane
Landscape Zone
BUILDING AND YARD ZONE
12'
SIDEWALK
6"
7'
11'
8'
36'
12'
12'
40'
[Enhanced Landscape and BMP]
12'
12'
36'
One-Way Lane w/Parking
Lane and Median Improvements
Existing Road Section
Existing Public R.O.W.

TND Projects in Virginia
Examples of Transportation Efficient Land Use

East Beach, Norfolk, VA*

New Town, Williamsburg, VA*

Carlyle Square, Alexandria, VA*

Pentagon Row, Arlington, VA*

Belmont Forest/Green, Loudoun County, VA*

Daleville Town Center, Botetourt County, VA

Haymount, Caroline County, VA

Ladysmith Village, Caroline County, VA

Belmont Town Center, Prince William County, VA*

Old Trail Village, Bargamin Park, Crozet, VA*

New Bristow Village, Prince William County, VA

Wyndhurst, Lynchburg, VA*

Cornerstone, Lynchburg, VA

Moorefield Station, Loudoun County, VA

Brambleton, Loudoun County, VA

Lansdowne Village Common, Loudoun County, VA

Portner's Landing, Alexandria, VA*

Reston Town Center, Reston, VA*

Shirlington, Arlington County, VA*

Evans Farm, McLean, VA*

Prince William County Center, Prince William County, VA

Village at Rockett's Landing, Richmond, VA

Spotsylvania Courthouse Village, Spotsylvania County, VA

Potomac Yard, Alexandria/Arlington, VA

Leeland Station, Fredericksburg, VA

New Post, Spotsylvania County, VA

* *Substantially Complete*

RHODESIDE & HARWELL

COX The Cox Company

RENAISSANCE PLANNING GROUP