

TOWN OF LELAND

MASTER PLAN



Revised and Adopted by Council 5/21/2009

ACKNOWLEDGEMENTS



We would like to thank the Town of Leland and the numerous citizens who participated in this exciting planning process. This effort is a reflection of the community's vision and serves as the foundation for a growing community. It is intended to guide the leaders of today and the visionaries of tomorrow.
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FRAMEWORK PLAN: ENVIRONMENTAL CONSIDERATIONS

The Framework Plan illustrates the practical result of applying the TransectMap methodology to Leland's planning area. Particular attention has been paid to conserving critical wetlands and other environmentally sensitive areas while acknowledging the pace and intensity of development, particularly within the southern portions of the study area on either side of US 17.

The six geographic regional sectors of the transect mapping system create the principal framework of environmental and development classification for this new plan. Sectors S-1 and S-2, the most restrictive environmental classifications, are closely based on requirements and categories established by various North Carolina state authorities, especially the NC-CREWS (North Carolina Coastal Region Evaluation of Wetland Significance) *Strategic Plan for Improving Coastal Management in North Carolina* (1999) and the *North Carolina Wildlife Commission's Guidance Memorandum to Address and Mitigate . . . Impacts to . . . Wildlife Resources and Water Quality* (2002).

One particularly important classification is the NC-CREWS delineation of wetlands into three types: Exceptional Wetlands (the most critical for good water quality); Substantial Wetlands (important wetland areas that contribute to the overall ecology); and "Beneficial Wetlands" (those areas that should be preserved where possible, but which are of lower overall importance on the ecological measurement scales). This Plan uses the NC-CREWS classifications in developing the physical Framework Plan for land uses, development and conservation areas.

The NC-CREWS plan notes that:

"approximately 50 percent of the original wetlands of the coastal area have been drained and converted to other land uses (Hefner and Brown, 1985; Dahl, 1990; DEM, 1991). Although agricultural conversion, the largest historical contributor to wetlands loss, has largely stopped, wetlands continue to be lost as they are drained or filled for development. Conflicts between economic development and wetlands protection continue to be a major concern, with many coastal communities considering wetlands protection to be a major barrier to economic development. Since wetlands are such a dominant part of the coastal landscape and are vitally important to many aspects of the area's ecology, their management and protection is a major concern. . . Environmental considerations play a significant role in land use decision-making and are one of the major objectives of the local land use planning mandated by the NC Coastal Area Management Act."

In their report, the North Carolina Wildlife Resources Commission (NCWRC) notes that "riparian" areas, that is, land areas along and

adjacent to rivers, creeks and streams:

" . . . perform many functions that are essential to maintaining water quality, aquatic species survival, and biological productivity. . . The use of wooded riparian buffers is an important tool in reducing damage to streams (Waters 1995) [and convey] critical benefits to society."

According to the NCWRC, riparian areas provide the following benefits:

- Reduce pollutants and filter runoff
- Improve air quality and lower ozone levels
- Maintain stable water flows
- Help maintain water and air temperature by providing shade
- Stabilize stream banks
- Provide most of the organic carbon and nutrients to support the aquatic food web
- Provide sources of large woody debris for the stream channel
- Help reduce the severity of floods
- Facilitate the exchange of groundwater and surface water
- Provide critical wildlife habitat

In addition to maintaining appropriate stream buffers, this Plan seeks to maintain key wooded areas as wildlife corridors and, where compatible, to utilize these areas for active and passive recreation for the citizens of Leland.

RECOMMENDATIONS

This plan concurs with the following recommendations of NCWRC and further recommends that the NCWRC document be used for guidance in land use and environmental policy and regulation for the Town:

Increase Minimum Riparian Buffer Widths

"For a buffer to effectively perform for all riparian processes, wider contiguous buffers (100–300 feet) are recommended. . . We recommend the maintenance or establishment of a minimum 100-foot native forested buffer along each side of perennial streams and 50-foot native forested buffer along each side of intermittent streams and wetlands throughout the present and future service areas or the entire municipal jurisdiction. . . We additionally encourage the implementation of buffers on ephemeral streams due to the important functions that they provide as headwater streams. . . Buffers should be measured horizontally from the edge of the stream bank. . . and must be provided over the entire length of stream, including headwater streams." This is consistent with recent North Carolina Division of Water Quality recommendations which suggest 50-foot minimum stream buffers, but state that 100-foot buffers are preferred for long-term water quality protection.

Enhance Minimum Open Space Requirements

"Further, we recommend leaving 30% of the development area as greenspace, which would include buffers and wetlands and ensure that the greenspace is connected to natural resources." Open space requirements for specific developments should be based on the location of the development in the Framework Plan. For example, 30% may be an appropriate target for neighborhoods in the S-3 and S-4 sectors. Areas in the S-1 and S-2 sectors should require 50 to 100% undisturbed area. As neighborhoods and centers become more urbanized, the percentage of open space required may be much less in area, but the detailing would be more formal in nature with increased landscaping, seating, play equipment, shelters, and community buildings. The Town will want to develop appropriate open space requirements as it considers updating its development regulations in the near future.

Prohibit Development in the 100-year Floodplain

"We recommend maintaining individual property rights; and the use of a non adverse impact common sense strategy to mitigate loss and protect natural functions of flood plains. The Town should adopt a no rise policy as part of this strategy. No Rise Policy- Property owner may fill in the floodplain with a building or foundation but they have to create an equal amount of void area by digging out "high" ground to offset this. This way the overall basin is not getting smaller, and having less volume to hold water.

Encourage Infill in Developed Areas"In addition we encourage "infill" development in urbanized portions of the jurisdiction." This Plan recommends that the VillageRoad area is the most important infill area for the Town because of the established utilities and infrastructure there, but also because this area has the fewest environmental constraints of any area of the Town. The Town should develop guidelines and development incentives for infill development as part of updates of the Town's policies and regulations.



S-1 PRESERVED OPEN SPACE

The S-1 sector represents the basic “green infrastructure” of the community providing critical habitat for wildlife; protection of water quality and protection from flooding and erosion; and needed recreation and greenspace for the human habitat. This category, indicated in dark green on the Framework Map, comprises lands that are already non-developable, such as protected agricultural lands and woodlands, wildlife habitats and critical wetlands.

In the particular case of the Leland community, this sector specifically consists of:

- “Exceptional” wetlands with riparian buffer;
- Floodways with riparian buffer;
- Existing parks; and,
- Conservation easements.

APPROPRIATE LAND USES/DEVELOPMENT TYPES:

- conservation areas,
- parks & greenways
- agricultural and forestry uses
- water access areas
- limited civic uses such as schools

In addition to the geographic sectors, the Framework Plan indicates two related special land uses: the existing schools and other civic sites such as the town hall, shown in dark purple. These properties are assumed to be part of the community’s permanent green infrastructure since large pieces of land on these properties will be open space.

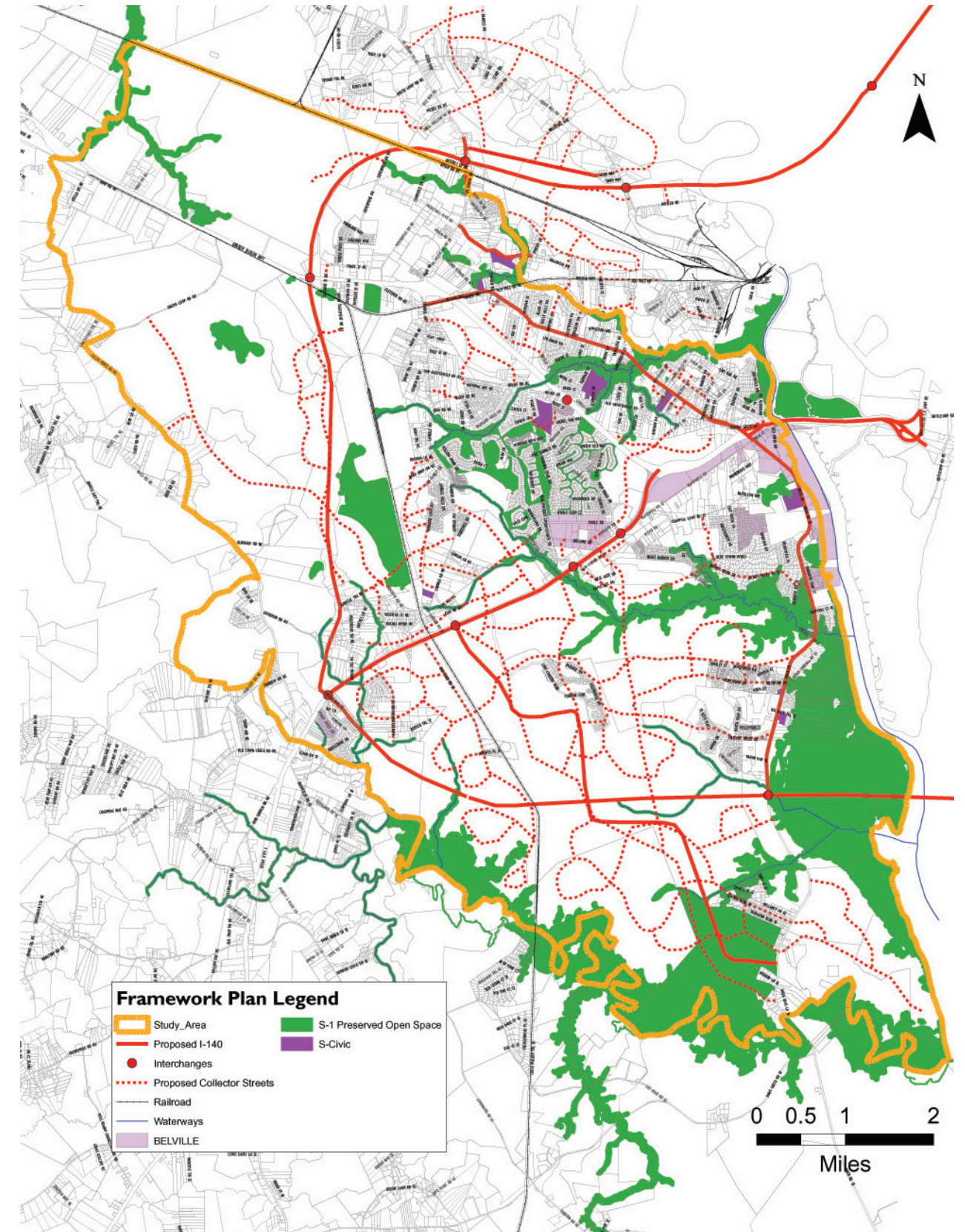


Streams and wetlands are typical S-1 sector features.

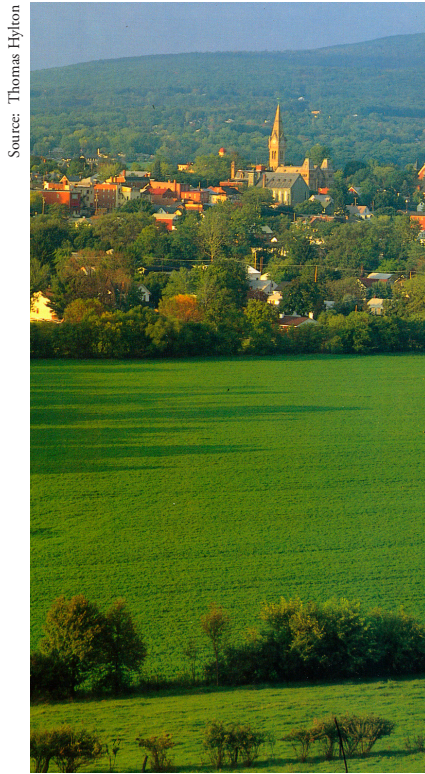


Source: Kinley-Horn & Associates

Creekside greenway trail, a typical S-1 sector land use



S-2 RESERVED OPEN SPACE



Rural area outside of a historic Pennsylvania town center

S-2 sector lands represent areas that are prime candidates for moving into the S-1 sector through conservation easements or other open space acquisition/protection measures. This sector, shown in medium green on the Framework Map, consists of lands that should be off-limits to development except occasional structures at very low densities. These areas may be legally developable based on current federal, state, and local regulations. However, they are areas that based on environmental and urban service factors (difficulty of providing sewer and water service and roadways, for example) should be lightly developed or undeveloped, remaining in a rural or natural state.

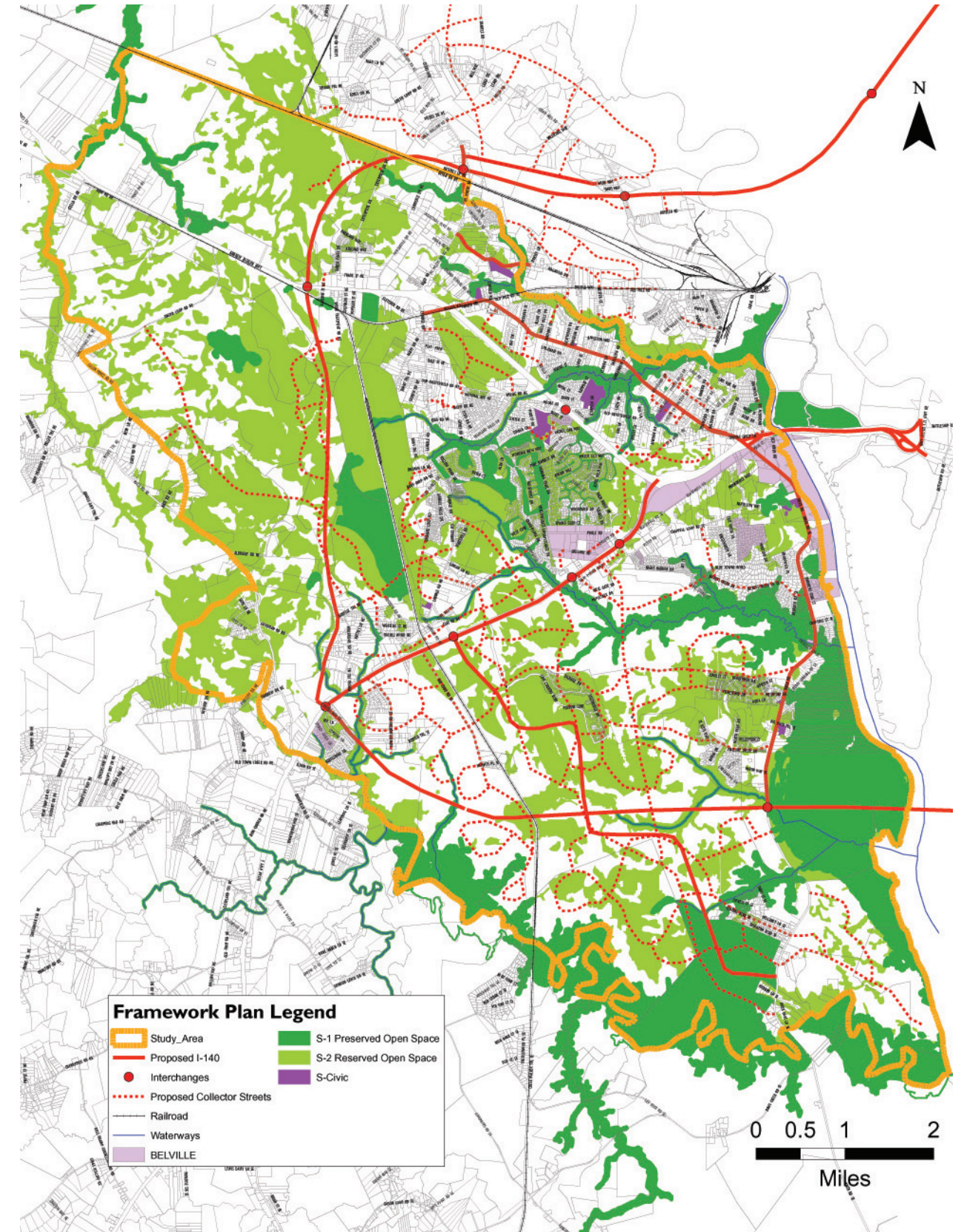
In large part, these areas correspond (however, in a more detailed fashion) with locations recommended for “conservation” on the Brunswick County Future Land Use Map.

Examples of S-2 lands include important agricultural land, floodplains and certain kinds of wetlands. In the particular case of the Leland community, this sector specifically consists of:

- “Substantial” wetlands
- Flood Zones A, AE, V & X500 (100 year or 500 year flood hazard areas)

APPROPRIATE LAND USES/DEVELOPMENT TYPES:

- Conservation areas,
- Parks & greenways
- Agricultural and forestry uses
- Limited civic uses such as schools
- Very low-density residential development and clustered development (no greater than 1 dwelling unit per 5 gross acres)



S-3 RESTRICTED GROWTH SECTOR

Source: Randall Arendt



Conceptual view of hamlet-type development: buildings clustered around a cross-roads

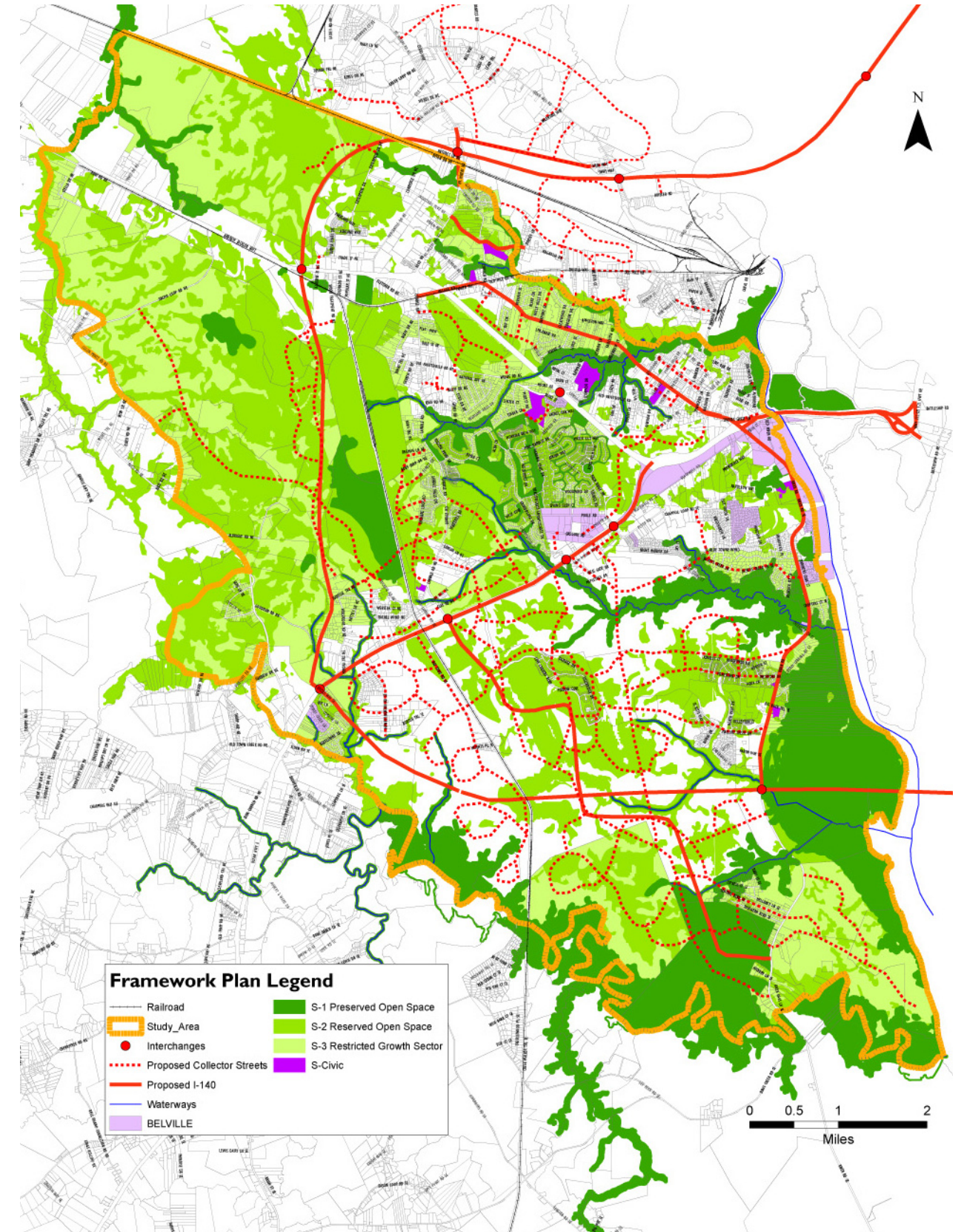
The S-3 sector, indicated by the lightest green on the Framework Map, is intended for very limited development under tightly regulated conditions. This sector is generally classified as lands that are not proximate to thoroughfares and are not projected to be high growth areas due to limited access to transportation networks and utilities.

The S-3 sector includes “Beneficial Wetlands” as defined by NC CREWS. Appropriate development typically consists of small hamlets and cluster developments such as conservation subdivisions, or very low-density residential development on very large lots. In the particular case of the Leland community, this sector is generally located away from planned neighborhood or regional centers and close to heavily encumbered S-1 or S-2 land. This sector is typically the last to be specified as it represents the land that remains after all of the other sectors have been designated.

APPROPRIATE LAND USES/DEVELOPMENT TYPES:

The community types and land uses appropriate for this sector are:

- low density cluster developments or hamlets (a clustering of buildings around a rural crossroad)
- low-density residential development (up to 1 dwelling unit per 2 gross acres; preferably no greater than 1 dwelling unit per 5 gross acres)
- very limited convenience retail uses
- civic uses (parks, schools, religious and government uses)



S-4 CONTROLLED GROWTH SECTOR



Mix of housing types in a new neighborhood



Neighborhood-scaled mixed-use building



Housing and civic uses in a neighborhood

The S-4 sector contains denser, mixed-use development at the scale of neighborhood centers, indicated by light blue circles, and suburban, residential development at the scale of walkable “traditional neighborhoods” shown in beige. This type of residential development creates an identifiable center organized around a small public square or green, often with some civic facilities or a building such as a church or a small store. Local, slow-speed streets form a connected network, with larger collector streets. Paths form pedestrian connections linking sidewalks to internal parks and preserved open space along the boundaries of the neighborhood. This pattern of development can be more environmentally sensitive to its context and can provide improved public health benefits for citizens through its capacity for safe walking and cycling.

S-4 lands are typically close to thoroughfares and at key cross-road locations. In the particular case of the Leland community, this S-4 sector specifically includes much of the Brunswick Forest and Mallory Creek future developments and a smaller amount of developable land on the northern side of US 17. Other neighborhood centers and residential neighborhoods are clustered at the northern end of the Village Road corridor, with limited mixed-use development at freeway interchanges on the future I-140, and the area around the junction of Old Fayetteville and Lanvale Roads.

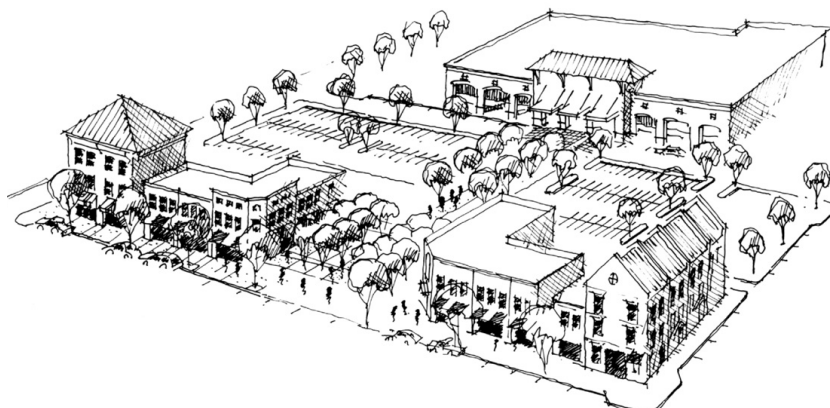
APPROPRIATE LAND USES/DEVELOPMENT TYPES:

The following community types and uses are appropriate in the S-4 sector:

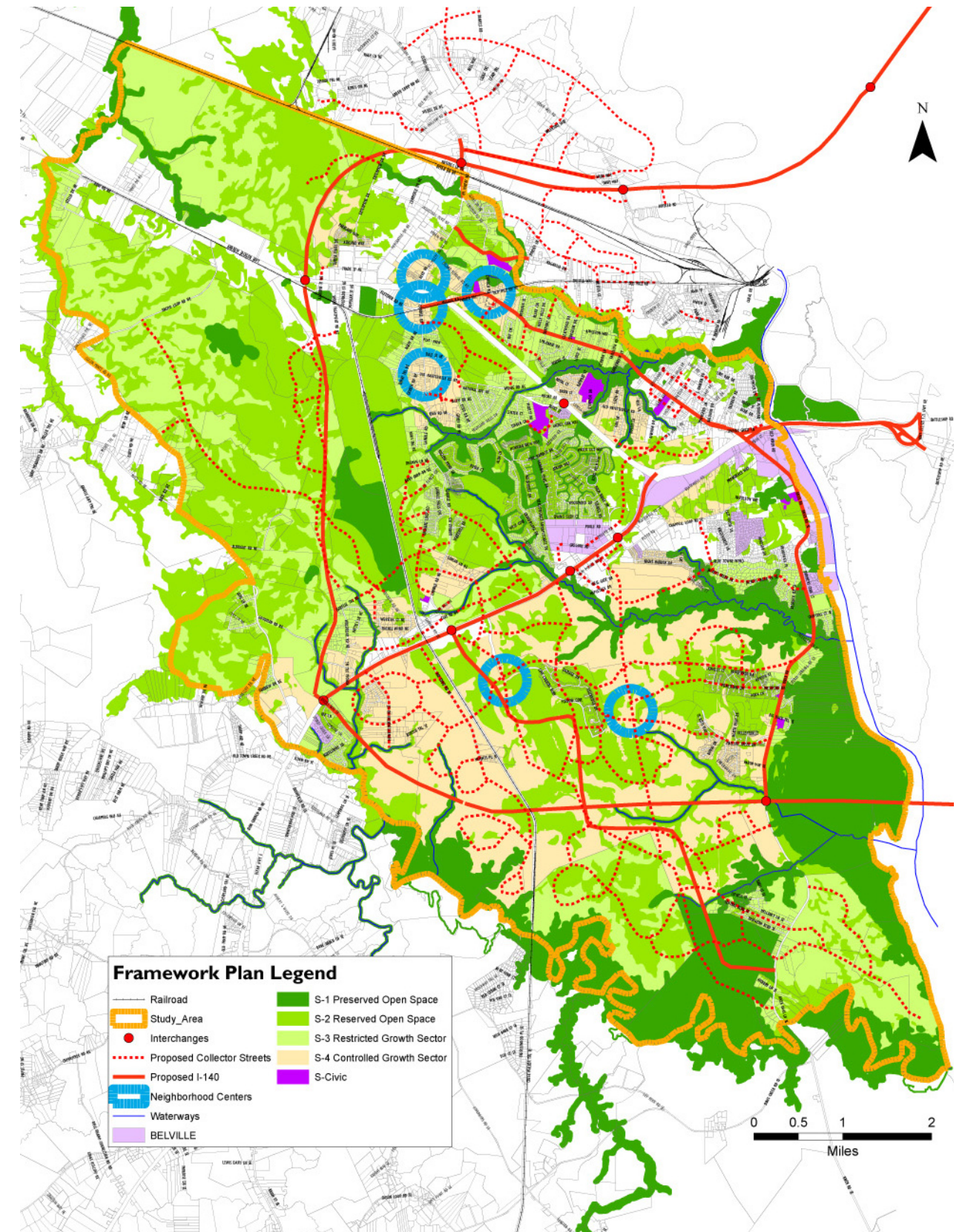
- traditional neighborhood developments
- neighborhood centers
- single-family and multifamily residential
- neighborhood-serving commercial uses (retail and office)
- civic uses
- light industrial uses

NEIGHBORHOOD CENTERS

Neighborhood Centers, shown on the framework plan in the light blue circles, are based on a 1/4 mile radius (a typical 5-minute walk) from a key intersection. They are intended to be mixed-use activity centers serving surrounding neighborhoods with retail, services, civic uses, and higher density housing. A neighborhood center should not contain more than 80,000 to 120,000 square feet of commercial uses. A grocery-anchored mixed-use development is a typical use for a neighborhood center.



A grocery-anchored mixed-use development is a typical neighborhood center use.



S-5 INTENDED GROWTH SECTOR



Mixed-use town center development



Mixed-use building in a regional center with residential above retail



Regional centers contain a mixture of higher density commercial and residential uses



Industrial, warehouse, or distribution-type building

Sector S-5, indicated in mustard yellow, is intended to apply along high-capacity regional thoroughfares at major transportation nodes and interchanges, or along portions of highly-traveled corridors. S-5 land generally falls within areas for higher-intensity regional center development, marked by the dark blue irregular oval boundaries.

Care should be taken to limit the length of S-5 corridor developments to avoid the creation of lengthy, undifferentiated linear strip development. Attention to local geography and landscape conditions can assist in this definition, as indicated on the Framework Map along the US 17 corridor.

APPROPRIATE LAND USES/DEVELOPMENT TYPES:

The full-range of community types and uses are appropriate in the S-5 sector, including:

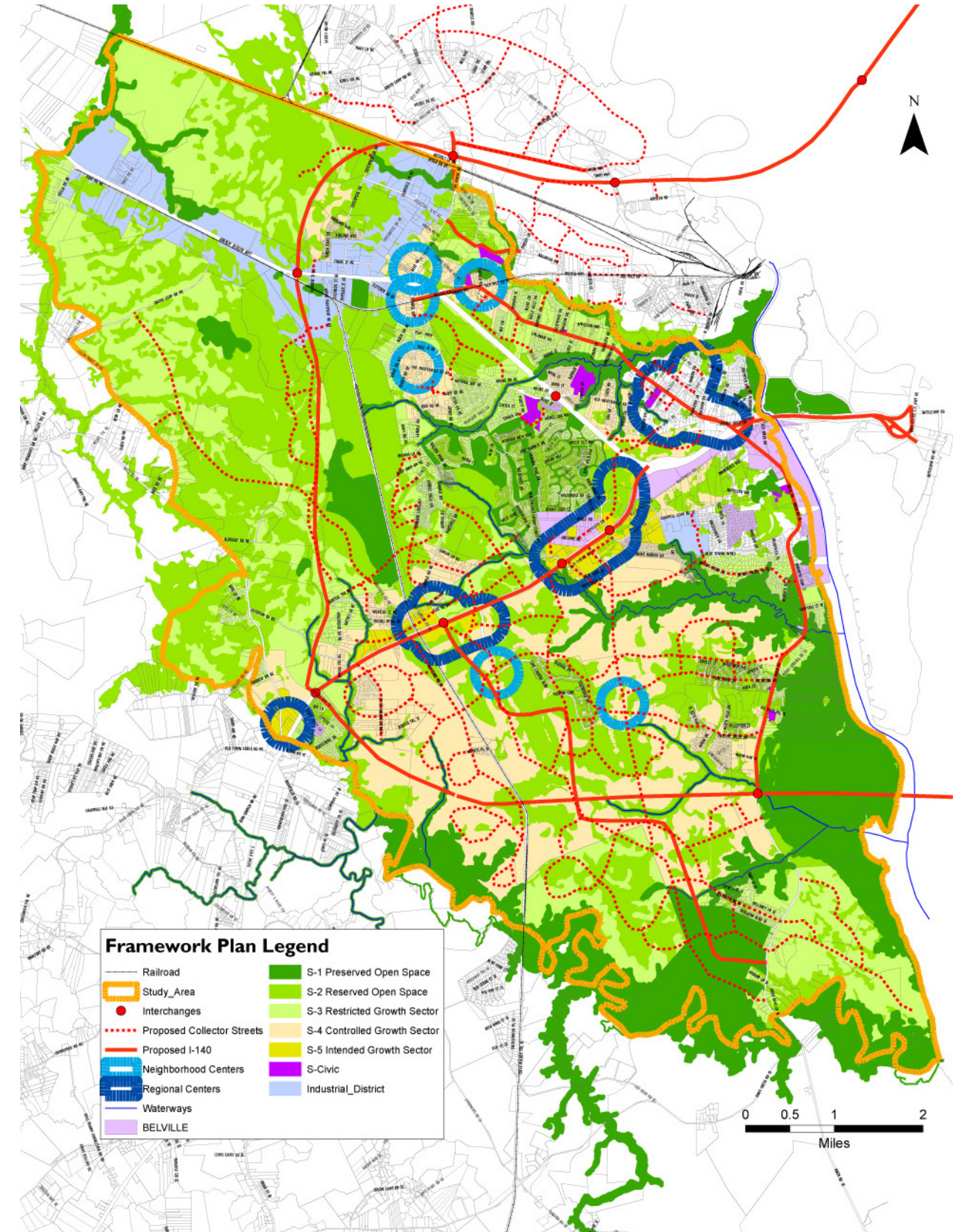
- single-family and multifamily residential
- neighborhood-serving commercial uses (retail and office)
- civic uses
- traditional neighborhood developments
- neighborhood centers
- regional centers
- industrial districts

REGIONAL CENTERS

Regional Centers are mixed-use activity centers with employment and commercial uses that attract people from beyond the immediate neighborhoods and from surrounding communities. These centers are appropriate for commercial and employment development as well as the area's highest density housing. The area of these centers is based on a 1/2 mile radius (a typical 10-minute walk)—the larger dark blue circles on the map. Regional centers are envisioned for downtown Leland; at the emerging retail commercial area along US 17; around the planned commercial development at Brunswick Forest; and near the junction of the future I-140 interchange with US 17. These centers are also logical locations for future mass transit station areas as they will provide the highest concentrations of residential and employment in the Plan area.

INDUSTRIAL DISTRICTS

As regional employment centers, industrial districts also fall into the S-5 sector. Industrial development is shown around the existing Leland Industrial Park and along the US 74/76 corridor in the northwest portion of the study area, where industrial and distribution facilities are currently concentrating.



S-6 INFILL/REDEVELOPMENT



Town center building concept from charrette



New mixed-use, town center buildings in Fort Mill, SC



Town center building concept from charrette



New, urban townhomes and condos

Source: Michael Ronkin

Sector S-6 is comprised of areas with existing development, with a relatively dense street grid, and which are appropriate for redevelopment or additional development. These areas are shown in the red color on the map at right. This includes most of the southern portion of the Village Road corridor and the downtown area adjacent to the US 74/76 interchange.

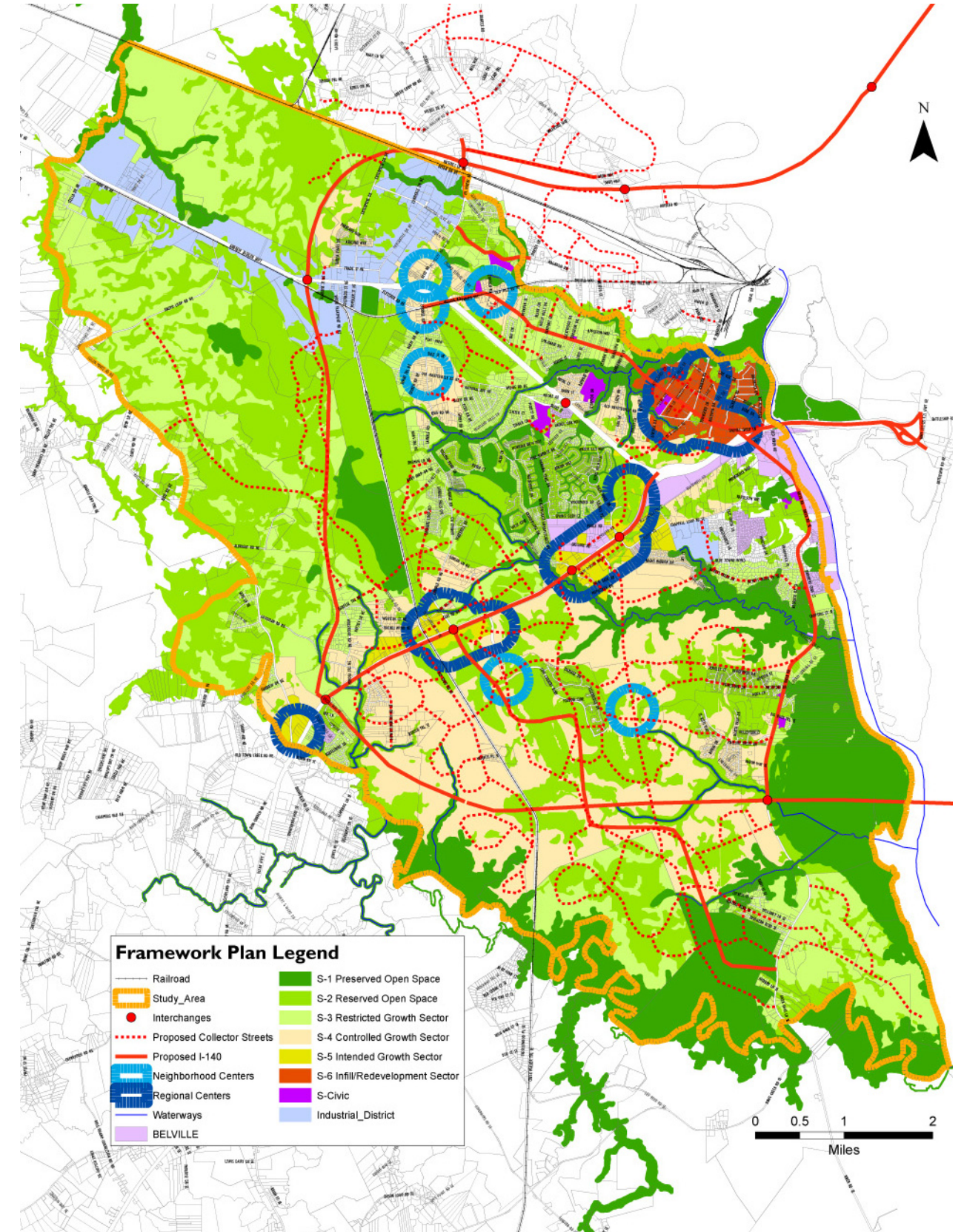
This area is, in large respect, appropriate for redevelopment and new infill development and well served with infrastructure (roads, utilities, etc.), and access to services and amenities. Because this area is already well provided for in terms of urban services, it is the most efficient and most attractive area for redevelopment of underutilized land or development of vacant parcels. It is also one of the best areas for development in terms of minimizing new environmental impacts to natural areas since the area has been built upon for decades.

Infill and redevelopment is already occurring in this area with the construction of new townhomes and multifamily dwellings on vacant land or replacing former mobile home sites.

APPROPRIATE LAND USES/DEVELOPMENT TYPES:

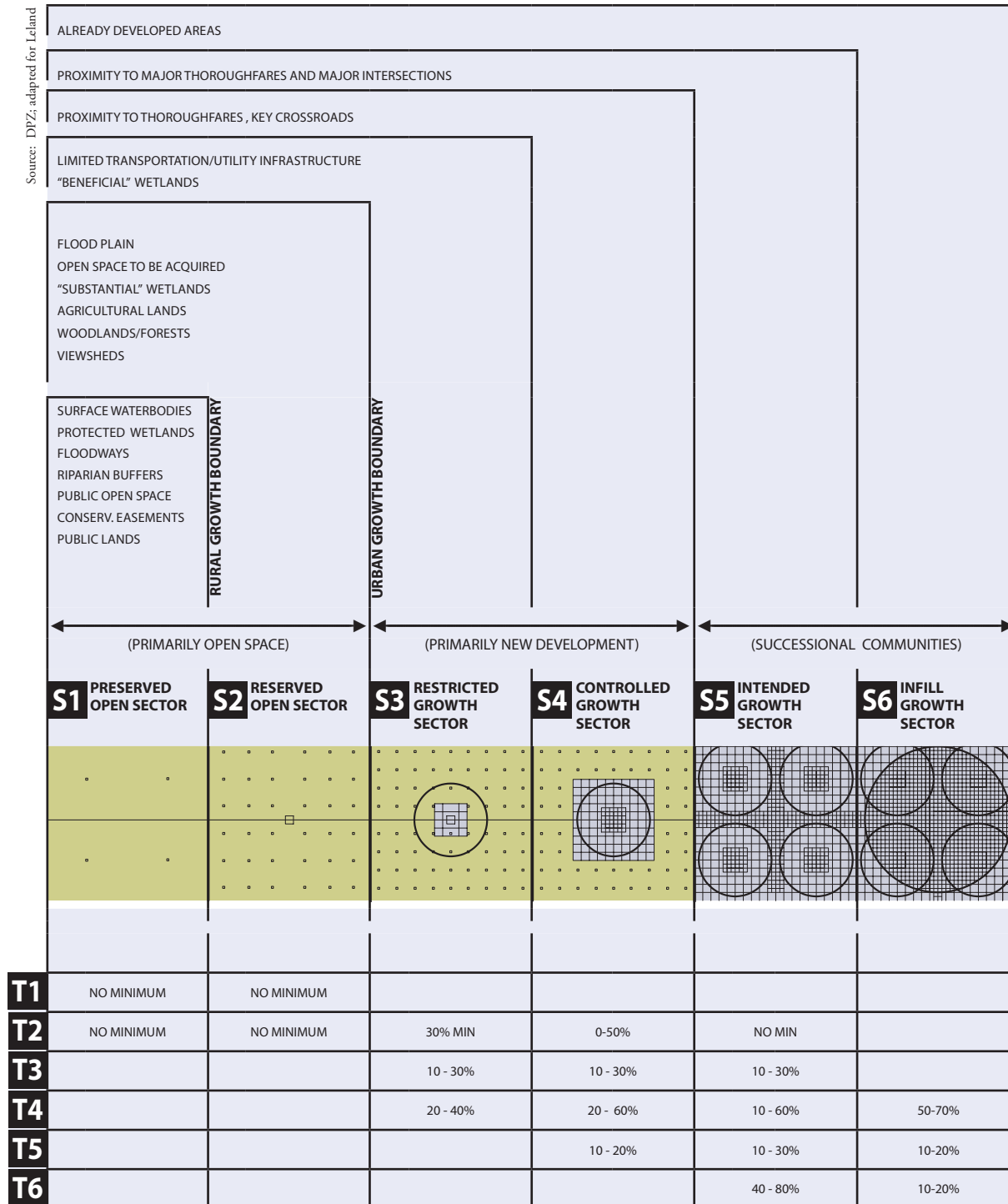
In-depth discussion of concepts for downtown development, redevelopment and infill neighborhood development is included in the Focus Areas section. In general, however, the following development types and uses are appropriate in the S-6 sector.

- single-family and multifamily residential
- new neighborhoods
- commercial uses (retail and office)
- mixed-use development
- civic uses
- light industrial uses



FRAMEWORK PLAN SUMMARY

Sector/Transect Zone Allocation: This table defines the geography, including both natural and infrastructural elements, which determine the areas suitable for the regional sectors specified in the Framework Plan. This table also suggests the appropriate proportions of Transect Zones within each regional sector. The Transect Zone application should be further refined as the community develops new development regulations.

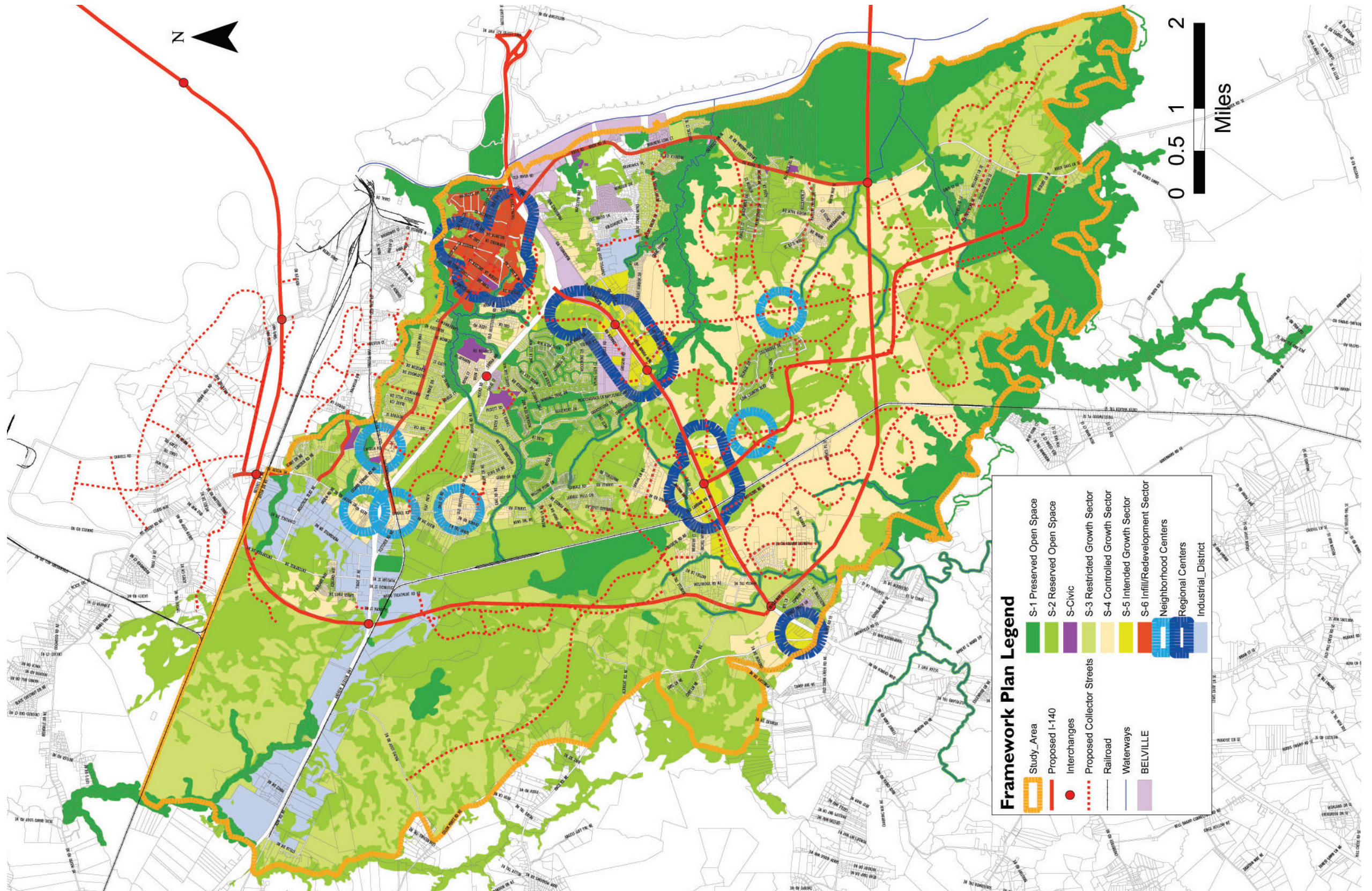


Transect Zone Descriptions: The following are descriptions of the appropriate character of Transect Zones for Leland. These standards should be further detailed as the Town rewrites its development regulations

T1	T-1 NATURAL General Character: Natural landscape with some agricultural use Building Placement: Not applicable Frontage Types: Not applicable Typical Building Height: Not applicable Type of Civic Space: Parks, Greenways
T2	T-2 RURAL General Character: Primarily agricultural with woodland & wetland and scattered buildings Building Placement: Variable Setbacks Frontage Types: Not applicable Typical Building Height: 1- to 2-Story Type of Civic Space: Parks, Greenways
T3	T-3 SUB-URBAN General Character: Lawns, and landscaped yards surrounding detached single-family houses; Building Placement: Large and variable front and side yard Setbacks Frontage Types: Porches, fences, naturalistic tree planting Typical Building Height: 1- to 2-story with some 3-Story Type of Civic Space: Parks, Greenways
T4	T-4 GENERAL URBAN General Character: Mix of houses, townhouses & small apartment buildings, with scattered commercial activity; balance between landscape and buildings; presence of pedestrians Building Placement: Shallow to medium front and side yard Setbacks Frontage Types: Porches, fences, Typical Building Height: 2- to 3-story with a few taller mixed use buildings Type of Civic Space: Squares, Greens
T5	T-5 URBAN CENTER General Character: Shops mixed with townhouses, larger apartment houses, offices, workplace, and civic buildings; predominantly attached buildings; trees within the public right-of-way; substantial pedestrian activity Building Placement: Shallow setbacks or none; buildings oriented to street defining a street wall Frontage Types: Stoops, shopfronts, arcades Typical Building Height: 3- to 5-story with some variation Type of Civic Space: Parks, Plazas and Squares, median landscaping
T6	T-6 URBAN CORE General Character: Medium to high-density mixed use buildings, entertainment, civic and cultural uses. Attached buildings forming a continuous street wall; trees within the public right-of-way; highest pedestrian and transit activity Building Placement: Shallow setbacks or none; buildings oriented to street, defining a street wall Frontage Types: Stoops, shopfronts, and arcades Typical Building Height: 2- to 4-story with a few taller buildings Type of Civic Space: Parks, Plazas and Squares; median landscaping

The American Transect. Drawing by James Wassell

THE FRAMEWORK PLAN



TRANSPORTATION RECOMMENDATIONS

[Note: Portions of this section were provided by Kimley-Horn and Associates, Inc. as transportation subconsultants on this project.]

GUIDING PRINCIPLES FOR TRANSPORTATION POLICY

Five guiding principles for Leland’s transportation policies are:

1. *Coordinate land use and transportation as a means to preserve the quality-of-life cherished by the residents of the Town.* It is imperative that evaluations of the transportation impacts of land use decisions continue to be made, as well as the land use impacts of transportation decisions. Both sets of factors must be considered together to create a balance between land use development and transportation facilities; one without the other would be harmful.
2. *Ensure street interconnectivity.* The Town of Leland should update its land development ordinances including the subdivision ordinance to require a pedestrian system that connects all new developments with nearby destinations.
3. *Use “context-sensitive” street design techniques.* Make sure the design of each street fits its location, in terms of environmental conditions, urban, suburban or rural settings, and the balance between pedestrian and vehicle uses.
4. *Enhance Leland as a walkable community.* The Town should adopt a capital improvement program (CIP) that contributes local funds each year to sidewalk construction and maintenance. The Town could accelerate sidewalk construction on existing high-priority streets—especially collector and thoroughfare streets—through the CIP.
5. *Create the infrastructure for bicycling as a viable means of transportation.* A leisurely speed of 10 mph puts even the farthest reaches of what will be future Leland within a 30-minute cycling time of downtown. For these reasons, designing to accommodate pedestrians and cyclists at key destinations in Leland and along connecting corridors is strongly recommended.

To reduce congestion and protect the environment, new and existing roadways should provide for more efficient movement of vehicles while better accommodating transit, walking, and bicycling. Likewise, all new and improved transportation options should respect the land use and transportation connection by supporting established neighborhoods while anticipating new growth and changing travel patterns.

These policies are further explained and elaborated on in the body of this section.



Source: KHA; adapted from Wisconsin DOT

LINK LAND USE AND TRANSPORTATION DECISIONS

The Master Plan represents the Town’s collective vision for a safe, efficient, walkable, and interconnected transportation system that harmonizes with the natural, historic, and social resources that create Leland’s community character.

An efficient transportation system is one that connects neighborhoods and activity centers via a network of streets, paths and trails that are safe and supportive of pedestrians, bicyclists, transit patrons, cars and trucks. Such a system offers choice for short and long trips and promotes convenient movement of people and goods. This is not to suggest that all streets are created alike; in fact, parallel streets may serve different functions.

The history of street building shows patterns of original farm-to-market roads being bypassed over time. Leland School Road was bypassed by Village Road which was later bypassed by US 74/76 which itself will be bypassed by Interstate 140. This series of bypasses builds a useful redundancy in the street network, therefore creating opportunities for community redevelopment and renewal.

Streets contribute significantly to the form of a town or city. To be specific, narrow two-lane streets with on-street parking and safe

pedestrian crossings lead to visibly different building form and even land use compared with a high-speed, multi-lane divided highway. Both types of streets are needed in most cities and towns; therefore, the question becomes: how much of each and where do they belong? The Town of Leland is meeting this challenge by evaluating and considering land use and transportation decisions simultaneously, within the context of this Plan.

For a growing area like Leland, linking land use and transportation can reduce capital and operating costs for the transportation system, ensure consistent economic growth, and protect the social and environmental resources.

Leland will benefit from an adopted comprehensive plan as it responds to forthcoming land development applications. The process allows a growing municipality to fill-out its transportation system by leveraging public funds with developer exactions. The combination of public and private funding is essential, for there will be gaps along corridors between developments that should be filled in a timely manner using public funds. Improvements along the frontage of new developments—e.g., sidewalks, street trees, and other streetscape enhancements—can be exacted from developers. In some instances, off-site improvements can be exacted, too.

RECOMMENDATIONS

Coordinate Land Use Planning Regionally

One of the town’s greatest contributions toward improving the transportation system will be to continue to coordinate responsible land use planning with other towns in Brunswick County and local, regional, and state agencies, including the Metropolitan Planning Organization (MPO).

Require Transportation Impact Analyses

As the community develops, it is imperative that continual evaluations of the transportation impacts of land use decisions be made, as well as the land use impacts of transportation decisions. Both sets of factors must be considered together to create a balance between land use development and transportation facilities; one without the other would be harmful. The *Grow Greener in Leland* report and the *Collector Street Plan* recommend that traffic impact analyses be required for developments that generate 1,000 to 3,000 or more new motor vehicle trips per day (see Section 6 for more information on traffic impact analyses).

IMPROVED STREET CONNECTIVITY

As part of balancing land use and transportation, implementing and updating the provisions of the 2005 *Town of Leland Collector Street Plan* should be important priorities for Leland's elected officials and staff.

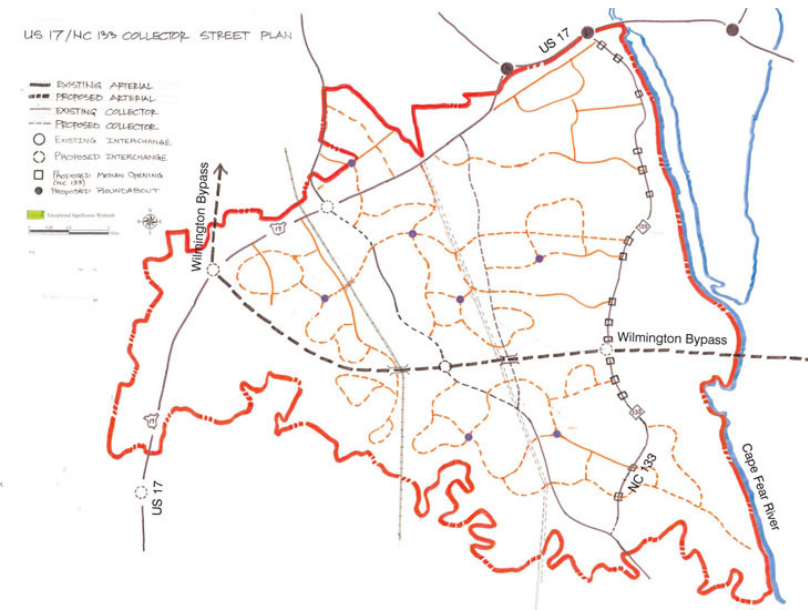
Two basic philosophies exist in American street planning. Traditionally, networks of streets, paths and trails were interconnected along some reasonable pattern such that connections were provided on most, but not all streets. However, in recent decades, a less traditional approach has become conventional across America that connects fewer streets in favor of much wider corridors we call arterials.

The conventional philosophy is predicated on sufficient State DOT funding to keep up with the widening schedule while at the same time assuming municipalities with land-use authority will require developers to provide street connections as land is developed. In actuality, most state DOTs have not kept up with road widening and many municipalities have failed to require street connections. The result has been increased traffic congestion, which has stirred up anti-sprawl sentiment across the country and public interest in ways of handling growth in a more efficient manner.

Furthermore, the relative safety record of our interstate highway system has lulled many American road planners into a mindset that higher speeds and wider streets contribute to safety. However, that safety record is much worse on our non-interstate system. (For example, on a single weekend in May, 2007, eleven people were killed and ten seriously injured on roads in multiple accidents in the Charlotte, NC, area).

In fact, the widespread construction of five-lane roads, with the center lane available to left-turning traffic even in opposing directions, has all-but-been-abandoned by the North Carolina Department of Transportation due to high crash rates. Instead, DOT prefers four-lane arterials with divided medians that allow for evenly-spaced median openings with well-designed left-turn lanes.

Leland is realizing land development pressures at a time of unprecedented stress and strain on the ability of the State of North Carolina to widen roads. For this reason, the traditional philosophy of street planning is embodied in this plan; that is, an interconnected network of community-friendly streets that provides for the safe, effective and efficient movement of all modes of travel including walking, strolling, jogging, rollerblading, cycling, riding and driving.



▲ **RECOMMENDED COLLECTOR STREET NETWORK FROM US17/NC133 AREA COLLECTOR STREET PLAN**

▼ RECOMMENDED COLLECTOR STREET SPACING



Land Use/Type of Collector Street	Intensity	Access Function	Approximate Street Spacing
Low Intensity Residential	Less than 2 dwelling units per acre	High	3,000 to 6,000 ft apart
Medium Intensity Residential	2 to 4 dwelling units per acre	High	1,500 to 3,000 ft apart
High Intensity Residential	More than 4 dwelling units per acre	High	750 to 1,500 ft apart
Activity Center	Mixed-use residential/commercial	Medium	750 to 1,500 ft apart

RECOMMENDATIONS

Apply The Collector Street Plan Principles

The *Town of Leland Collector Street Plan* — prepared by Kimley-Horn and Associates and adopted by the Wilmington Area Metropolitan Planning Organization (MPO) in December, 2005 — established two fundamental principles:

1. A connected network of town streets should be constructed by developers and assembled as areas of the town are developed.
2. Decisions about transportation planning **MUST** be integrated with equivalent considerations of land use planning and urban design.

The plan included conclusions from a previous collector street plan, the *US 17/NC 133 Area Collector Street Plan* by Kimley-Horn for the area between US 17 and NC 133, completed in May, 2005. Both plans were conceptual in that they did not indicate precise alignments of individual streets, which need to be determined by detailed site studies based on surveys and accurate wetlands delineation. They did, however, suggest an appropriate grain of connectivity required for efficient patterns of circulation as the town grows, as shown in the graphics at left.

In particular, the *US 17/NC 133 Area Collector Street Plan* provided a sliding scale of spacing dimensions for collector streets that remains a good guide for this and future town plans. (See the graphic and table at lower left.)

However, despite previous collector street planning efforts, approved plans for new residential development south of US 17 show that even this modest grain of connectivity is not being adequately achieved and that greater adherence needs to be paid to the principles of the collector street plans.

IMPROVED STREET CONNECTIVITY

Revise The Collector Street Network Plan

The drawing opposite shows a conceptual pattern of new development south of US 17 as a series of neighborhoods based on the traditional neighborhood model (see Focus Areas section), where close attention is paid to the walkability of streets within a quarter-mile radius (equivalent of a five-minute walk) focused around some central communal feature, a building, a public space or both. This conceptual settlement pattern of half-mile diameter neighborhoods is generally defined along its edges by local collector streets and/or parks and conserved green space.

These collector streets define the overall pattern of connectivity at the town scale with a pattern of linkages similar to the 2005 Town of Leland *Collector Street Plan*, while the smaller local streets within each neighborhood create the conditions of community connectivity and walkability. As connectivity increases, so travel distances decrease and route options increase, leading to a more efficient transportation system.

In keeping with the adopted *Collector Street Plan*, the Brunswick Forest area is shown as bisected east-west by the anticipated route of the future Skyway to Wilmington, and north-south by at least one, preferably two arterials. (The *US 17/NC 133 Collector Street Plan* identified the need for such road(s) parallel to NC 133 as very important to reduce pressure on NC 133, which has reached its traffic capacity.)

The plan illustrated opposite relates the pure form of the neighborhood model to the reality of specific site conditions, preserves open space and wetlands as a community resource, and generally locates collector streets at the periphery of each neighborhood.

Develop and Enhance the Collector Street Network

The main strategy is to disperse traffic rather than relying on a few wide streets to carry higher traffic volumes. Accordingly, the Town of Leland should continue to develop an interconnected network of collector streets that balance accessibility with mobility and contribute to the Village's unique sense of place.

Space Collector Streets Based on Land Use Context

The proper dispersal of traffic should be accomplished based on the following recommendations: In general terms, the spacing of these collector streets should ideally be at approximately half-mile (2,640 feet) centers throughout new development. This dimension can increase to a maximum of 6,000 feet in low-density residential areas (2 dwellings per acre or lower), but should decrease to 3,000 to 1,500 feet in areas where the residential densities are between 2 – 4 dwellings per acre. Where residential densities exceed 4 units per acre, collector streets should be spaced between 750 and 1,500 feet apart.



Update Collector Street Requirements

Leland's Subdivision Ordinance should be updated to adopt stronger language for interconnectivity. The ordinance should "require" instead of just "encourage" street interconnectivity. Every effort should be made towards assuming ETJs to ease the objective of connectivity. Gated roads would be permissible as long as connectivity thru the entire development is not interrupted. The collector street plans and the *Grow Greener in Leland* report provide good recommendations on revising the connectivity requirements. The requirements should be based, as stated above, on the land use context of development.



▲ PROPOSED REVISIONS TO COLLECTOR STREET NETWORK

Revisions to and reinforcement of the adopted Town of Leland Collector Street Plan are shown as purple lines, marking conceptual locations for collector streets and establishing once again the necessary grain of connectivity for efficient circulation. The circles represent 1/4 mile radius (5-minute walk) neighborhood locations. The need for efficient circulation applies to everyday conditions including freedom from congestion, economical school bus routes, and provision for speedy fire, police and ambulance service, but also to more severe emergency situations where fast evacuation may be necessary due to extreme weather. This level of connectivity should be maintained in any new development.

CONTEXT SENSITIVE STREET DESIGN

Building on the connection between land use and transportation, it is helpful to consider context-sensitive street design; that is, making sure the design of each street fits its location, in terms of environmental conditions, urban, suburban or rural settings, and the balance between pedestrian, bicycle, and motor vehicle users. There are several different types of natural and built contexts in Leland, and these are summarized and defined by the “transect mapping” sector classifications noted in the Framework Plan section. Each of these general land categories is accompanied by unique design elements, and while some elements overlap, there cannot be a “one size fits all” solution for street design.

Much of the modern American landscape has been developed for automotive transportation to the exclusion of other modes of travel. However, as auto-dependant development has grown and the consequences of lackluster planning have become apparent, a shift has taken place to realign development to human needs. A return to the concept of natural, rural, suburban and urban distinctions demands that each context carries visual cues and functional features pertinent to its land condition. In transportation corridors, these distinctions lie in context-sensitive design through elements such as street widths, on-street parking, wide sidewalks, informal landscape treatments or disciplined rows of shade trees, and curb-and-gutter or natural drainage systems.

RECOMMENDATIONS

As noted in the *Collector Street Plan* and the *Grow Greener* report, Leland’s codes and ordinances should be updated to include more inclusive street design recommendations where urban design, land use, and transportation can come together to create a desirable sense of place within the public right-of-way. Later in this section are specific examples of context-sensitive street design for Village Road and Old Fayetteville Road, including elements such as narrower travel lane width, pedestrian-scale lighting, street trees, on-street parking, and traffic calming devices. Detailed information on pedestrian and bicycle circulation below emphasizes the shared relationship between modes. The Focus Area section provides examples of different urban design and land use contexts within which proper street design plays a vital role.

Allow On Street Parking

One of the most important context-sensitive design elements is on-street parking. At a time when developers are increasingly building parking lots behind buildings, screened from the public realm to enhance an area’s appearance and walkability, it is still important to consider the role of on-street parking in creating a comfortable and attractive streetscape.

Within Sectors S-4, S-5, and S-6 areas, in higher-density urban districts or Traditional Neighborhood Developments (TNDs), on-street parking is appropriate and may be used to give definition to a more urban context. It may also be used in this context to define the boundary between the realms of pedestrian and automotive transportation, and may serve as a physical and visual buffer for pedestrians on the sidewalk. In increasingly low density and rural areas, on-street parking is not appropriate, as narrower streets are preferred.

Currently, on-street parking is not allowed to count towards required parking for new development. Allowing on-street parking to count towards minimum parking requirements has many benefits including reducing on-site pervious surface and slowing motor vehicle traffic.

Require Sidewalks

Sidewalks are an essential element in areas where a mix of land uses encourages people to walk from building to building. In this case, it is appropriate to have sidewalks fronting buildings on both sides of the street. As density increases, the sidewalks become a primary point of activity, and should be up to 12 feet wide and accompanied by street furniture such as benches, waste receptacles, media kiosks, and appropriate lighting to serve the needs of the pedestrian and to provide a sense of order.

In suburban and rural areas, as building density decreases, pedestrian traffic can be served by a sidewalk on one side of the street, and in some cases, by multi-use paths constructed as part of a greenway system. Rural and natural areas are also appropriate locations for trails, which can meander alongside roadways or wind through the landscape. As land use shifts from high-density to lower-density, the appropriate street furnishings will be placed less frequently. Appropriate lighting is necessary wherever pedestrian traffic is anticipated as a safety provision. (See the Implementation and Regulatory Recommendations section for further discussion of streetscape requirements.)

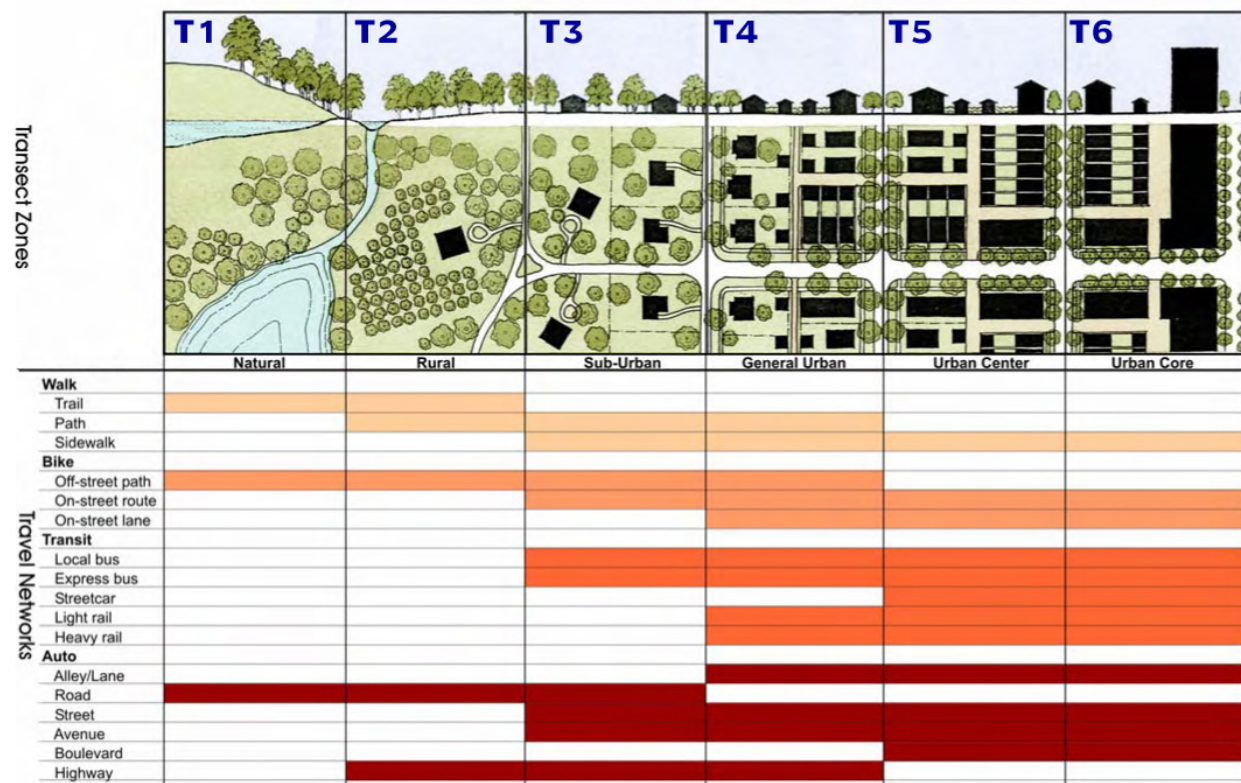
Require Street Trees

Street trees are an excellent tool in the definition of place, and can be used to narrow the perceived width of an otherwise wide road. This perceived narrowing has the useful effect of slowing down traffic. It is achieved by planting trees that will mature to heights of at least 12 feet as close to the edge of pavement as practical. In mixed-use and commercial areas, trees may be placed along the street in sidewalk grates, and can be used to create a sense of enclosure, and a buffer to pedestrians on the sidewalks. Placement of trees between the sidewalk and the street helps distinguish the automotive realm from the pedestrian realm, and allows for shade in sun-baked concrete or asphalt environments.

As land uses transition from urban to suburban areas, planting strips with evenly placed trees indicate the change from a dense mixed-use environment to a less urban residential surrounding. These trees may still serve as a buffer to adjacent sidewalks or multi-use paths, and may be larger in scale than urban street trees. The suburban to rural transition may be supported with informal planting, which can provide ample spatial definition while presenting a less ordered appearance. The transition from rural to natural landscape is marked by more naturally occurring tree buffers or agrarian landscapes.

Allow Appropriate Drainage Infrastructure

An additional context-sensitive element for consideration is surface water drainage. While the curb-and-gutter method is appropriate for urban contexts, it is often more appropriate to incorporate swale drainage systems into the rural and natural environments, and sometimes in lower-density suburban developments, where more advanced goals for environmental preservation can be met by doing so.



Appropriate transportation infrastructure for Transect zones.

WALKABLE COMMUNITY

Walking is a cornerstone and key to a community's transportation system. Every trip begins and ends with walking; yet it is most often the first forgotten mode of travel. If the proper pedestrian environment is provided, walking offers a practical transportation choice that provides benefits for both individuals and their communities. The potential for increased walking is enormous since 25% of all trips in the United States are less than one mile in length, which is a 20 minute walk at a average pace.

In addition to the presence of sidewalks, features that contribute to making communities more walkable include:

- a mix of land uses in compact, walkable settings
- buffers between the edge of pavement and the sidewalk (typically planting strips, but on-street parking, and bike lanes also help)
- trees to shade walking routes
- slow traffic speeds
- reduced pedestrian crossing distances of streets and intersections
- pedestrian infrastructure (i.e. signage, crosswalks, medians, and adequate pedestrian phasing at signals) in roadway designs

The availability of pedestrian facilities and amenities plays an important role in encouraging people to replace driving trips with walking. Benefits associated with walking include the ability to ease traffic congestion, improve air quality, reduce the need for automobile parking facilities, and contribute to healthier citizens through active living. The success of transit service is also highly dependent on the state of pedestrian facilities and amenities. To be considered a realistic transportation alternative, however, land uses and infrastructure need to be favorable for pedestrian use.

The existing pedestrian network within Leland is a mix of streets with adequate sidewalks and streets with provide substandard sidewalks or no sidewalks altogether. These sidewalk deficiencies and an inhospitable pedestrian environment contribute to a reliance on the automobile even for short trips. The most walkable areas in Leland are in some new developments. Beyond the new developments, sidewalks are few and far between.

The Town's Subdivision Ordinance currently states that:

“Sidewalks *may* be required by the planning board on one or both sides of the street in areas likely to be subject to heavy pedestrian traffic such as near schools and shopping areas. Such sidewalks shall be constructed to a minimum width of four feet . . .” (Sec. 22-145(o)).

These requirements are not sufficient to create the kind of coherent and connected pedestrian network necessary for an efficient and attractive walkable community.

RECOMMENDATIONS

Complete a Pedestrian Master Plan

The Town should complete a pedestrian facilities plan for a network that will connect local residents and visitors with area destinations (including schools, shopping areas, parks, and civic uses). Recommendations from the plan should be implemented through the Town's Capital Improvement Plan (CIP) and through State and local transportation projects. Such a plan can be partially funded through an NCDOT grant.

Make Changes to the Development Ordinances

Recognizing the importance of the pedestrian environment, the Town of Leland should update its land development ordinances including the subdivision ordinance to require an interconnected pedestrian system. Sidewalks should be required in new developments based on a combination of land use factors and street type as noted on the previous page.

- In general, sidewalk widths should be a minimum of 5 feet — the space required for two adults to walk side by side—in residential neighborhoods.
- Sidewalks adjacent to the street without a buffer (planting strip) should not be allowed because of the discomfort for pedestrians. An eight-foot wide planting strip is preferred between the sidewalk and the street since it supports the growth and maturation of shade trees. In higher density and commercial areas, sidewalks should be at least 6 to 12 feet wide.
- In low density areas, a network of sidewalks on at least one side of the street, or multi-use paths and trails should serve pedestrians.

Fund Pedestrian Facilities through the CIP

Concurrently, the Town should adopt a CIP that contributes local funds each year to sidewalk construction and maintenance above and beyond sidewalks that will be built and improved by developers in the near term. The Town could accelerate sidewalk construction on existing high-priority streets—especially collector and thoroughfare streets—through the CIP.

High priority streets would be identified through a pedestrian master plan, but should include: portions of the Village Road Phase I project not funded by NCDOT; and sections of thoroughfares or collector streets within 1/2 mile of schools or commercial areas.



Overly wide subdivision street with no sidewalks or street trees



Overly narrow sidewalk (less than 4 feet)



Pedestrian-hostile infrastructure on Village Road

ENHANCED BICYCLE INFRASTRUCTURE

The companion transportation mode to walking is bicycling, which provides transportation and recreational opportunities for the citizens, employees, and visitors of Leland. Bicyclists can use greenways and multi-use paths with pedestrians or choose to mix with vehicular traffic on roadways (except access-controlled roadways such as US 74/76 and I-140).

The encompassed by this Plan includes places that are up to four miles from the center of Leland, a distance easily traversable by bicycle if safe and comfortable conditions are in place. A leisurely bicycling speed of 10 mph puts even the farthest reaches of Leland's future town limits within less than a 25-minute cycling time of the Village Road commercial area. Therefore, designing to accommodate cyclists downtown and along connecting corridors is strongly recommended.

Currently, most of the streets in Leland are primarily designed for motorized vehicles at the expense of non-motorized modes of travel (bicycling and walking). A review of the existing bicycle network finds that the combination of missed opportunities and rapid development surrounding the Town threatens its ability to maintain a safe and convenient transportation system for bicycles. In particular, safe crossings of the major highways that bisect Leland are needed, including US 17 and US 74/76.

Using a combination of funding from NCDOT and the Town of Leland general fund, a Town-wide bicycle plan is currently (as of 2007) being developed for Leland. The plan includes a citizen outreach program to gauge interest and ideas. The plan will also incorporate an engineering analysis of existing and alternative future conditions for bicyclists.

RECOMMENDATIONS

Include Bicycle Facilities in Transportation Plans and Projects

Once the bicycle plan is adopted, the Town of Leland should work with the Wilmington Area MPO and NCDOT ensure bicycle facilities are included in the regional Long-range Transportation Plan (LRTP) and programmed transportation projects. The Town can secure improvements to the bicycle environment with funds programmed in the Metropolitan Transportation Improvement Program (TIP) and the Town's CIP.

Improve Connectivity

To create the necessary conditions that encourage walking and cycling, a factor of most critical importance is improving connectivity. More connections between neighborhoods and destinations provide safer route options for cyclists and pedestrians.

BICYCLE FACILITY TYPES

The 'toolbox' for implementing bicycle improvements usually contains at least four facility types: wide travel lanes, on-street bicycle lanes, and multi-use paths (or trails), and bicycle routes. These facilities are generally characterized as follows:



Wide Travel Lanes: A wider outside travel lane allows a motorist to safely pass a bicyclist while remaining within the same lane of travel. This improvement is considered a significant benefit for experienced and basic cyclists. Fourteen feet is typically recommended for the width of a travel lane meant for use by both motorists and bicycles. Continuous stretches of pavement wider than fifteen feet may encourage the undesirable operation of two motor vehicles in one lane. Wide outside lanes are most appropriate on arterial streets. If prevailing vehicle speeds exceed 40 mph, consideration should be given to paving a wide shoulder or building a parallel multi-use path.



On-Street Bicycle Lanes: On-street bicycle lanes form the portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use by bicyclists. Bicycle lanes make the movements of both motorists and bicyclists more predictable. State and national design manuals for the construction of on-street bicycle lanes generally recommend a minimum of four feet of pavement measured from the edge of gutter for a bicycle lane (that is, not including the width of the gutter pan). Adjacent to on-street parking, the width of a bicycle lane should be increased to six feet. Striped bicycle lanes are most appropriate on arterial and collector streets. Street sweeping is essential for bike lanes so that debris that is normally swept away by motor vehicle traffic can be removed for cyclists.



Multi-Use Paths: Shared multi-use paths (or trails) can serve bicycles and pedestrians in one "non-motorized" transportation corridor either adjacent to, or completely independent of the street system (such as a greenway). One path usually accommodates two-way travel and is constructed eight to twelve feet in width to facilitate passing and mixing of modes. These facilities are typically separated from a motor vehicle travel lane by five feet or more. One drawback to multi-use paths parallel to a roadway is the number of safety conflicts at intersections and driveways presented by the two-way path. Multi-use paths are most appropriate on sides of streets that have few driveways since driveway conflicts can lead to high crash rates involving bicyclists.



Bicycle Routes: A large portion of the community's existing street system may be fully adequate for efficient bicycle travel without bike lane signing and striping. The most common example of this is in residential neighborhoods where low traffic volumes and low travel speeds allow bicyclists to comfortably ride in the roadway. Typically, the posted speed limit on these streets should be 25 miles per hour or less. Where appropriate, trail-blazing signage may be installed to designate "bicycle routes" on some streets to alert bicyclists to certain advantages of the particular route. This is most appropriate when hoping to provide continuity with other bicycle facilities and designate preferred routes through high-demand corridors. Signed bicycle routes are most appropriate on residential collector and local streets plus short stretches of arterial streets as needed to maintain continuity of a bicycle route.

EXPANDED PUBLIC TRANSIT

Across the nation, public transportation is increasingly being recognized by local and regional planning agencies as an important tool for focusing new development in patterns that are more clustered and more efficient for providing public services. Residents of transit-supportive municipalities reap the benefits of alternative modes of transportation, which result in significant savings in cost and time, and reduction in stress associated with traffic congestion. Public transportation is viewed as a popular short and intermediate term strategy to avoid congested highways. Transit and other alternatives to private motor vehicle travel will also become increasingly important as the Baby Boom generation ages and becomes a predominant demographic, as is likely to be the case in Leland. The presence of supportive pedestrian and bicycle networks is also very important for the success of transit since every trip begins and ends with walking.

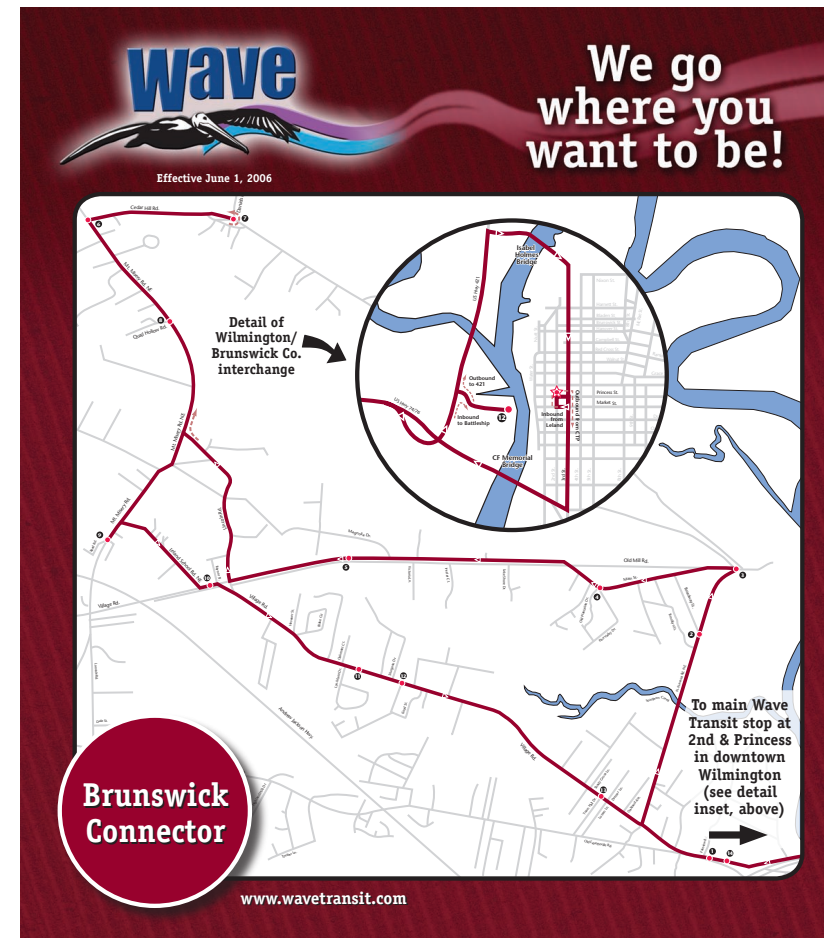
Public transportation offers various advantages, including:

- A choice to avoid roads congested with traffic;
- A viable transportation option to citizens with limited access to or ability to operate private vehicles;
- Improving overall health of the citizens by increasing walking and reducing stress associated with driving;
- Creating a balanced transportation system by providing mobility options for people through multiple modes of transportation; and,
- Enhancing economic development efforts by attracting a greater mix of residents and employers who seek an area that offers multiple transportation options.

Public transit relies upon a complete transportation system to operate effectively. Major roads and highways must be suitable for bus traffic, and sidewalks must provide adequate access between transit stops, popular destinations, and homes. Therefore, the existing state of the transportation network often determines the suitability of transit. While the existing road network in Leland could support transit, the lack of concentrated residential and employment centers limits the feasibility of most forms of public transportation.

Currently, the Town has limited fixed route transit service. The Wilmington Area Transit Authority provides a shuttle service called the Brunswick Connector that provides hourly service through the Village Road area and Navassa before connecting with the main bus transfer facility in downtown Wilmington. The route does not currently serve the developing residential and commercial centers along the US17 corridor. However, in the future, one or more activity centers in Leland will likely contain sufficient density of residents to support a larger and more frequent bus route.

An emerging concept for communities without sufficient density to support transit is “transit-ready development.” In this concept, communities prepare for future transit expansion by developing a mix of uses in a pedestrian-friendly layout at locations appropriate for future transit service. Transit-ready developments rely on a street pattern that provides abundant connections and dense nodes of employment and residential development. This type of development is proposed in key locations in the Framework Plan and in the Focus Areas section.



BRUNSWICK CONNECTOR SHUTTLE ROUTE ▲

The Wilmington Area Transit Authority provides a shuttle service called the Brunswick Connector that provides hourly service through the Village Road area and Navassa before connecting with the main bus transfer facility in downtown Wilmington. The route does not currently serve the developing residential and commercial centers along the US17 corridor.

RECOMMENDATIONS

Transit is a viable option when it is fast, frequent, dependable, easy to use, and when it serves destinations to which people want to travel. Transit service to and through Leland is part of a larger debate ensuing in the Wilmington region. Leland should work with its neighbors to ensure that its vision for transit service is considered in the debate.

Specifically, the following recommendations should be addressed:

Require Transit Appropriate Land Development

Require development in locations appropriate for future transit service — such as the town center, neighborhoods and employment centers identified in this plan — to have a mix of uses and higher density.

Determine Appropriate Future Routes and Stops

Determine future destinations of bus connections in consultation with Navassa, Belville and other regional partners. In particular, sites adjacent to US 17 as well as on Village Road may be good locations for park-and-ride lots that could facilitate a turnaround place for buses to and from the City of Wilmington and other popular destinations. Providing a park-and-ride lot that is associated with a vibrant activity center could accelerate the provision of bus service.

Expand Transit Service

Develop expanded local service in incremental steps as density and land uses warrant. Work with the Wilmington Area Transit Authority, the MPO, Brunswick County, and NCDOT to develop paratransit service for persons with disabilities in Leland.



MAJOR ROADWAY NETWORK

ROADWAY LEVELS OF SERVICE (EFFICIENCY)

The private automobile is the most widely-used form of transportation within Leland and its impacts on the urban environment are evident everywhere. Data from the 2000 Census shows the importance of the automobile for Leland’s workers. For workers 16 year and older that did not work at home, 94.2 percent (807 of 857) used an automobile to commute. And of those using an automobile, 81.6 percent (699 of 857) drove alone.

Table 5.1 – Journey to Work

Mode to Work	Number	Percent
Car, truck or van:	807	94.2 %
Drove alone	699	81.6 %
Carpooled	108	12.6 %
Public Transportation (including taxicab)	12	1.3 %
Walked	11	1.3 %
Other means	11	1.3 %
Worked at home	16	1.9 %
Total	857	100%

Source: 2000 US Census

Not surprisingly, the Town’s transportation system is predicated almost solely on the needs of the automobile, and improvements to the transportation system over the last forty years have been focused almost exclusively on reinforcing the dominance of the automobile.

The North Carolina Department of Transportation and the Wilmington MPO regularly collect traffic counts (referred to as Average Daily Traffic or ADT) information for state routes throughout North Carolina. The development of the Master Plan included a review of these counts within the study area to determine if any roads are experiencing unusually heavy traffic. Table 5.2 details the road type, speed limit, and traffic volume for several important corridors within the study area. The table also details maximum service volumes and current level of service for these roadways.

The roadways shown in Table 5.2 were evaluated on the basis of their Level of Service (LOS). Roadways were ranked on a lettered scale of A to F, with level of service ‘A’ representing the best operating conditions for motor vehicles and level of service ‘F’ the worst. (It must be remembered that these criteria focus on travel speed for motor vehicles only. They are not a measure of the “civic efficiency” of a street in more holistic terms, such as the ability of the street to support businesses and other development by virtue of its accessibility to pedestrians, cyclists,

residents, and/or shoppers; its aesthetic contribution to the community; and overall safety for roadways users—merchants, shoppers, pedestrians, cyclists, transit riders, etc. The faster vehicle speeds and traffic flow on roadways and streets, the more potentially deadly streets are for pedestrians and cyclists.)

Following is a description of the various levels of service categories as outlined in the Highway Capacity Manual 2000 (HCM 2000).

Level of Service A: Primarily free flow operations at average speeds, usually about 90 percent of free flow speed. Motor vehicles are completely unimpeded in their ability to maneuver within the traffic stream.

Level of Service B: Reasonable unimpeded operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted.

Level of Service C: Stable operations. Ability to maneuver and change lanes may be more restricted than in LOS B.

Level of Service D: Borders on a range on which a small increase in flow may cause substantial increases in the approach delay and hence decreases in travel speed.

Level of Service E: Significant delays and average travel speeds of one-third the free flow speed or slower.

Level of Service F: Traffic flow at extremely low speeds. Intersection congestion is likely at critical signalized locations with high approach delays.

Levels of service for the corridors in Table 5.2 were evaluated using Wilmington MPO data. A “traffic volume” number less than the figure in the “capacity” column indicates that segments operate at a level of service of E or better. Table 5.2 shows all but three segments operate at LOS C or better.

Table 5.2 indicates the 2006 Average Daily Traffic volumes for key roadways in Leland. Traffic congestion on US 17 in the vicinity of the Village Road interchange is reflected by Level of Service F where 51,000 vehicles per day (vpd) are using a roadway with a typical capacity of only 40,000 vpd. Observations and anecdotal evidence indicate this congestion on US 17 extends over the causeway and bridge into Wilmington at peak times. Level of Service E conditions persist along NC 133 (River Road) south of Leland and Belville where the 12,000 vpd count is matched by a typical capacity of 12,000 vpd for a two-lane roadway. The busiest section of Village Road, near US 17, carries 25,800 vpd which equates to a Level of Service D for the section with five lanes.

Table 5.2 Roadway Levels of Service

Corridor	Road Type	Cross Section	Range in Existing Traffic Volumes (vehicles/ day)	Capacity	Current LOS
US 17	Major	4-lane divided	27,000 to 51,000	40,000	C - F*
US 74/76	Major	4-lane divided freeway	24,000	63,000	A
NC 133	Minor	2-lane undivided	12,000	12,000	E
Lanvale Rd	Collector	2-lane undivided	4,900 to 8,700	12,000	A - C
Navassa Rd	Collector	2-lane undivided	4,300	12,000	A
Old Fayetteville Rd	Collector	2-lane undivided	3,400 to 5,000	12,000	A
Village Rd	Minor	2 to 5 lanes undivided	9,400 to 25,800	12,000 to 33,000	D

Source: Wilmington MPO 2006 Annual Traffic Count Report and 2030 LRTP

* congested in certain areas only, i.e. the causeway section towards the Cape Fear River after US 17 merges with US 74/76

MAJOR ROADWAY NETWORK

ROADWAY SAFETY AND CRASH HISTORY

Eight corridors within the study area were analyzed using crash data obtained from the NCDOT over a three-year period (October 1, 2003 to September 30, 2006). Table 5.3 shows the crash rates and total number of crashes. A crash “rate” is defined as the number of crashes per 100 million vehicle-miles traveled. The crash rate comparison with the statewide average crash rate for similar types of roadways is the key to ranking problem locations since a crash rate considers the probability that roads carrying more traffic are likely to have more crashes.

Table 5.3. Roadway Crash History

Corridor	Section	Crash Rate *	Statewide Average Crash Rate**	Total Number of Crashes	Severity Index	EPDO Rate ***
Village Road	Mt Misery Rd to US 17	553	308 to 480	239	4.03	2227
Lanvale Road	Village Rd to US 17	481	370	85	5.66	2723
Old Fayetteville Rd	Bluff Rd to Village Rd	283	370	46	5.22	1477
River Road (NC 133)	Ocean Hwy to Daws Creek	185	191	121	4.96	918
Navassa Rd	Village Rd to Old Mill Rd	95	370	6	4.7	449
Old Mill Rd	Village Rd to Navassa Rd	91	370	4	2.85	260
Ocean Hwy (US 17)	River Rd to Sloan Rd	63	97	137	4.66	292
Andrew Jackson Hwy (US 74/76)	Stella Dr to US 17	56	87	89	4.87	271

Source: North Carolina Department of Transportation

* Crash Rate is the number of crashes for every one million vehicle miles traveled

** Statewide Average Crash Rate is for comparable rural roads throughout North Carolina (based on number of lanes and highway route type such as US Highway with signals, US Highway with interchanges, NC route, primary or secondary routes).

*** EPDO Rate normalizes fatalities, injuries and reported property damage into a rate indicating the cost per crash. The higher EPDO rates indicate a higher financial impact.

Crashes on North Carolina roadways are monitored by NCDOT and when crash rates exceed the expected levels — that is, when the crash rate exceeds the statewide average for similar types of roadways — plans should be developed for countermeasures. Funding for safety-related improvements, just like for all transportation improvements, is scarce relative to the demand for projects.

RECOMMENDATIONS

Monitor Crash Problem on Lanvale Road

One particular danger zone is Lanvale Road, where the crash rate is 30 percent higher than the statewide average for two-lane secondary roads in rural area. Monitoring of crash reports along with more detailed site investigations of Lanvale Road crash locations are recommended. Applications to NCDOT for spot-safety funds and/or discretionary funds may be appropriate. Sight distance reviews and updates of traffic-regulatory signs and markings may be insightful.

Improve Safety Conditions on Village Road

Plans are also underway to widen Village Road in an attempt to improve its safety. This roadway has a crash rate more than 15 percent higher than the statewide average for four-lane undivided primary roads in urban areas (based on data gathered between October 2003 and September 2006). Other safety measures for Village Road should also be explored, including diverting some traffic onto Old Fayetteville Road at a new more southerly intersection (see section on Old Fayetteville Road below).

Implement Other Traffic Management Techniques

At a general level, several traffic management techniques should be applied along Village Road and other busy town streets as appropriate. Techniques to manage access to properties along the street, such as medians and driveway improvements may be necessary if turning traffic contributes significantly to the crash history. Conversion to right-in, right-out only access is also a proven method for reducing turning conflicts that lead to turning type crashes.

PLANNED ROAD PROJECTS

In terms of supply side strategies, the recommendations contained in the Town of Leland *Collector Street Plan*, and reinforced in this document, set forth the design requirements for a network of new streets that will be adequate for Leland’s future needs. Additionally, and at a more regional scale, the Wilmington Metropolitan Planning Organization 2030 Long Range Transportation Plan (LRTP) identifies priorities for Brunswick County over the next 23 years, separating them into fiscally-constrained or unfunded categories. The MPO addresses transportation needs at a regional level, so the recommended projects are based on regional benefits. MPO recommendations are forwarded to the NCDOT for evaluation as the State determines projects that will be funded over the ensuing seven years. Table 5.4 lists the Leland area projects included in the State’s latest 2007-2013 State Transportation Improvement Program (STIP).

Table 5.4 – Programmed Projects

Roadway	Section	Project	Construction Start Year
Village Road (Phase I)	Old Fayetteville Rd to US 17	Widen to 4-5 lanes	2008
Village Road (Phase II)	Old Fayetteville Rd to Lanvale Rd	Widen to 4-5 lanes	2013
US 17	Various locations	Access management	2010
US 17 & 74/76	Causeway to Cape Fear River	Add one lane each way	2012
Old Fayetteville Road	At US 74/76 bridge	Build ramps to 74/76	After 2013

Source: NCDOT State Transportation Improvement Program 2007 to 2013

The State Transportation Improvement Program (STIP) is the official list of upcoming transportation investments anticipated with State and federal funds. It is an extremely competitive process to add a project to this coveted list. Local and regional efforts over the years have resulted in several projects in and near Leland, including the planned widening of Village Road. Funds and timing for Village Road are separated into two projects with the southern segment expected to be widened first. Environmental studies are underway on the northern segment.

RECOMMENDATIONS

Revise Village Road Phase I Plans

Consistent with the goals of Leland’s citizens, alternative details developed at the charrette to the roadway design by NCDOT for the Phase 1 Village Road project are proposed later in this section. As recommended there, every effort should be made to work with the NCDOT to create a more attractive, walkable, low-speed street condition in order to support the Master Plan’s recommendations for the redevelopment of a town center along that length of Village Road.

Study/Revise Village Road Phase II Plans

The 2035 travel demand forecasts recently completed by the Wilmington Urban Area MPO for the section of Village Road between Old Fayetteville Road and Lanvale Road shows 10,000 to 13,000 vehicles per day, which is enough traffic for two very busy lanes. That is, the traffic forecast does not seem to justify road widening to a full four or five lanes north of Old Fayetteville Road, as suggested by the Long Range Transportation Plan.

Further study is warranted to determine if a narrower roadway section is capable of meeting travel demand, particularly given that there are wetland crossings in this section of Village Road.

MAJOR ROADWAY NETWORK



Frontage road with new development along US 17 at Wal-Mart site

US 17 Access Management: Extend Frontage Roads and Collector Streets

As part of the project noted in Table 5.4 above as “access management projects” to US 17, a secondary street system is needed in the vicinity of US 17 between the future I-140 and the existing US 74/76 interchanges. Direct highway access via driveways to large-scale commercial development on both sides of the highway supports the need for an interconnected and well-planned network of secondary streets so shorter vehicle trips would not be reliant on US 17. These new secondary streets built parallel to US 17 would incorporate the existing fragments of frontage road currently evident in the Wal-Mart development, but should be extended into a network behind the commercial buildings as reliance on frontage roads only can create traffic congestion when intersections are close together. This new street pattern relates closely to the ideas for the progressive urbanization of the large commercial developments along US 17 described in the Focus Area section.

Study Old Fayetteville/US 74/76 Interchange

The Regional Transportation Plan prepared by the Wilmington MPO includes a future interchange on Old Fayetteville Road where it now bridges over the US 74/76 freeway. Traffic forecasts prepared by the MPO representing the year 2035 suggest that with a new interchange on Old Fayetteville Road at US 74/76, traffic volumes would increase to 5,000 to 7,000 vehicles per day on Old Fayetteville Road (compared to 3,500 to 5,000 vehicles per day currently). These traffic volumes are typically too low to justify building an interchange. In depth study of traffic volumes and dynamics along this corridor will be warranted as development in the area continues and in light of the recommended roadway network changes in this plan.

Implement Demand-side Congestion and Access Strategies

Traditionally, congestion problems are addressed with either supply-side or demand-side strategies. Supply side strategies may include tactics such as building more roads to increase capacity. Demand-side strategies include tactics such as encouraging more ridesharing among commuters and creating more compact patterns of land development that stimulate walking, cycling and public transit options. The Town of Leland should be proactive in addressing mobility needs within the community using both supply-side and demand-side strategies.

JURISDICTIONAL RESPONSIBILITY FOR THE TRANSPORTATION SYSTEM

The transportation network within the Town of Leland should provide mobility for automobiles, public transit, bicycles, and pedestrians in one comprehensive system. The responsibility for maintaining and/or enhancing the transportation system is divided among local, regional, and state entities depending on the location and type of improvement and its stage in the implementation process.

The actions of the Town and those of other agencies significantly impact all facets of life in and around Leland. Intergovernmental coordination of town and regional planning has grown increasingly important. The Master Plan focuses on the interdependent transportation systems within the Town’s corporate limits; however, it also recognizes that they function as part of a larger regional network serving the area. To this end, the Town of Leland should continue working with regional transportation authorities to implement sustainable transportation solutions (i.e. options for personal mobility that do not rely solely on private cars). Strategies are identified throughout the Master Plan that reduce vehicle miles traveled and congestion levels on the major roadway network. These include greater focus on walking and cycling; mixing uses within buildings and within developments so that several destinations can be combined into one trip; and greater connectivity so that citizens have more choices of routes to and from their destinations.

One of the most pressing hurdles for Leland toward linking land use and transportation planning is the context in which decisions are made. In the State of North Carolina, land use planning is regulated on the local level and memorialized in adopted Comprehensive Plans. Conversely, transportation planning in Leland is primarily the responsibility of the North Carolina Department of Transportation (NCDOT) and the Wilmington Area Metropolitan Planning Organization (MPO). The disconnect between land use and transportation planning in North Carolina often places local and state government agencies at odds over single critical issues — each with their own political agendas and implementation schedules. Often, the MPO is called upon to create forums to resolve disagreements between municipalities and NCDOT over transportation issues. For example, the recent efforts of the MPO and the North Carolina Board of Transportation member representing the area, Mr. Lanny Wilson, secured new funding for a high-priority project to widen the US 17 causeway that was requested by Brunswick County municipalities including Leland.

Private developers have an increasing responsibility for the transportation system, especially as competition increases for the limited public funds available for new projects. Progressive municipalities understand private

developers can offer excellent opportunities to complete projects very quickly. Meanwhile, private developers benefit from improved circulation within and beyond the limits of their development. To maximize the potential for partnerships with private developers, the Town of Leland must continue to review the transportation provisions and impacts of new development on a case-by-case basis. Appropriate exactions that accurately assess developers for the proportionate share of transportation impacts are fair.

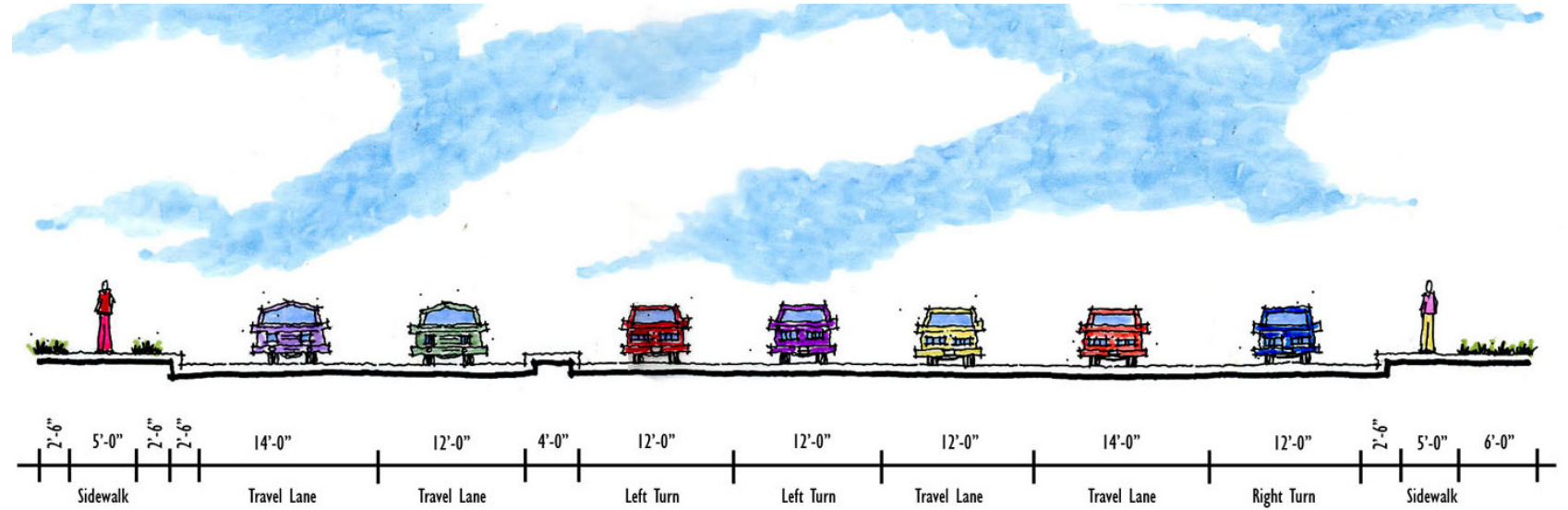
Overall, a combination of publicly- and privately-funded sources will be necessary in order to construct the kind of transportation system that Leland will need over the next two decades. Such a well-planned and multi-modal system would enable the Town to retain its quality of life, attract new investment and minimize harm to the natural environment.

Finally, while individual communities’ transportation solutions will be important, the Town’s greatest contribution towards improving the transportation system will be to coordinate responsible land use planning within the area covered by the Master Plan with other towns in Brunswick County and with local, regional, and state transportation agencies.

VILLAGE ROAD FUTURE VISION (PHASE I)

NCDOT PROPOSED CROSS-SECTION

The North Carolina Department of Transportation (NCDOT) is currently preparing detailed plans to widen the southeastern portion of Village Road between Town Hall Drive and the US 17/74/76 interchange. These plans originally called for the State's generic five-lane highway cross section, increasing to seven lanes at some street intersections. The project is funded and is programmed to commence in 2008. The proposed design's lack of pedestrian, bicycle, and streetscape amenities would severely compromise the future redevelopment potential of this key portion of the proposed new mixed-use town center that will rely heavily on the creation of a good pedestrian environment for its economic success. The NCDOT design, shown at right, utilizes 12-foot and 14-foot travel lanes, thus making usable and attractive pedestrian and bicycle facilities impossible within the right-of-way.



NCDOT PROPOSED VILLAGE ROAD CROSS-SECTION

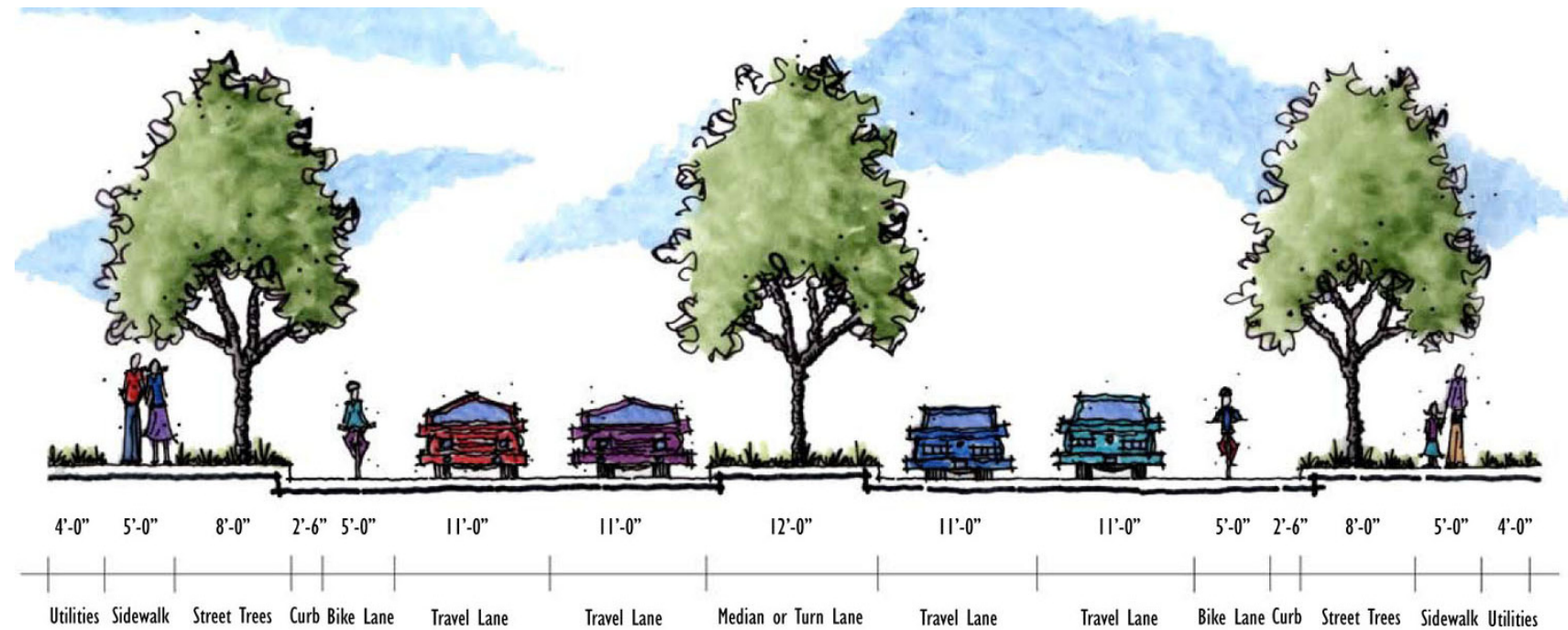
▲ This design focuses primarily on vehicle movement with little in the way of usable facilities for pedestrians and cyclists. For example, sidewalks are separated from fast moving traffic by a minimal grass strip or no grass at all, thus minimizing the level of comfort and convenience for pedestrians and eliminating opportunities for street trees.

ALTERNATIVE TO NCDOT CROSS-SECTION

The revised design proposed by this plan and vetted by community stakeholders at the Master Plan charrette and in previous discussions during the *Collector Street Plan* process fits within NCDOT's right-of-way dimensions and provides a more "urban" and pedestrian-friendly alternative. This alternative design handles an increased traffic capacity while providing a much improved streetscape that is compatible with future pedestrian-oriented redevelopment of parcels flanking the roadway. This alternative design is consistent with the public's stated desire for more and improved accommodation for pedestrians and bicyclists.

Based on community input from this plan and previous planning efforts, the redesigned cross-section fits within the 105-foot right-of-way established by the NCDOT and reflects the vision for Village Road established in the 2005 collector street plan processes. This alternative provides 5-foot sidewalks, 8-foot tree planting strips, 5-foot bicycle lanes, and 11-foot travel lanes throughout.

Every effort should be made to work with NCDOT to incorporate this revised design into their planning and design schedule so that this improved infrastructure will support Leland's future development visions for this important part of town. Any generic widening scheme for Village Road would destroy much of the potential for this roadway corridor to remain the historic backbone of the Leland community. These alternative street design proposals for the eastern end of the corridor within the proposed redeveloped "town center" provide the potential for greater economic development and longer-term prosperity for property owners and citizens alike.



PROPOSED CROSS-SECTION FROM CHARRETTE

▲ In contrast to the NCDOT design, this alternative provides 5-foot sidewalks, 8-foot tree planting strips, 5-foot bicycle lanes, and 11-foot travel lanes. The concept also provides for a median, which provides safety benefits for motorists and pedestrians (who can use the median when crossing the street), and allows room for landscaping. This improved street infrastructure creates the conditions for enhanced and safer spaces for pedestrian activity, leading to increased redevelopment opportunities for new mixed-use or residential buildings lining the streets and creating a distinctive sense of place.



Existing conditions on Village Road. Note the lack of sidewalks. (Image Source: KHA)



Photo transformation of the same section of Village road showing planted median, bike lanes, street trees, sidewalks, and additional travel lanes. This image represents Leland's vision for Village Road. (Image Source: KHA, Leland Collector Street Plan)

VILLAGE ROAD FUTURE VISION (PHASE I)



PROPOSED VILLAGE ROAD IMPROVEMENTS RESULTING FROM CHARRETTE

Key intersections in the proposed Village Road concept are enhanced with textured pedestrian crosswalks. The central turn lane is discontinuous, eliminating the “suicide” lane configuration, and broken up where appropriate with a 12-foot planted median strip that reduces the visual scale of the street to a more pedestrian level, provides safe midblock crossing locations and locations for landscaping.

OLD FAYETTEVILLE ROAD FUTURE VISION

As part of this redesign of the Old Fayetteville Road corridor (further detailed in the Focus Areas section), new street cross sections provide opportunities to improve the infrastructure along the street to suit three different sets of conditions: Rural, Suburban and Urban. The three different cross-section details for this single roadway corridor provide an excellent example of context-sensitive design. The details of each cross-section reflect the various land use, transportation and environmental conditions on different parts of the corridor.



Existing conditions of perspective below: looking east on Carolina Avenue at Old Fayetteville Rd intersection. Walgreens store is in the background (lower left side of picture).

OLD FAYETTEVILLE ROAD PERSPECTIVE WITH ON-STREET PARKING, NEW STREETScape DESIGN AND INFILL DEVELOPMENT ▼



Existing Conditions on Old Fayetteville Rd

OLD FAYETTEVILLE ROAD FUTURE VISION

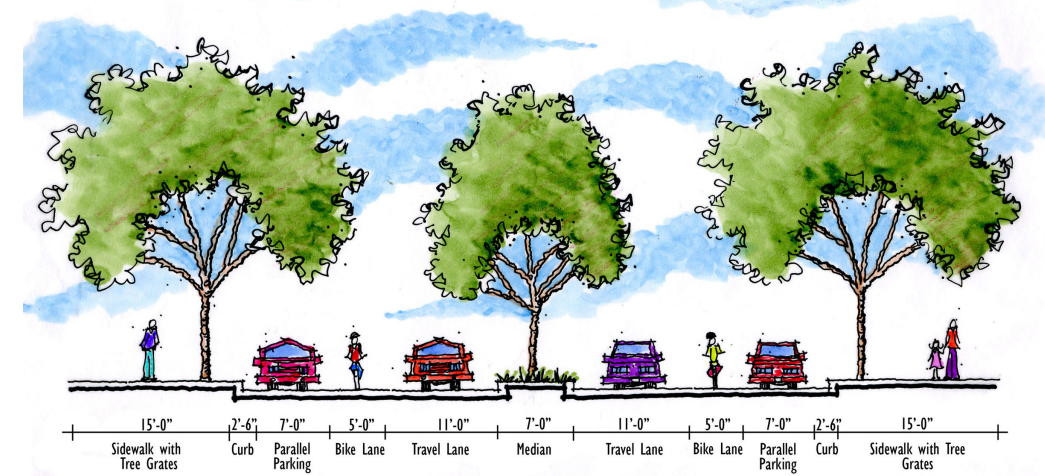
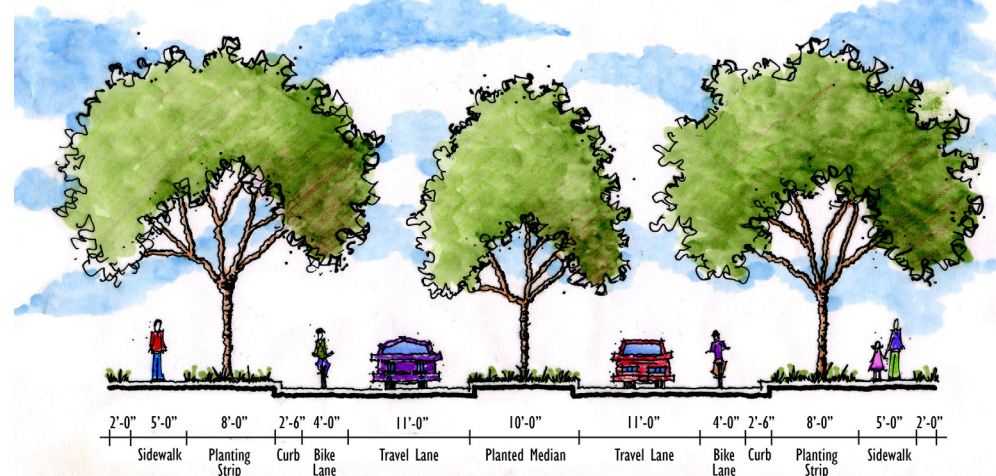
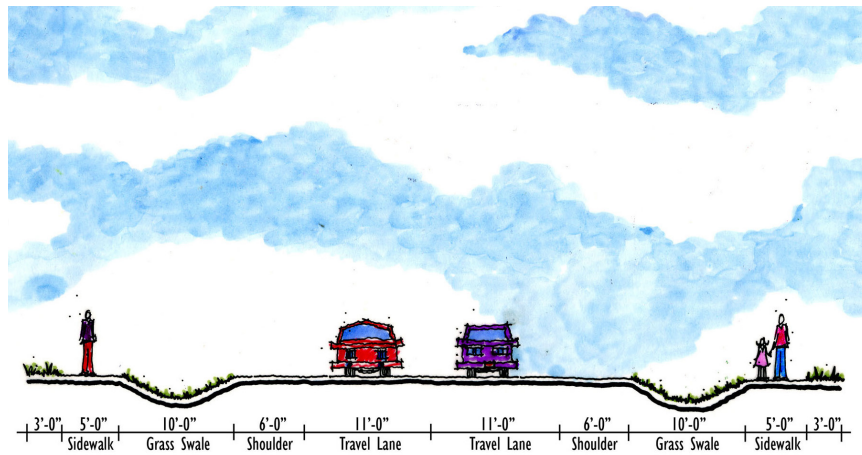
OLD FAYETTEVILLE FUTURE VISION ▼



RURAL/SUBURBAN SECTION OF OLD FAYETTEVILLE ▲

MIDTOWN URBAN SECTION OF OLD FAYETTEVILLE ▲

MIXED USE URBAN CORE SECTION OF OLD FAYETTEVILLE ▲



RURAL/SUBURBAN SECTION ▲

This street design concept relates to the portion of Old Fayetteville Road from Lanvale Road to Sturgeon Creek. The design is for a “low-impact design” cross section with drainage swales to retain and infiltrate surface water runoff on site versus the more urban curb and gutter. This on-site infiltration helps cleanse the surface water naturally prior to its gradual release into the natural ecosystem to reduce the environmental impact of the road in this sensitive location close to Sturgeon Creek. This simplified cross section fits within a 70-foot right-of-way and provides on both sides a 3-foot grassed utility strip, a 5-foot sidewalk, a 10-foot grassed drainage swale, a 6-foot shoulder that doubles as a bike lane, and an 11-foot travel lane in both directions. This cross section would need to be supplemented by turn lanes at key locations such as the two school entrances to take account of increased traffic loads at those points. This portion of the road is intended to have a lower density residential character, markedly different from the more urban settings further east nearer Village Road and the mixed-use core of the town center.

MIDTOWN URBAN SECTION ▲

From Perry Street as far as the junction with the Navassa Road extension, the character of Old Fayetteville Road is proposed to change and become more urban. Public open space and some town homes would define a more informal northern side to the street frontage while the linear urban character of small mixed-use and apartment buildings line the southern frontage, providing continuity with the more urban area to the east. The symmetrical street section fits within a 75-foot right-of-way and provides a 2-foot utility easement, a 5-foot sidewalk, an 8-foot tree planting strip, a two feet six inches wide curb zone, and 4-foot bike lane with an 11-foot travel lane in both directions all separated by a 10-foot planted median (or turn lane where appropriate).

MIXED-USE/URBAN CORE SECTION ▲

Between the extension of Navassa Road and the connection of Old Fayetteville Road with mixed-use core on Village Road, the proposed street section becomes even more urban, and fits within an 88-foot right-of-way to create a pedestrian-oriented environment. The symmetrical section has 15-foot sidewalks on both sides with street trees in tree grates, a two feet six inches wide curb zone, plus a 7-foot parallel on-street parking lane on both sides, a 5-foot bike lane, and an 11-foot travel lane in both directions either side of a 7-foot planted median. This design creates a generous pedestrian zone protected from through traffic by on-street parking that is necessary to accommodate the levels activity required for commercial success of retail and restaurant businesses in the town center.

VILLAGE ROAD-US 17/74/76 INTERCHANGE

The recommendations in this section are consistent with the Regional Transportation Plan and the *Belville Town Plan*.

EXISTING CONDITIONS

The existing Village Road interchange with US 17/74/76 generates concerns for public safety and traffic congestion. The interchange has the highest traffic volume and crash rate of intersections in the plan area. Peak hour congestion continues to increase and become more problematic. Issues of traffic congestion and safety at this location were raised by several participants in the charrette.

The diamond-shaped configuration of ramps requires left-turn movements across several lanes of Village Road traffic. It also produces some motorist confusion trying to maneuver into the appropriate lane of traffic on Village Road. This leads to crashes, near-crashes and inefficient traffic movement. To enhance safety and reduce congestion in the interchange area, the following actions are recommended:

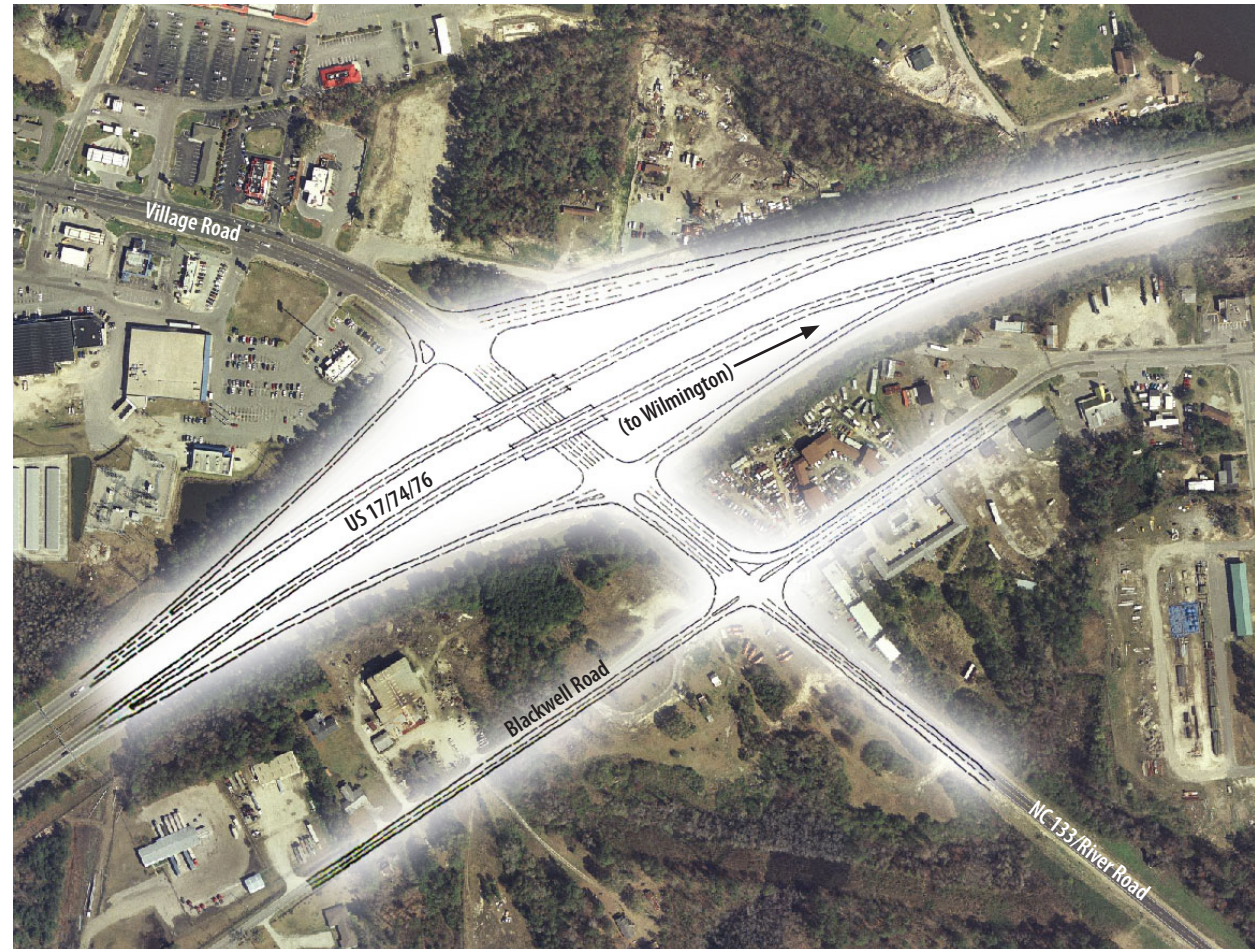
RECOMMENDATIONS

Adjust the signal timing and phasing around the interchange.

In the short term, the existing traffic signals need to have their timing and phasing updated based on movement volumes and crash data. It appears that it has been some time since the current signal programming was last updated and it is long overdue for a significant upgrade.

Complete the improvements to Village Road north of the interchange.

The current free movement into driveways close to the interchange increases the risk of crashes and reduces the efficiency of the traffic signals. A landscaped median is strongly preferred to a simple concrete median or a two-way-left-turn lane for two reasons: First, the median will eliminate the free left turn lanes making Village Road a safer corridor. Second, the landscaping will help to visually enclose the area, thereby lowering overall speeds along the corridor.



Existing Conditions on Village Road looking northeast from US 17/74/76 interchange

**EXISTING CONDITIONS ▲
US 17/74/76 INTERCHANGE
WITH VILLAGE ROAD**

VILLAGE ROAD-US 17/74/76 INTERCHANGE

Realign Blackwell Road approximately 650 feet south of the current intersection with NC 133 to provide adequate separation between the southbound ramps.

Currently, it is quite difficult to turn left from Blackwell Road onto NC 133/River Road. Because of the signals for the on- and off-ramps from US 17/74/76, the spacing is too constrained to permit the installation of another signal at its present intersection. Realigning it further south would meet adequate spacing standards.

Construct a “square loop” ramp for northbound ingress and egress in combination with Blackwell Road.

Finally, as part of a longer term solution, Leland and Belville should advocate for the removal of the existing northbound off-ramp for NC 133 and installation of a new northbound on- and off-ramp that is separated from the current interchange. This ramp would be connected to the realigned Blackwell Road. The proposed “square-loop” resembles a freeway loop in operation, but permits greater access to the surface road and allows for the surrounding property to develop/redevelop more feasibly, with the economic benefits of that development accruing to the surrounding communities.

By eliminating the left turns required for southbound (NC 133) to northbound (US 17/74/76), the entire interchange works more efficiently. The elimination of the left-turns needed for the northbound on-ramps (and the signal that controls them), increases the overall signal spacing for the interchange to 1500 feet, a more acceptable spacing based on NCDOT design standards.

The proposed configuration appears to be satisfactory to the needs of the US 17 corridor. Though there is some desire to convert US 17 to a freeway, this conversion is not likely in the next 20+ years given the number of driveways and street intersections.



New eastbound off-ramp/on-ramp for US 74/76/17

Realigned Blackwell Road

New signalized intersection

Enlarged potential redevelopment site

Landscaped median with controlled access

FOCUS AREAS: OVERVIEW

The detailed design provisions discussed in the sections on the Framework Plan and on Transportation clearly illustrate the interrelationship between land use planning, urban design and transportation planning. In this section of the report two “focus areas” of the plan are described in more detail. These focus areas are:

- I. The Village Road Area
- II. The US17 Corridor, and

These distinct geographical areas are organized and categorized in relation to the six “sector” classifications noted in the Framework Plan section.

The plans shown in this section are intended to be conceptual build-out visions for significant and prototypical areas of Leland. The purpose of these conceptual plans is not to require strict conformance to each building or parcel as drawn, but to show general patterns and intensities and potential development/redevelopment opportunities. Care was taken in the design process to envision development alternatives based on property boundaries or known opportunities for parcel consolidation as well as the market feasibility for the scale, amount, and type of development.

While the illustrations shown in this section are preferred build-out alternatives created with public input and review during the charrette process, the conceptual plans are not intended to preclude site-specific modifications. It is assumed that any modifications will be the result of specific programmatic and market analysis. However, development and redevelopment proposals are expected to: maintain and protect the general street network; street connections and rights-of-way; open space areas and usable public spaces; general intensity of development; urban pattern (relationship of buildings to the streets and adjacent properties); massing; street and pedestrian circulation patterns; and, to mix uses both horizontally (within sites) and vertically (within buildings), where appropriate.

The conceptual development plans laid out in this section and in the document were generally created with the assumption that their implementation would be accomplished primarily through private investment, with willing buyers and willing sellers and not through eminent domain. Although there will certainly be a role for government investment — in infrastructure improvements and public facilities; and developing and enforcing regulatory standards — the primary mechanism for accomplishing the physical vision embodied in these conceptual plans will be the initiative of private property owners, developers, and business owners in concert with the Town’s adopted policy and regulatory processes.

▼ EXISTING VILLAGE ROAD AREA



VILLAGE ROAD CONCEPT PLAN

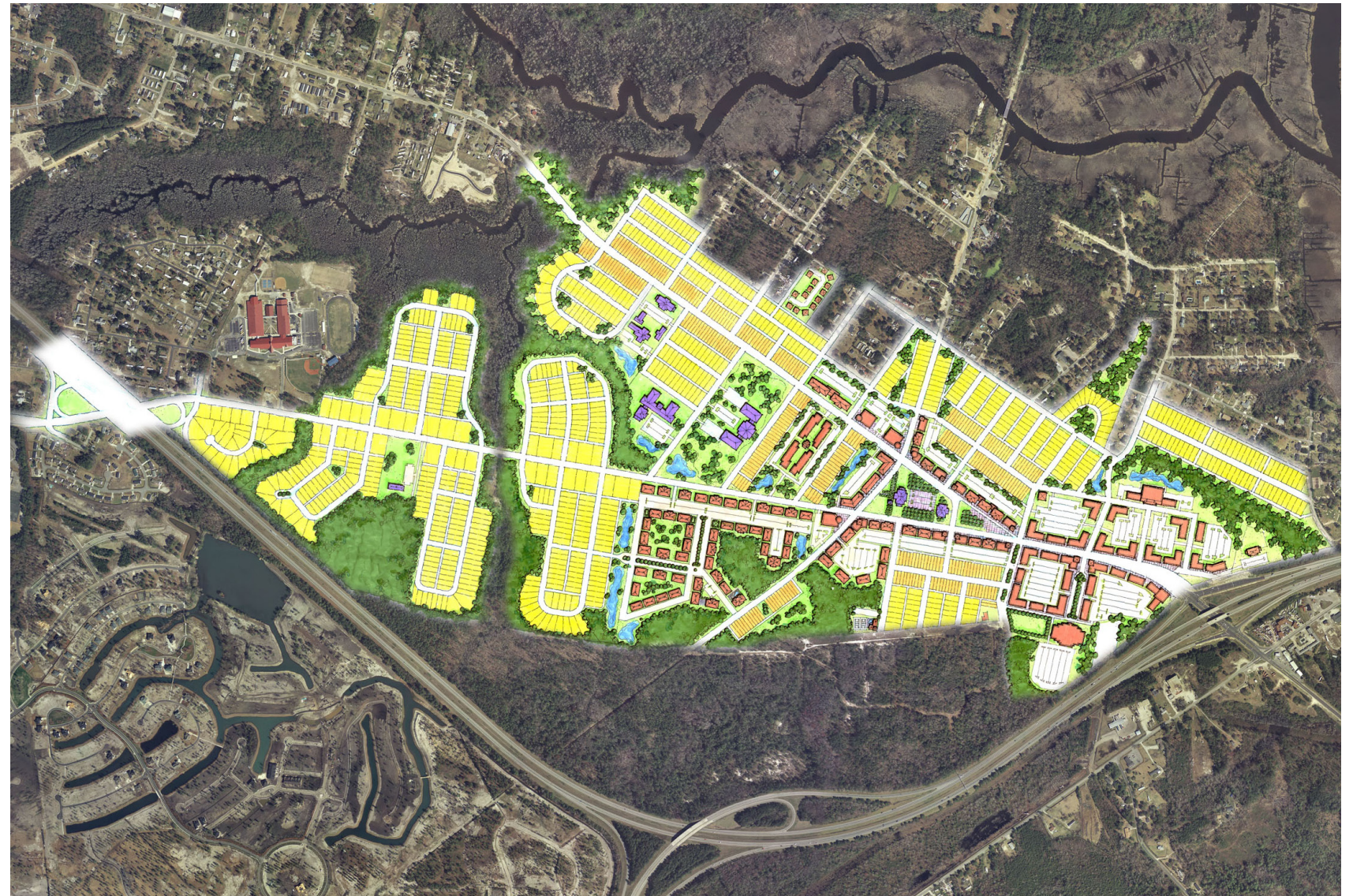
For the Village Road area, the Framework Plan proposes a mix of S-4 Controlled Growth (Traditional Neighborhood Development and neighborhood commercial centers) at the northwestern end of the roadway corridor; S-3 Restricted Growth (small-scale, low density residential infill development) in the mid-portion of the corridor; and denser S-6 Infill/Redevelopment (built-up areas with underdeveloped land or outdated uses) at the southeastern end, close to its intersection with US 17/74/76.

The conceptual build-out plan reflects the types of development intended by the Framework Plan and appropriate to the market conditions, geography, and the property ownership configurations for the area. The transportation recommendations for this area are discussed in detail in the Transportation section.

The plan divides the town center area into three basic zones of development intensity:

1. The mixed-use Town Center area nearest the highway at the southeastern end of Village Road;
2. A medium-density zone with mixed housing, civic and some commercial uses in the middle portion around the junction with Navassa Road and extending west as far as Forest Hills, Perry and Division Streets; and
3. A fringe area comprising medium- to lower-density single-family housing along Village Road from Perry Street as far as Sturgeon Creek, and up Old Fayetteville Road from its junction with Perry Street as far as the high school and the proposed new interchange with US 74/76.

The main change in the spatial configuration of the proposed redeveloped town center from the present condition is the extension of Old Fayetteville Road as a main spine of development, linking the proposed new interchange on US 74/76 with the existing one at Village Road. This enables Old Fayetteville Road to become a secondary circulation route to relieve some traffic pressure from Village Road, thus helping to safeguard Village Road's primarily residential character along substantial portions of its length to the north. The relation of this proposed new street alignment with the forthcoming widening of Village Road between the US 17/74/78 interchange and Navassa Road is discussed in the Transportation section. In the concept plan shown here, Village Road and Old Fayetteville Road converge at the entry point into the higher-density mixed-use core area.



▲ VILLAGE ROAD/DOWNTOWN CONCEPTUAL MASTER PLAN

VILLAGE ROAD AREA DEVELOPMENT POTENTIAL

Commercial Space - 1,000,000 sf
(Retail/Office)

Housing - 2,500 Units
(single family homes, townhomes, mixed-use condo/
apartments)

Civic Uses - 163,000 sf
(new Town Hall, library, school, community center)

VILLAGE ROAD RIPE & FIRM ANALYSIS

A “ripe and firm analysis” comprises an appreciation of the development potential of land within a study area. This analysis enabled the project team to focus efforts on specific, high-priority areas. This analysis was the starting point for in developing the Village Road concept plan. It also helps to protect areas in the community considered to be special for their civic value or worthy of preservation for some other reason.

FIRM AREAS

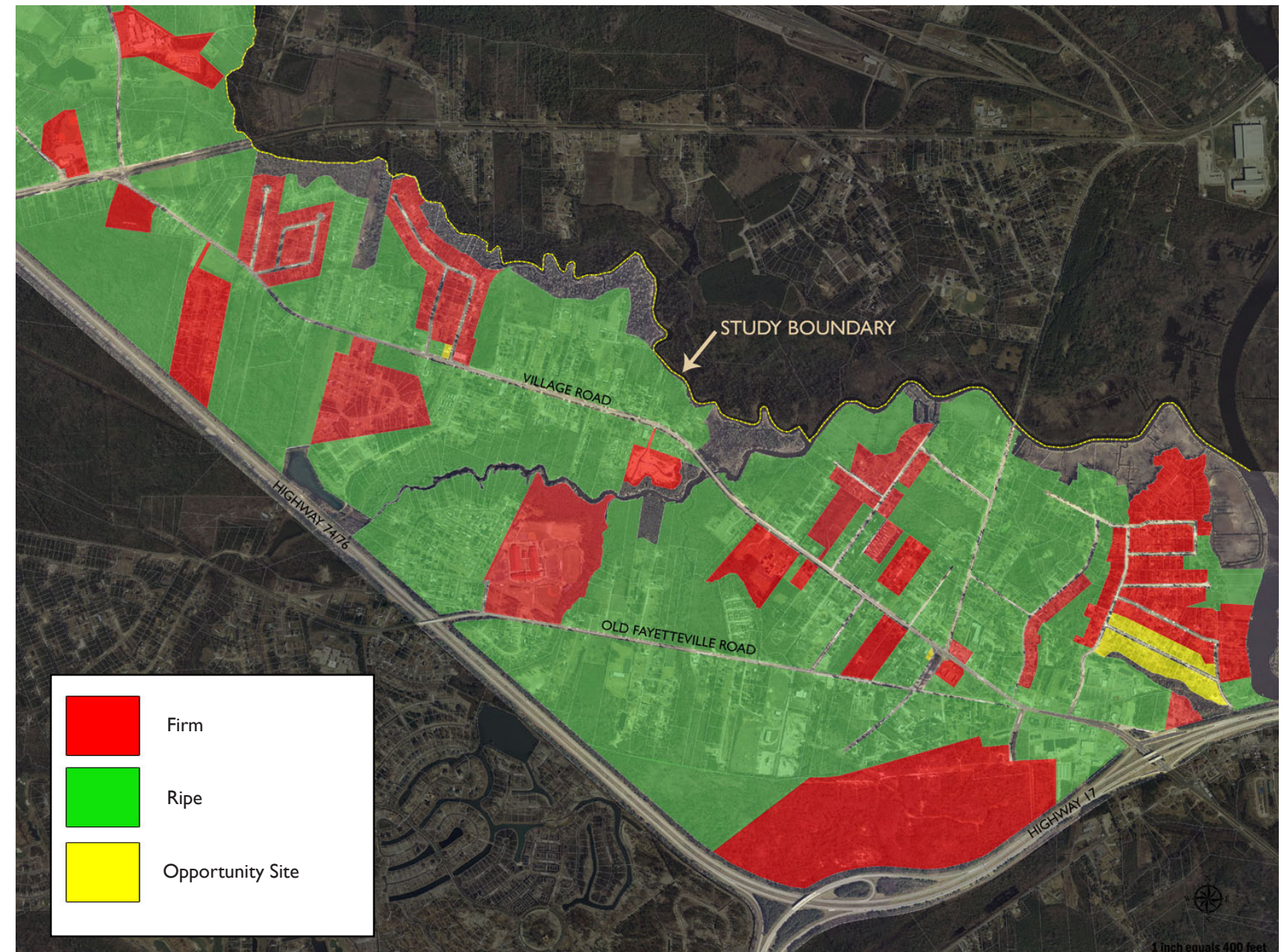
Parcels determined to be “firm” generally demonstrate stable conditions of building and land use and reflect the “highest and best use” according to real estate and appraisal forecasts. Such parcels typically require very little or no intervention or are unlikely to change in the near term. These properties also include important civic sites such as schools, churches, and parks; and new developments, or approved developments.

RIPE AREAS

By contrast, “ripe” areas are those that typically offer significant development or redevelopment opportunities. These include parcels that are vacant, underdeveloped (that is, able to accommodate additional on-site expansion or new development), or in need of redevelopment. The potential for denser development at Leland’s commercial core is particularly notable adjacent to Village Road’s interchange with US 74/76. The presence here of two aging strip shopping centers with generic outparcel developments on either side of the roadway provides opportunities for land assembly to support extensive redevelopment with a distinctive urban character. This would capitalize on its prime commercial location and access and also create a distinctive gateway into the civic and community core of Leland.

OPPORTUNITY SITES

A minority of sites may fall into an intermediate condition, classified as “opportunity sites,” shown in yellow. Generally, these are properties that have reasonably stable uses but which hold considerable potential for redevelopment, either because of their physical condition or their location adjacent to sites with significant development potential.



▲ VILLAGE ROAD RIPE AND FIRM ANALYSIS

The ripe and firm analysis for the Village Road area illustrates that the majority of land along the corridor is “ripe” for redevelopment (shown in green), with several “firm” areas (shown in red), both large and small, sprinkled throughout the area. Along the corridor, this redevelopment potential is evidenced by the new residential infill projects that are already occurring, including the clearing of former mobile home parks.

MIXED-USE TOWN CENTER AREA

The mixed-use Town Center zone comprises developments on either side of Village Road, as far as its junction with Northgate Drive, using consolidated patterns of land ownership to create comprehensive redevelopment plans for each side. Each potential project includes a major anchor, for example, a large grocery store on the north and a multiplex cinema on the south. The areas currently occupied by outparcel developments are consolidated into new urban blocks with street fronts lined with three-storey mixed-use buildings, generally with retail at sidewalk level and offices and/or apartments above.

Existing uses, such as fast-food restaurants, can be accommodated within the ground floors of some buildings with ample short-term parking on-street or within the block. The center of each block provides parking for all uses, supplemented by extensive on-street parking along the new network of smaller, local streets that create the new block structure.

Related to these redevelopment visions for the town center is the work necessary to create Old Fayetteville Road as a primary street. This would involve rebuilding one short section of Carolina Avenue (the former alignment of Old Fayetteville Road) with the street itself turned to connect with Village Road. In the master plan, a public plaza is lined by new buildings and linked with a larger civic open space, with a new town hall and library buildings to create a functionally and symbolically important civic core at the heart of the revived town center.

▼ EXISTING CONDITIONS



▼ TOWN CENTER AREA PROPOSED DEVELOPMENT PATTERN



PHASING OF IMPROVEMENTS

This 20-year build-out plan for the Village Road is conceived as having several phases, with the timetable related in large measure to the timing of street improvements. The most significant of these street improvements is the immediate proposed widening of Village Road from its junction with US 17/74/76 to just past Navassa Road and this plan's suggested improvements to that widening scheme (see Transportation section).

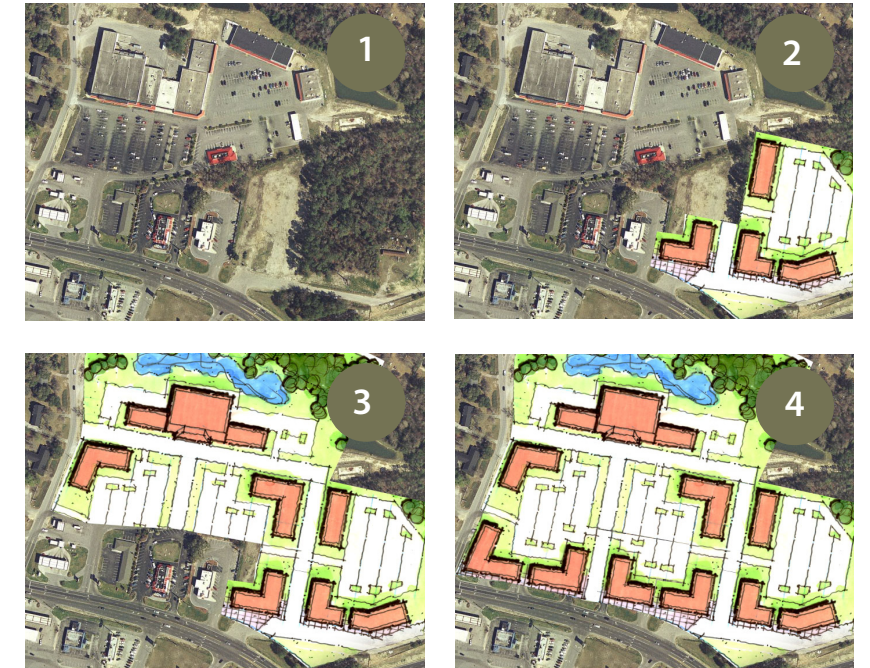
The development of new buildings along the corridor will occur incrementally after street improvements are complete. The form of buildings—their height and relationship to the street and architectural detailing—will be as important to the successful implementation of placemaking in the town center area as the streetscape improvements. The perspective along Village Road (shown at right), looking west from its junction with Baldwin Avenue shows the new, improved urban character of this town center area, with predictable traffic movements and enhanced pedestrian spaces more clearly defined by new buildings lining the streets.

Private development and redevelopment can and will happen in a phased approach as well, as shown in the graphics on this page for the redevelopment of the northwest quadrant of the Village Road interchange with US17/74/76 (site of the Piggly Wiggly shopping center). The phased redevelopment is based on existing property lines and shows how existing undeveloped land could be developed in a first phase that would not affect existing businesses. Over time, as leases run out, existing buildings become obsolete, and land values increase, additional phases, along with new street infrastructure, could be built to create a new, mixed-use center with retail and office development with a definitive block structure, internal parking, and street-fronting buildings.



▶ PHASED REDEVELOPMENT CONCEPTS FOR VILLAGE ROAD (AT BALDWIN AVE) WITH STREETScape IMPROVEMENTS

▼ PHASED REDEVELOPMENT CONCEPT FOR VILLAGE RD NW QUADRANT



NORTHWEST QUADRANT DEVELOPMENT POTENTIAL

Existing Development: 112,500 sf (primarily retail)

Redevelopment Concept: 286,200 sf (retail, office, residential)

MEDIUM-DENSITY MID-TOWN SECTION

In the concept plan, the core area is bounded to the west and north by a mix of housing, civic and commercial uses lining both Village Road and Old Fayetteville Road. Generally these main streets are lined with apartments and/or small commercial buildings as far west as Lossen and Dresser Streets. Apartments and town homes form the next layer of development, transitioning to lower density single-family housing to match existing housing areas. This pattern of redevelopment generally utilizes and reinforces the existing street pattern of side streets off Village Road, but creates new and more consolidated patterns of residential development along both sides of Old Fayetteville Road that maximize the redevelopment opportunities in that area. Opportunities for higher density apartments and condominiums exist along and to the south of Old Fayetteville Road on property that borders and connects with the new mixed housing development planned on the undeveloped land that backs up to US 74/76 at its junction with US 17.

Civic uses also play a major role in this mid-section of the town center. The existing town hall site can usefully be redeveloped to provide facilities for emergency services, police, fire and EMT, in a location that provides good accessibility in all directions. New sites for the town hall or other municipal functions such as a library to serve the expanding population could also be provided in the more visible and symbolically sited location near the proposed new intersection of Village Road and Old Fayetteville Road.

The drug store (Walgreens) currently in that location is constructed in a manner more appropriate to a generic suburban location, and in common with contemporary building practice is not anticipated to have a particularly long building life. At some point in the future, that business can usefully be relocated to a new, more suitably urban building along Village or Old Fayetteville Roads, allowing the triangular-shaped site between the converging streets to be redeveloped more appropriately with civic buildings and associated civic spaces. The perspective looking east along Old Fayetteville Road indicates the dramatic civic and symbolic potential of this site for redevelopment for important town functions (see following page).

Moving north along Village Road, the proposed pattern of development includes town homes fronting onto an improved Village Road with proper sidewalks, street trees and planting strips. Detached single-family homes line streets to the rear. An expanded existing small church campus and an elementary school are also incorporated into the master plan. The school faces onto the town park and would most likely be a small private or charter establishment.



▲ EXISTING CONDITIONS

MIDTOWN AREA PROPOSED DEVELOPMENT PATTERN ▼



MEDIUM-DENSITY MID-TOWN SECTION

PERSPECTIVE OF REALIGNED OLD
FAYETTEVILLE ROAD LOOKING
SOUTHEAST



PERSPECTIVE ANGLE



EXISTING PERSPECTIVE



LOWER-DENSITY FRINGE



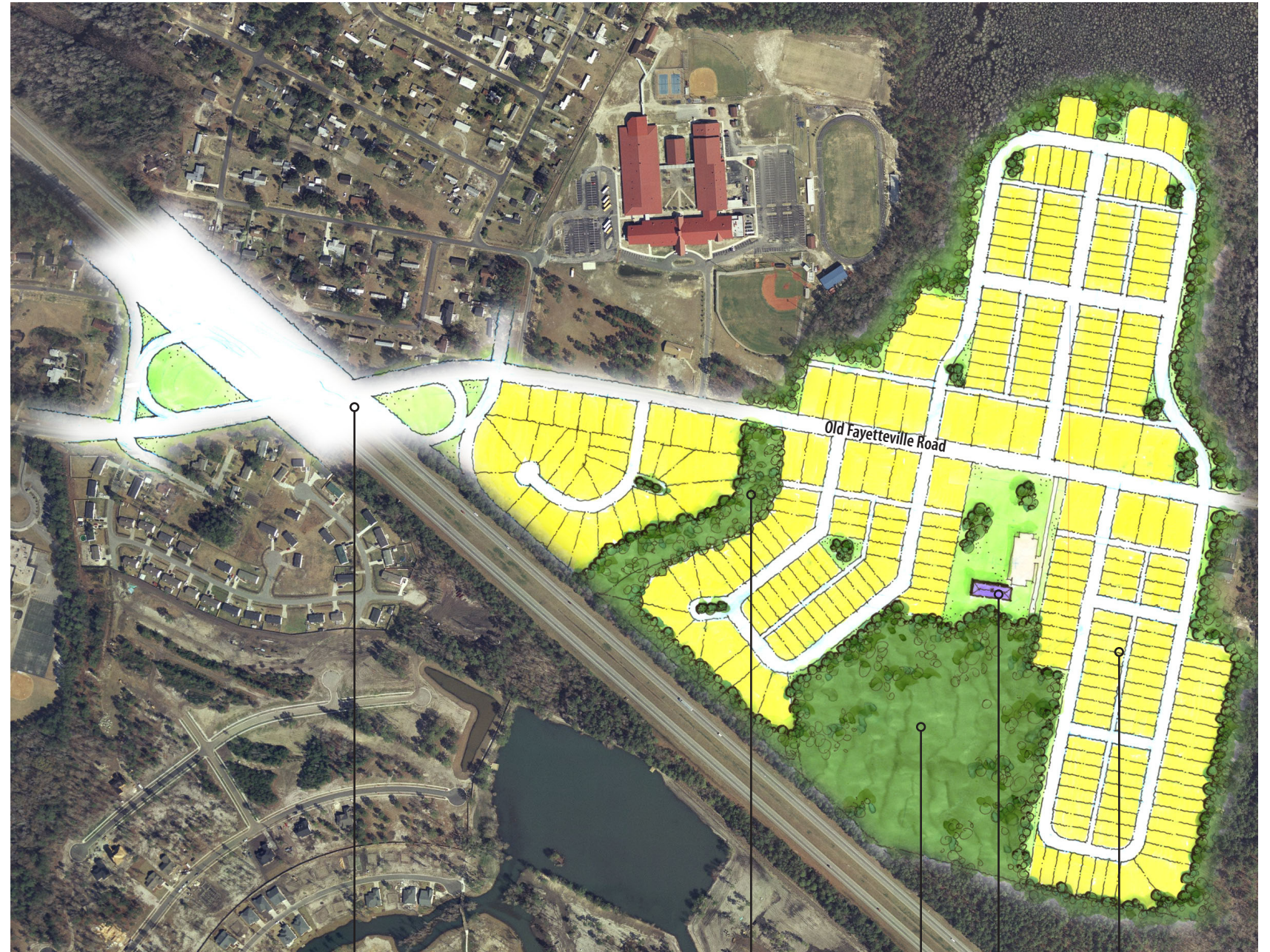
EXISTING CONDITIONS ▲

The westernmost portions of the redevelopment of this focus area are impacted by the environmental structure of the existing creek network, which dissect and bound the buildable land along both Village Road and Old Fayetteville Road.

In the concept plan, the areas on either side of Old Fayetteville Road between Perry Street and the proposed new interchange with US 74/76 are given over almost exclusively to single-family housing with one existing small church incorporated into the new plan. Where single-family housing fronts onto Old Fayetteville Road, the lots are larger and deeper, allowing homes to be sited some distance back from the roadway while still maintaining a gracious front façade as part of the entry into the town center.

It is important that homes along this entrance corridor do not back up to the street, but face the street as is the case with existing homes in this corridor. All lots that face onto Old Fayetteville Road are accessed by a system of alleys to avoid excessive curb cuts on Old Fayetteville Road, which will become a minor arterial after the proposed new interchange is constructed. Street design recommendations to match this redevelopment pattern have been noted in the Transportation Section.

Design standards need to be developed for new buildings and land uses to ensure a fitting new gateway into the town center. During this process, every effort should be made to retain low-impact design strategies for surface water management most suitable to the sensitive environmental conditions around the branches of Sturgeon Creek.



▲ PROPOSED INTERCHANGE AREA DEVELOPMENT PATTERN

New Interchange with US 74/76

Creek Buffer

Wetland Preserve

Existing church

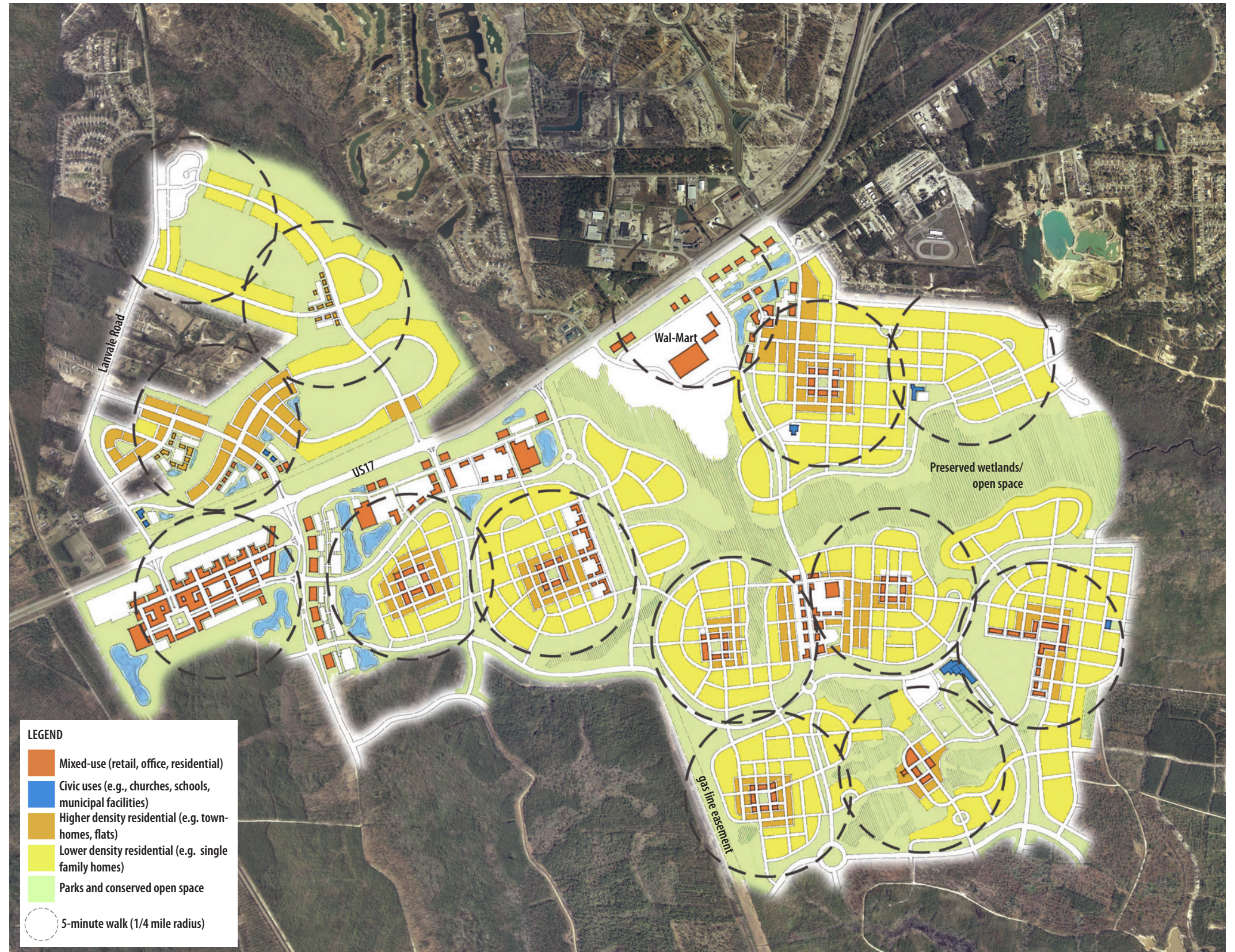
Single family homes

US 17 CORRIDOR: PROPOSED DEVELOPMENT PATTERN

During and after the 2007 charrette, design studies for land along the US 17 corridor were undertaken, particularly to examine viable ways and means of creating a distinctive experience for people driving into and through the Leland community, and also to link development along the highway with the extensive existing and future residential development on both north and south sides of the roadway.

The Framework Plan defines the US 17 corridor as primarily sector S-5 zones, incorporating also lower intensity S-4 and S-3 zones, with even some S-2 land noted due to various environmental considerations. Care should be taken to limit the length of uninterrupted S-5 corridor developments to avoid the creation of lengthy, undifferentiated linear strip development along the full length of US 17 within Leland. Such a generic outcome would likely damage the unique character of the Leland community and limit its attractiveness for future business and residential investment.

Care was taken in these studies to create a distinctive visual rhythm along the highway between areas of intense, urbanized development and contrasting areas with strips of preserved landscape frontage that conceals or partially conceals development behind screens of trees. To relate new development most sensitively to the landscape and environmental conditions, mixed-use buildings and housing of various types tend to be clustered in denser pockets of walkable districts and neighborhoods, leaving areas of more fragile landscape preserved for community use and environmental management. These design strategies are described below in more detail.



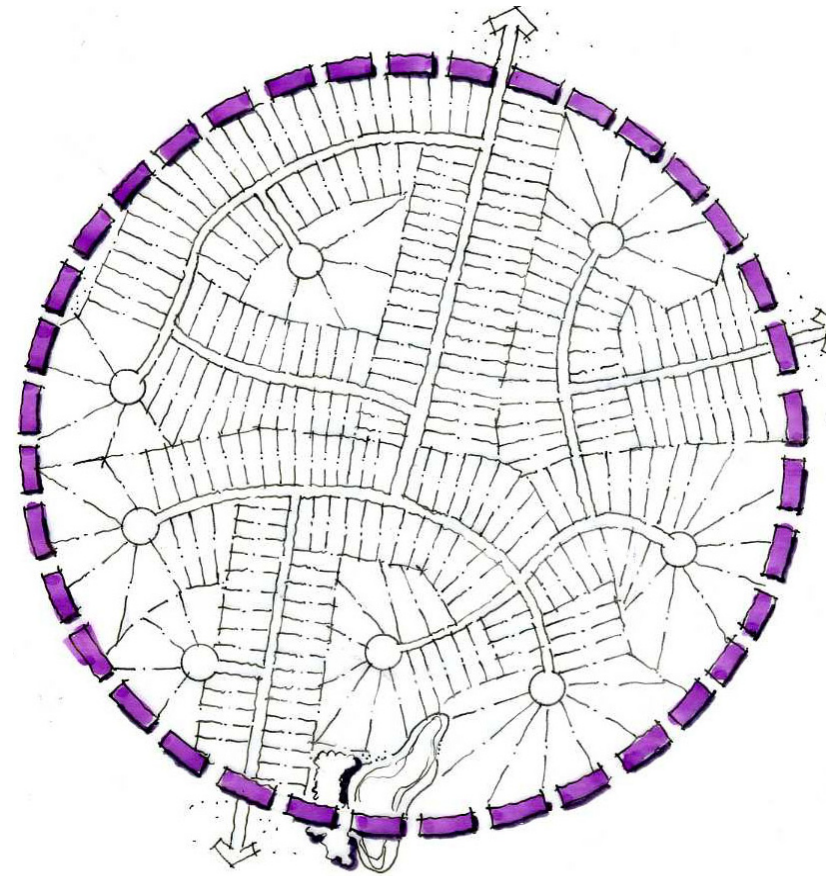
PROPOSED US 17 CORRIDOR DEVELOPMENT PATTERN ▶

NEIGHBORHOOD MODEL DEVELOPMENT

Research over the past decade has shown that the average comfortable walking distance for Americans is approximately a quarter-mile or a 5-minute walk. Public health studies (e.g. Dannenberg, Jackson, Frumkin, and Schieber, “The Impact of Community Design and Land-Use Choices on Public Health: A Scientific Research Agenda”) also show that walking regularly can provide substantial health benefits, especially if walking is incorporated into the routines and trips of daily life. Many suburban residential layouts, even if sidewalks are provided, often do not provide either a safe or attractive walking environment.

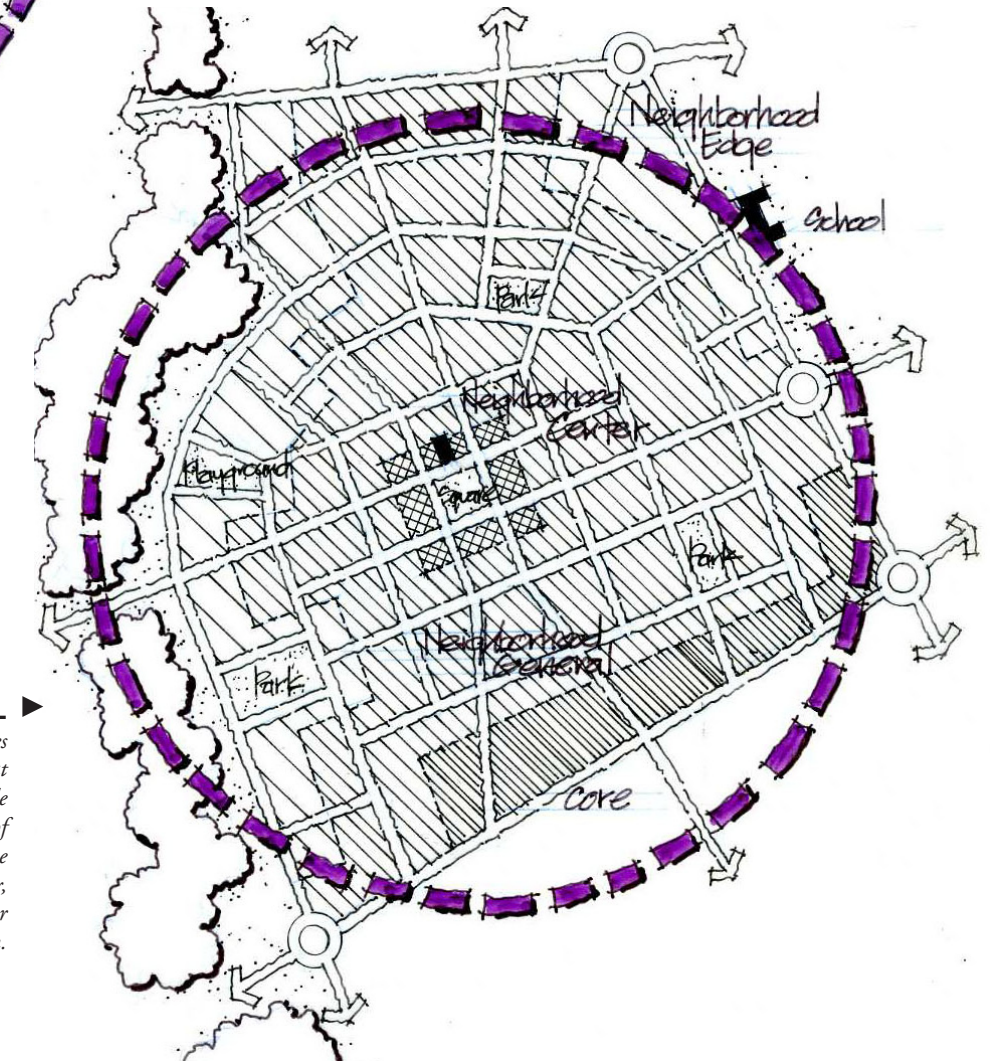
By contrast, the most interesting walks (and therefore those that are undertaken regularly) either have a clear destination—as opposed to just walking around—and/or provide a lot of visual interest and the opportunity for casual social interaction with neighbors. The second diagram (bottom right) shows how a traditional development pattern can provide both destinations and visual interest within the neighborhood and thus maximize the opportunities for walking regularly, with all its health benefits.

Each traditional neighborhood within the quarter-mile radius would, in its “pure” form of mixed housing types at higher densities for smaller households as well as families, normally house approximately 2,500 residents at an average density of approximately seven dwellings per acre. (This is a mix of single-family detached, town homes and apartments). In the context of Leland’s planning preferences for lower densities and the demographics of its citizenry, each model neighborhood would provide homes for a much smaller number, somewhere in the region of 850 people at an average density of approximately three dwellings per acre. Application of this concept to the developing areas in the US 17 corridor is discussed on the page that follows.



◀ CUL-DE-SAC NEIGHBORHOOD MODEL

Limited Connectivity (and limited mix of uses): The diagram of the quarter-mile radius (5-minute walk; 125 acres) circle superimposed on the typical suburban subdivision plan shows how walking is difficult without a pattern of connected streets or any variation in the environment to provide destinations or a variety of experience. Because of numerous cul-de-sacs, much walking has to be done on the busier collector streets that connect, and thus pedestrians have to deal with higher speed traffic and higher traffic volumes.



▶ TRADITIONAL NEIGHBORHOOD MODEL

Connectivity and a mix of neighborhood-serving uses: The concept includes playground, parks, school, neighborhood retail; and 850 housing units at approximately 3 units/acre. This preferred neighborhood design has an identifiable center organized around a small public square or green, a connected network of local, slow-speed streets, and a pattern of collector streets and preserved open space along its boundaries. Certain collector streets might become the location for denser, mixed-use development as neighborhood centers within the overall S-4 sector designation.

US 17: EXTENDED NEIGHBORHOOD STRUCTURE

The diagram opposite indicates the conceptual plan of the area between US 17 and NC 133 organized as a series of model traditional neighborhoods instead of the generic suburban layout currently in progress. The thirty-nine quarter-mile radius circles each house approximately 850 citizens, giving a total of 33,500 residents at relatively low densities—close to the nominal figure of 35,000 noted as the likely population increase in the same area under current plans previously approved for Brunswick Forest and Mallory Creek.

Commercial development in the form of local neighborhood centers could be accommodated in key locations and intersections along collector streets. The amount of land needed for adequate school sites and parks within this very extensive development area would lead to some slightly higher residential densities in some parts to maintain the approximate population levels projected from existing permitted and planned development.

In the proposals illustrated in this plan, the opportunities for a variety of housing types to suit local demographics is also supported by patterns of development that respond more sensitively to existing environmental conditions. For example, this may create opportunities for conservation subdivision design (where houses are grouped on smaller lots in order to preserve large areas of undisturbed forest and/or wetlands); or for dispersed pockets of attached single-family town homes to create the required number of permitted new homes in a smaller area without clearing and regrading the whole site for detached house lots, thus saving existing natural features and environments.

UPDATES TO THE COLLECTOR STREET PLAN

As noted in the Transportation Section, a greater level of interconnection between developments is necessary to create route choice; flexibility for day-to-day operations for area residents and Town services; and for the integration of bicycle and pedestrian movement. Even more important is the ability for the circulation pattern to function well under emergency conditions, either in terms of accessibility for the emergency services of fire, police and EMT, and also for the mass evacuation of this low-lying land under hurricane warnings. The conceptual plan of the multiple model neighborhoods superimposed over this quadrant of town indicates (as white lines) suggested revisions and updates to the adopted *Town of Leland Collector Street Plan* to reinforce the patterns of improved connectivity.

KEY RECOMMENDATIONS FOR NEIGHBORHOOD DEVELOPMENT

Use the Neighborhood model

The preferred neighborhood design has an identifiable center organized around a small public square or green, a connected network of local, slow-speed streets, and a pattern of collector streets and preserved open space along its boundaries. Certain collector streets and key intersections might become the location for denser, mixed-use development as neighborhood centers serving the surrounding area.

Require land for schools and parks

The amount of land needed for adequate school sites and parks within this very extensive development area would lead to some slightly higher residential densities in some parts to maintain the approximate population levels projected from existing permitted and planned development.

▼ **QUARTER MILE RADIUS NEIGHBORHOODS CIRCLES**
A small area plan based on the 5-minute walk neighborhood unit and revised collector street alignments (shown in white)



Encourage a range of residential densities

A range of densities allows property owners to incorporate a variety of housing types to suit local demographics. This flexibility also helps to create developments that respond more sensitively to existing site environmental conditions.

Implement the Collector Street Plan

Closer attention also needs to be paid to the approved *Town of Leland Collector Street Plan* and its suggested amendments in this plan. Additionally, several sites for new schools would also need to be identified over and above the inadequate provision currently incorporated in developers' preliminary plans.

EXISTING CONDITIONS: US 17 CORRIDOR

This corridor extends from the location of the planned interchange of US 17 with the future I-140 in the west to the existing interchange with US 74/76 in the east. It is evolving into a high-intensity development corridor with stores and business that draw customers from the region. The major existing features comprise a large and recently opened Wal-Mart super center with associated outparcel development and backed by conventional multi-family apartments on the south side of the highway at Westgate, and a variety of mixed commercial development at the entrance to the Waterford development on the north side of the highway. Also on the north side is a partially developed light industrial area, Lincoln Industrial Park, outside the Leland town limits, and within the town of Belville.

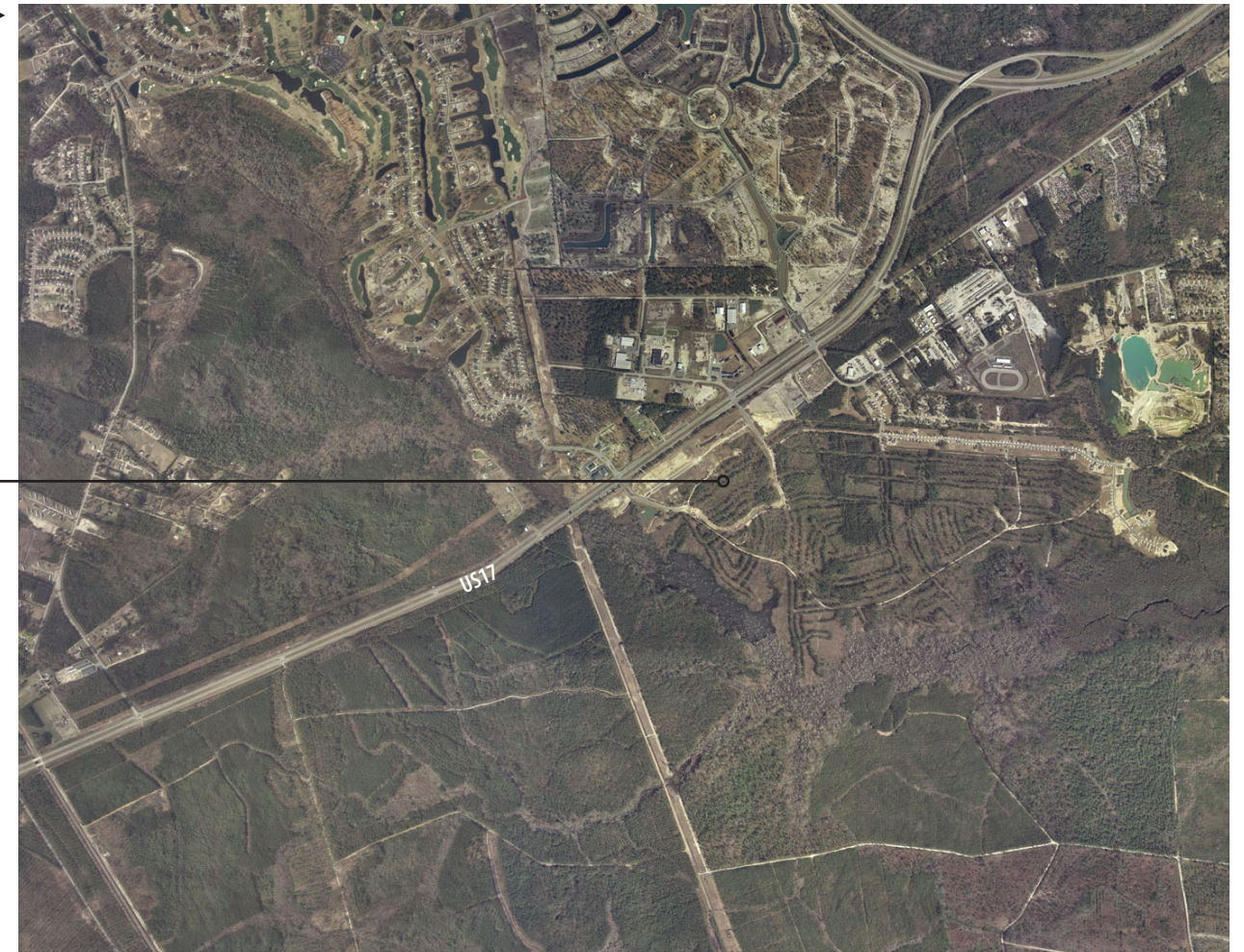
US 17 operates well as a major regional arterial road, moving traffic relatively efficiently through the area. However, in the context of Leland, this highway is also a local road, and in this capacity, while it provides access to different parts of the town on the north and south sides of the roadway it also functions as a major barrier between the separate parts of town.

As development increases on the south side of the highway, citizens living in the extensive subdivisions to the north will have increasing needs and desires to cross the highway. As presently configured it is all but impossible, and certainly dangerous to try to cross the highway on foot or by bicycle, and challenging to do so by car. The configuration of the elongated left turn traffic movements, although effective for cars, has made the situation worse for cyclists and pedestrians trying to cross at grade, and this plan holds out no possibility of this situation changing in the immediate future.

Despite these negative considerations, there are a number of positive attributes to recent commercial developments on north and south sides of the highway. One of the most important of these is the developing system of connected parking lots, especially in the Wal-Mart center through the use of a frontage road. This is a model that could be usefully replicated along both sides of the highway as development continues to grow in those locations. However, this positive factor is offset by the very bleak visual nature of the parking lots themselves, with little in the way of landscaping within and around the large areas of asphalt.

The other positive factor is the quality of several recent buildings that demonstrate a better than average level of architectural design, using more “urban” architectural styles that have the potential for integrating themselves into higher quality, mixed-use developments that are likely to become more common as the property market in the area matures.

EXISTING CONDITIONS ▶



Source: Kimley-Horn Associates



Wal-Mart site with parallel frontage road



Limited landscaping in parking lot



New Medical Office Building

FRAMEWORK PLAN RECOMMENDATIONS FOR US 17 ▼



Framework Plan Legend	
	Study Area
	Proposed I-140
	Interchanges
	Proposed Collector Streets
	Railroad
	Waterways
	BELVILLE
	S-1 Preserved Open Space
	S-2 Reserved Open Space
	S-3 Civic
	S-3 Restricted Growth Sector
	S-4 Controlled Growth Sector
	S-5 Intended Growth Sector
	S-6 Infill/Redevelopment Sector
	Neighborhood Centers
	Regional Centers
	Industrial District

EXISTING CONDITIONS: US 17 NORTH

Areas north of US 17 within the Town of Leland are largely built out with the Waterford and Magnolia Greens developments. However, some large contiguous tracts of undeveloped land do exist immediately to the west of Magnolia Greens, totaling approximately 450 acres. These land parcels have access from Lanvale Road, a local minor arterial, as well as from US 17. The land is dissected by creeks and encumbered with areas of Sector S-1 and S-2 land (Preserved and Reserved Open Space), but these parcels still retain considerable development potential for environmentally sensitive design. The site sits partly opposite the proposed urban village mixed-use development on the south side of US 17 and is zoned for commercial and industrial use by Brunswick County and shown for mixed use on the Brunswick County Future Land Use Map (see map at lower right).

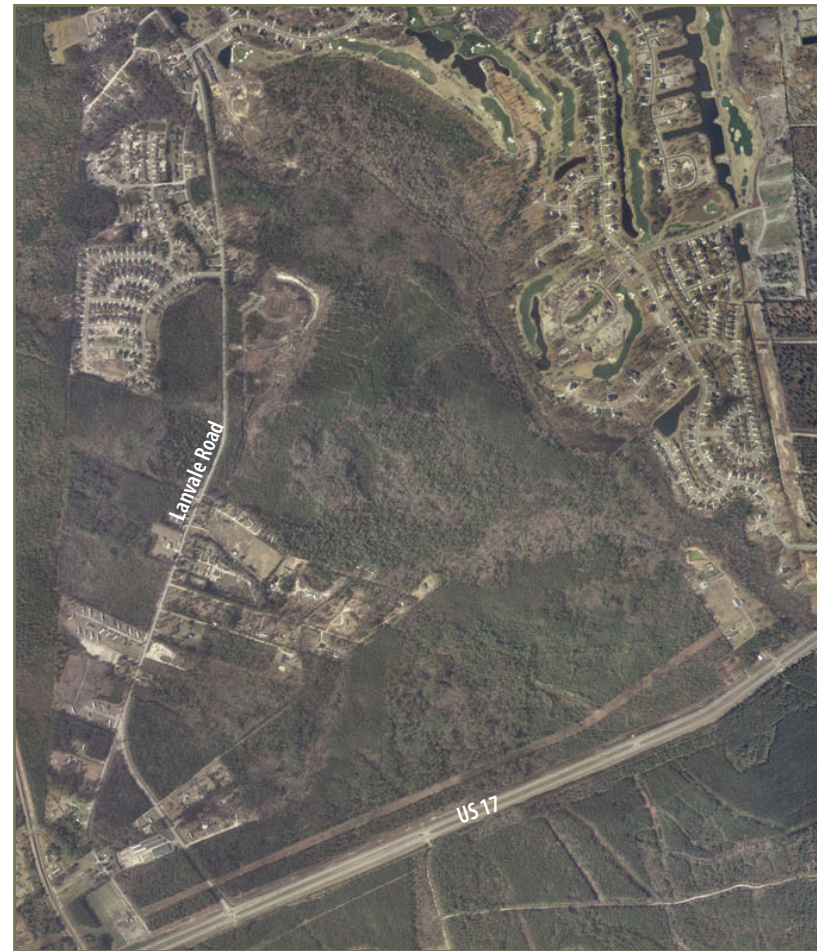
Any development on these pieces of property has responsibilities under the adopted Town of Leland *Collector Street Plan* to provide local connections between US 17 and Lanvale Roads. A connection across the creek along the eastern boundary to the existing Magnolia Greens development is desirable but difficult. An existing power easement runs parallel to US 17 on the north side of the highway. This makes frontage development difficult and in fact encourages the conservation of a desired tree buffer to screen new development from the road and thus avoid the creation of generic strip development all along this important regional arterial highway.

The Framework Plan classifies much of this land as S-2, Reserved Open Space, in line with the NC CREWS "Substantial Wetlands" classification, meaning that only very limited development should be permitted in these locations. However, the future completion of Interstate-140 through the extensive outlying areas, with its new interchanges and improved accessibility could stimulate additional growth in these undeveloped tracts over the next decades.

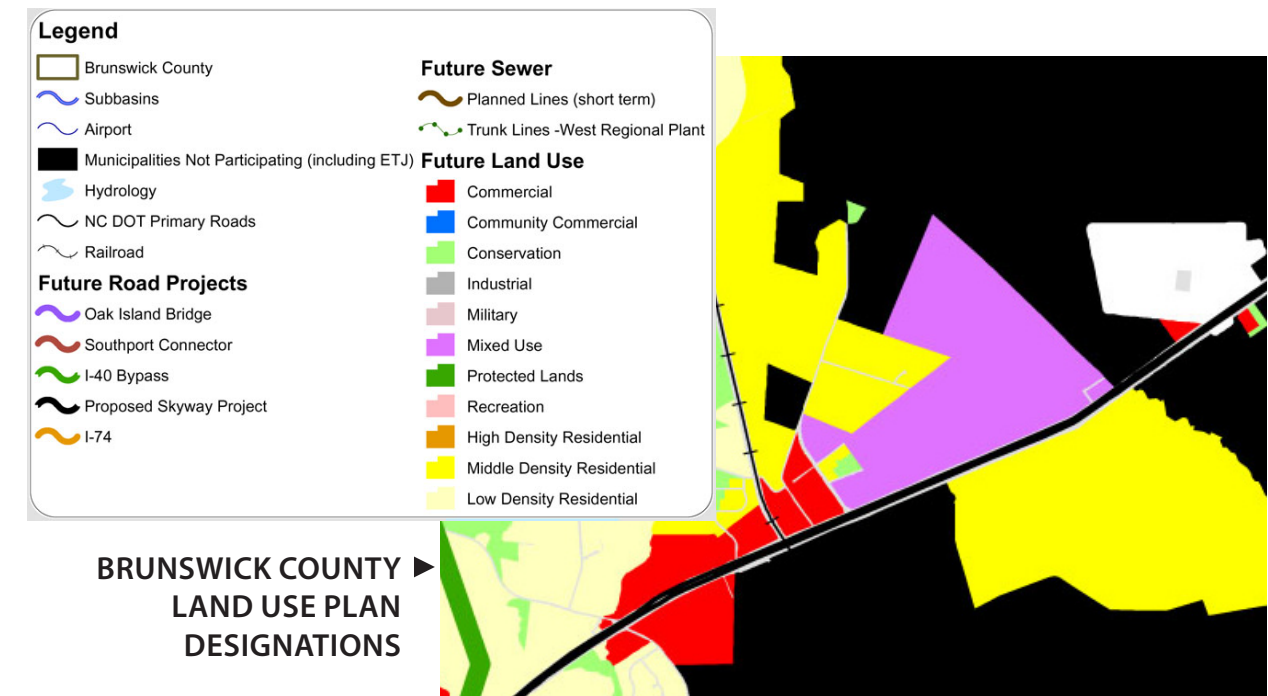
There are also large areas classified as Sector S-3, which has slightly less restrictive expectations for development (albeit at low densities), and future long-term development projections in these areas could have significant impact on future transportation needs within the study area.

Encourage Zoning Designations that Support Mixed-Use and Conservation-Oriented Residential Development

The county's existing zoning designation of most of the parcels as industrial goes against the natural site conditions. In addition to the County's Land Use Plan recommendation for mixed-use, sensitive environmental conditions make large floorplate industrial buildings most unsuitable for the site conditions. To safeguard the quality of future development in this portion of the study area, the Town should actively support the site being rezoned for mixed-use and mixed residential uses.



◀ EXISTING CONDITIONS



NEIGHBORHOOD DEVELOPMENT CONCEPT: US 17 NORTH

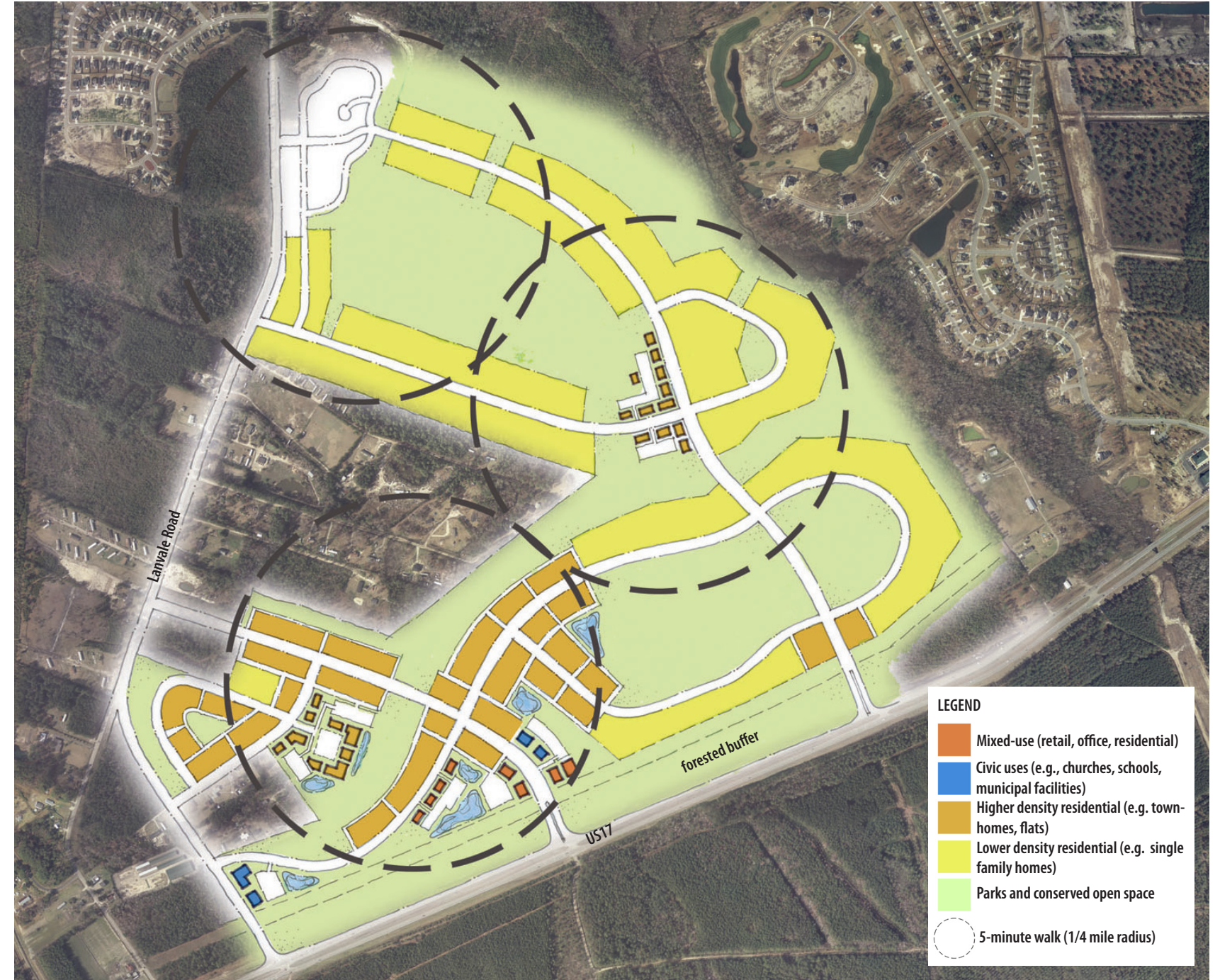
The vacant site on the north side of US 17, opposite the proposed new high-density mixed-use development at the entrance to Brunswick Forest, suggests that the best form of development would be higher density residential and some mixed-use development directly opposite the urban village. (The geometries of the power easement combined with protected creek buffers make larger scale commercial development difficult to insert into this section of the site). Lower density housing combined with large areas of preserved open space could best fit the remainder of the property in the areas most affected by the S-2 designation.

The site plan opposite indicates one version of such an option. One important design premise is the maintenance of a wooded strip for most of the length of the road frontage, between the wide power easement and the road right-of-way, broken only at the main entrance roads, where pockets of higher density development may be seen from the highway.

While conventional wisdom dictates that all site frontages are stripped of all trees (and all character) in the service of maximum visibility, this site has an important opportunity to create for itself a higher standard and higher marketing expectations based on more environmentally sensitive design principles. A wooded buffer along US17 can not only screen development from the noise and fumes of the busy highway, but also create a distinctive “address” by the flourish of mature greenery along what is otherwise becoming a generic “anywhere in America” highway experience. When combined with proposed preserved tree belts on the south side of the highway between the proposed “urban village” and Wal-Mart, this “green gateway” can provide a distinctive entry experience for visitors and residents of Leland.

This plan does not provide a definitive site layout, but illustrates the kind of development pattern that can bring good development returns on an important site while protecting the site’s environmental conditions. Indeed in today’s marketplace, environmentally conscious developments are proving very economically attractive to developers and consumers as home buyers seek to participate in a greener, more environmentally friendly type of development.

▼ NORTHERN SITE NEIGHBORHOOD DEVELOPMENT CONCEPT



DEVELOPMENT CONCEPT

Commercial Space: 80,000 square feet (Retail/Office)

Housing: 530 Units (200 single family homes, 130 townhomes/live-work units, 200 apartments/condos)

Open Space: 115 acres (25%)

NEIGHBORHOOD DEVELOPMENT CONCEPT: US 17 SOUTH

▼ US17 SOUTH NEIGHBORHOOD DEVELOPMENT CONCEPT

The concept for the undeveloped areas on the south side of US17 is intended to show the application of the neighborhood model form of development in a more pure form. A series of 11 villages are shown, each with a radius of 1/4 mile or a 5 minute walk from center to edge. The villages range from the existing Wal-Mart shopping center at the northern most section of the concept plan to a village node that is almost completely devoted to single family development.

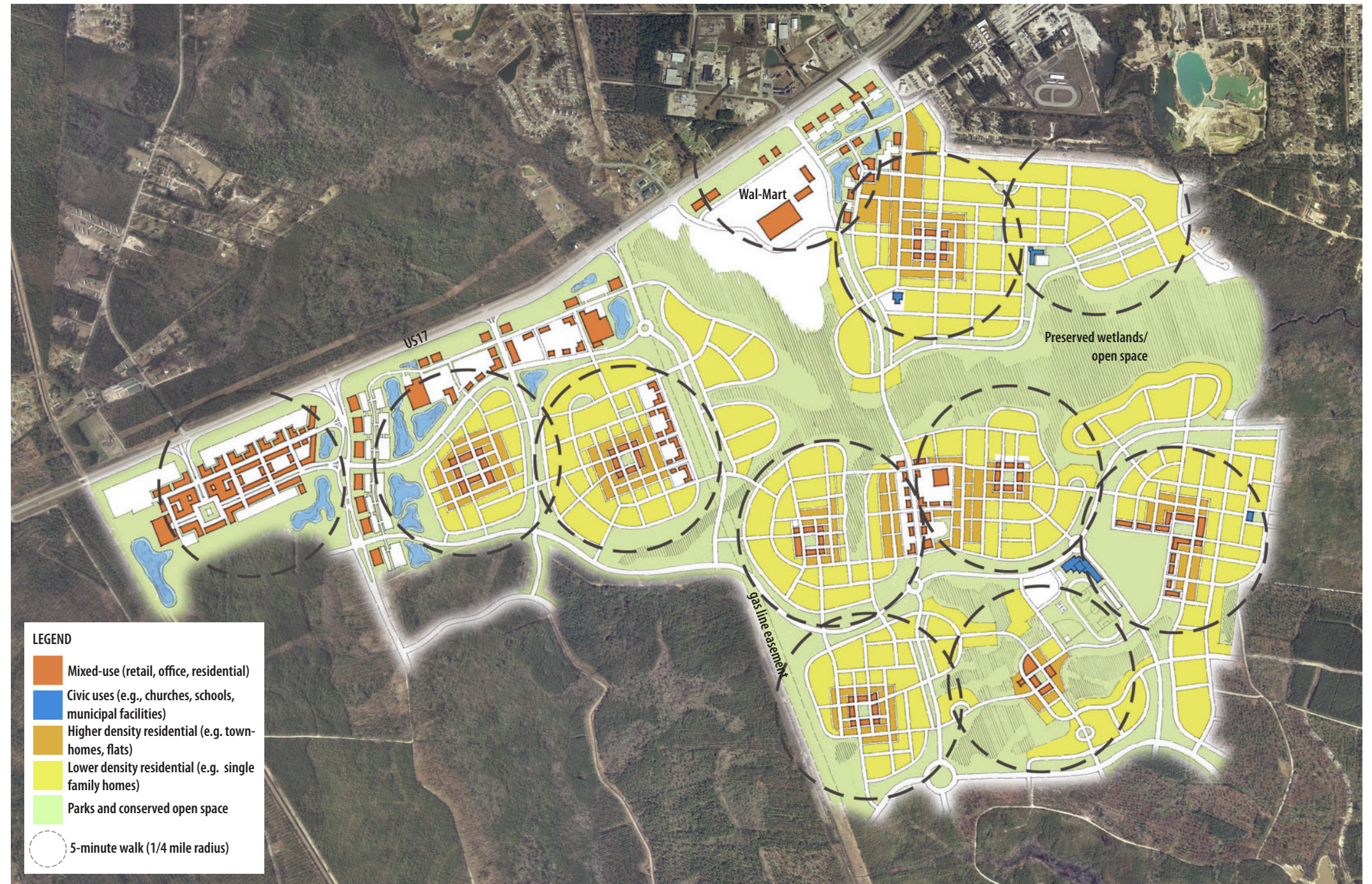
The development of the concept began with identification of sensitive wetland areas. These areas were preserved and neighborhood centers were identified on the remaining prime buildable land. The result is that while nearly a third of the area is undeveloped, the density of development meets or exceeds the level of density that would be allowed under current zoning, but in a more walkable format.

At the southwestern edge of the concept is a mixed-use node of development that is envisioned as a walkable, mixed-use center including retail, office, entertainment, residential, and potentially civic uses. This particular node is drawn in the location of the previously approved commercial center for Brunswick Forest. The concept plan shows how this center could be developed to connect to adjacent development, preserve a green buffer along US17 as well as critical wetlands on the site, and at the same time maximize development potential. The development in this location was drawn as a series of mixed-use buildings that are 2 to 5 stories in height.

A series of higher density mixed-use buildings is drawn along the US17 corridor. These are modeled after the type of high-quality, multi-story buildings that are currently being built along the corridor.

The other neighborhood nodes include a mixture of single-family and higher density residential uses, some neighborhood-serving commercial uses in mixed-use buildings (envisioned as 2-3 stories tall), and some civic uses such as schools, parks, and churches. In most cases, the neighborhoods are organized around a central green space or square for the surrounding residents and businesses. These neighborhoods, while typically denser (at 6 to 8 dwelling units per acre) than conventional subdivisions, are inherently more walkable and provide more usable open space.

Each neighborhood is connected to the other by a fairly fine-grained series of local and collector streets, following the recommendations of the revised collector street alignments and using the least environmentally sensitive land.



LEGEND

- Mixed-use (retail, office, residential)
- Civic uses (e.g., churches, schools, municipal facilities)
- Higher density residential (e.g. townhomes, flats)
- Lower density residential (e.g. single family homes)
- Parks and conserved open space
- 5-minute walk (1/4 mile radius)

DEVELOPMENT CONCEPT	
Commercial Space: 700,000-850,000 square feet (office/retail)	Housing: 4000-7,000 units (single family, townhomes, apartments/condos) at net densities of 3 to 6 units an acre
	Open Space: 25-30% (parks and preserved natural areas)

US 17 CORRIDOR: GENERAL RECOMMENDATIONS

Develop Elevated bike/ped connections across US17

To provide a longer-term alternative to always having to use automobiles to move around this area of town for every type of journey, the plan recommends future consideration of grade separated crossings for bicycle traffic elevated above the highway. While these would also be accessible to pedestrians, the distances between commercial facilities either side of US 17 makes movement by bicycle a much more feasible and attractive mode of mobility rather than walking.

Establish frontage roads Parallel to US 17

The Wal-Mart center's use of a frontage road and the developing system of connected parking lots is a model that should usefully be replicated along both sides of the highway as development continues to grow along US 17. Well-connected parking lots allow customers to move between separate stores without having to drive back onto the highway, thus avoiding mixing short, stop and start local movements with fast-moving, regional, long-distance traffic. Ultimately, this embryonic connectivity could transform into a properly connected network of secondary streets on either side of US 17. This would allow slow-moving local traffic to move efficiently without have to get onto the high-speed highway, with the consequent safety and congestion problems that arise from this confusion of modes.

The Town will have to work with existing developers to establish this system of connected streets. The frontage road concept is shown in the conceptual development plans for US 17 and should be mandated for development along the corridor through the Town's regulatory ordinances. The frontage roads should be added to the collector street plan and required to be implemented as a collector street.

Enhance landscaping requirements

An important part of enhancing development along the US 17 corridor will be to enhance landscaping requirements for parking lots and for the frontage along the highway. The Town should increase the amount of landscaping required in parking lots (and require or incentivize the use of low impact development measures for storm water management) and establish design guidelines for landscaping along the US 17 corridor.

Good landscaping in strategic locations that shades parked cars and areas used by pedestrians can do a lot to offset the "urban heat island" effect of large open parking areas, thus producing a better local micro-climate, more comfortable conditions for customers, and taking a small step towards mitigating global warming. This landscaping can also improve water quality through the use of "low-impact design" techniques such as on-site infiltration with "rain gardens" and drainage swales. The use of indigenous plant varieties is also strongly encouraged.

Develop Design Guidelines for Corridor

Despite some notably good new buildings in the US 17 corridor, this encouraging level of architectural design is not universal. The new Wal-Mart supercenter demonstrates disappointingly few such architectural attributes in the design of its "big-box."

The *Grow Greener in Leland* report recommended design standards for all new development and special design requirements for the US 17 corridor in particular. A special overlay district with design standards for new development on the corridor should be the outcome of a more in depth study of appropriate landscape, signage, and architectural treatments.

Further development possibilities exist further west along US 17 at its future intersection with the proposed new I-140. It is very likely that considerable commercial development will take place around this intersection, and design controls would need to be in place to avoid this area developing as yet another generic and placeless location that could be anywhere in America. As a place that can provide a visitor with his or her first impression of the Leland community, it is important that some distinctive ambience be created, one that leaves a positive resonance in the mind of visitors and locals alike.



Frontage road with new development along US17 at Wal-Mart site



Rain garden with natural vegetation designed to capture stormwater run off from parking lot

US17 CORRIDOR: REDEVELOPMENT OF COMMERCIAL CENTERS

At a more detailed level of design, the large parking fields and generic outparcel pattern of buildings in the Wal-Mart development were conceptually redesigned in a series of phased improvements to “urbanize” the character of the development and densify its uses. This enables the strip development to relate more effectively with current development trends and consumer demands for more visually interesting shopping environments and more varied shopping experiences.

The series of aerial sketches on this page show the phased infilling of the outparcels with more urban buildings that face onto the frontage road that links the parking lots, turning it into more of a “mini-Main Street” condition. This begins to meet shoppers’ higher expectations of their environment and provides economic opportunities for a wider range of retail businesses. In later phases, the big box store itself can be faced with smaller stores and the parking lot infilled with other small commercial buildings to create a series of urban streets in a block configuration. The block configuration of streets allows for a greater diversity of development opportunities over time. Ultimately, when the big-box has reached the end of its useful life (usually in 10-15 years) or moved to another location, the site can be fully redeveloped to include a mix of uses including retail, office, and even housing to create a complete neighborhood center.

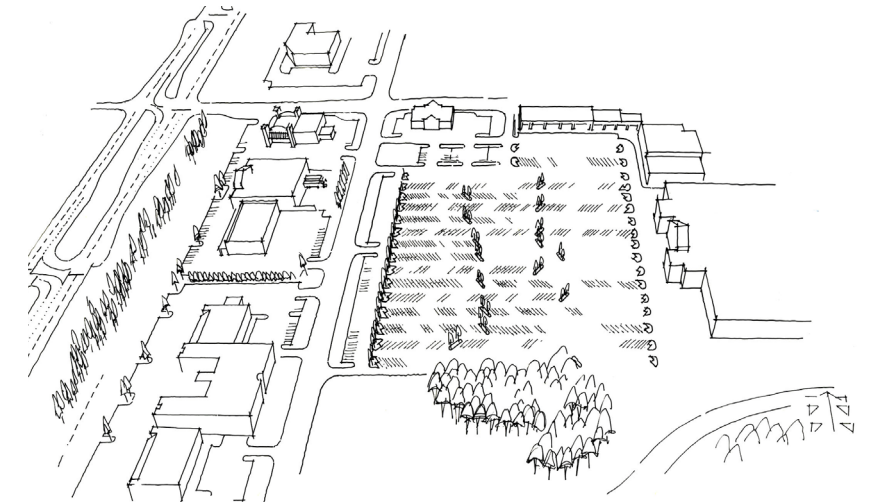
The Town’s role in facilitating such future redevelopment is to encourage and require that large sites be developed with a network of streets or potential future streets. Development can grow along these frontages over time.



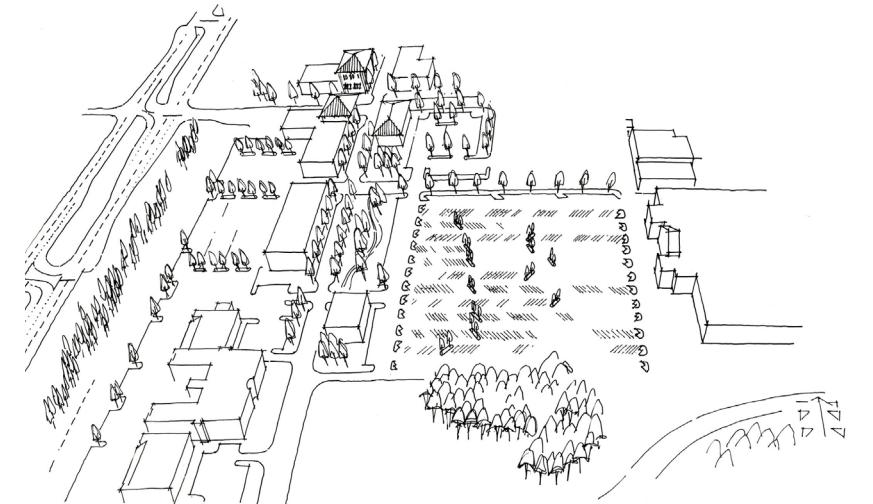
Existing Wal-Mart Development site with emerging frontage road



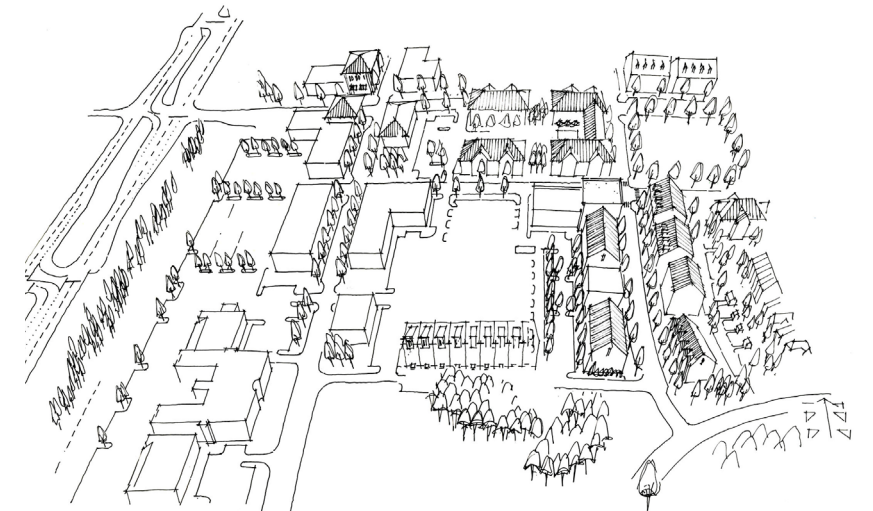
Wal-Mart Development Site looking east



▲ PHASE 1: Infill of parking areas to create small shops

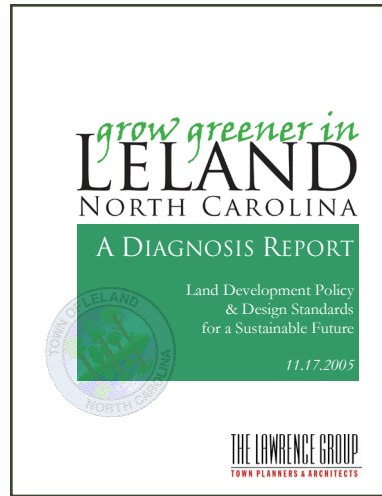


▲ PHASE 2: Additional infill with buildings on each side of frontage street



▲ PHASE 3: Redevelopment of big-box building into neighborhood center-scaled buildings

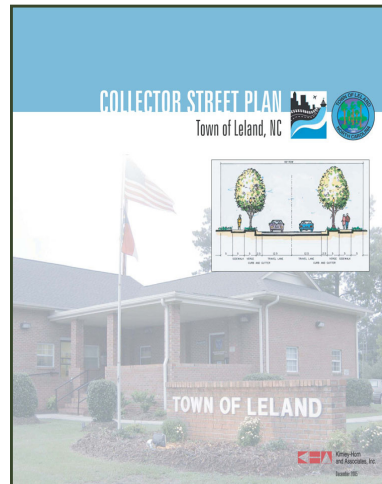
INTERIM REGULATORY REVISIONS



Growing Greener Report 2005

The development visions created as part of this plan cannot legally be developed under the Town's current zoning and subdivision regulations. A comprehensive rewrite of the Town's regulatory ordinances is recommended by this plan and is already contemplated by the Town as an implementation step following plan adoption. However, a complete ordinance rewrite will take 12 to 24 months or more to complete and get adopted.

In the meantime, implementation of the interim regulatory changes recommended in this document as well as in the *Grow Greener in Leland* report and Leland's *Collector Street Plan* would go a long way towards furthering the goals of this plan and the community's objectives. The recommendations in these adopted planning documents remain valid and consistent with the community's vision and goals for Leland. The *Grow Greener* report includes a number of specific text change recommendations for the current ordinances.



Collector Street Plan - Kimley Horn Associates 2005

Some of the most important and relevant recommendations from the *Grow Greener* and *Collector Street Plan* documents include:

Develop Design Standards, Especially for Non-Residential and Multifamily Development

The Town should consider applying design standards, at a minimum, to all non-single-family building. Design standards for residential development may not be as politically palatable in Leland. However, there is merit to applying some design standards to single family homes on narrow lots to avoid the "cookie cutter" feel as well as to mitigate the impact of garages and driveways on the streetscape. Design standards for buildings should address the following basic elements:

- Location on lot (consider maximum setbacks in some districts);
- Street Walls;
- Building Entrances;
- Roof Treatments (pitched roofs and parapet walls);
- Facade Treatment (window proportions, architectural treatment, roofline offsets);
- Encroachments (bay windows, balconies, awning, arcades, etc.);
- Buildings Materials (brick, stone, and siding); and
- Infill design standards (relationship to neighboring buildings).

Additionally, the current commercial zoning district requirements, specifically the building setback requirements, do not achieve the desired results of improving the overall street aesthetics and the pedestrian realm. Ideally, a walkable commercial street environment requires the following elements: low travel speeds, on-street parking, canopy trees in a planting strip or tree wells, wide sidewalks (8-16 feet) to accommodate pedestrians and/or outdoor seating & displays and buildings built

close to the street (preferably, 12-20 feet from the back of curb). These standards are certainly appropriate in the Village Road area and on internal commercial streets in new developments and in neighborhood centers.

Develop Design Standards for the US 17 Corridor

The US 17 corridor is becoming a major regional retail destination. Already, a Super Wal-Mart store is in operation; other retail developments are under construction or planned; and there are major undeveloped or redevelopable tracts along the corridor. While Leland citizens and Town officials are pleased with the prospect of regional retail destinations in the Leland, they are concerned that the aesthetics and the function of the corridor may be compromised.

The design standards recommended above should certainly apply to new commercial development in this corridor, and this plan also recommends design regulations tailored to the issues of US 17. These standards could be applied as an overlay district in the near term and/or as new district standards in the long term if the zoning code is rewritten. The design standards should be based on a more detailed study of the corridor that would consider the following variables:

- Type (formal or naturalistic) and width of screening
- Type (pole or monument) and size of signage
- Provision of pedestrian/bicycle accommodations along and across the corridor
- Provision of a frontage road
- Recommendations for parking location

Allow Pedestrian-oriented, Mixed-use in Commercial Districts

If Leland wants to develop a vibrant, mixed-use, walkable downtown area as envisioned in this plan including retail, offices, institutional uses and other walkable mixed-use nodes, then higher density residential development must be allowed to be developed in and near centers of commercial development.

This plan recommends that Leland consider in the near term allowing uses such as apartments, bed & breakfasts, group housing, condominiums, duplexes and triplexes, quadraplexes, and townhouses by-right in the C-1, C-2, and O & I zoning districts. These uses are currently only allowed in the PUD and MF districts, although single family dwellings and mobile homes are allowed in the commercial districts. Market forces are already proving the demand for higher density residential in and near downtown with the recent rezoning for and development of apartments and townhouses along the Village Road corridor.

In addition, if the Town desires to create truly memorable pedestrian-oriented commercial districts, there are certain uses allowed in the C-1 and C-2 districts that are not appropriate for such areas. Specifically, uses such as "kennels," "seafood processing," auto-oriented or heavy commercial uses such as car washes, auto dealers, "farm equipment sales," "mobile home sales," "mini-warehouses," "boat storage," and "towing services" should not be allowed in the pedestrian-oriented commercial areas. These are uses that usually require greater land area, may need to be screened for aesthetic purposes, and are generally drive-up, destination-oriented uses that are dependant on pass-by traffic. These uses are certainly needed in Leland, but their location can be limited to locations that are not in the area that the Town intends for its most pedestrian-friendly districts. This plan recommends that the Town reclassify such uses for C-3 zoning districts and concentrate these in appropriate locations.

Establish a Mixed-Use Zoning District

The *Grow Greener in Leland* report recommended that Leland establish a specific mixed-use zoning district. This plan concurs in that recommendation and suggests that such a district be applied in downtown and the other areas noted in the Framework Plan for neighborhood and regional center development.

Focus Commercial Zoning in Neighborhood and Regional Centers

Leland and Brunswick County zoning maps reveal that commercial zoning is primarily located in strips along the area's major roadways and at highway exits. The type of commercial development existing and permitted is oriented primarily towards automobile access: strung out, one lot deep, along roadway corridors to provide maximum visibility to passing cars. As discussed in the Framework Plan section, centers of mixed use development that occur throughout an area and that are usually no more than a 1/4 mile in radius (or a 5 minute walk) are more conducive to pedestrian access.

Furthermore, as is the case in most towns, there is more land zoned for commercial development in Leland than can adequately be absorbed by the market. This plan recommends that the Town consolidate commercial zoning into neighborhood or regional centers as identified in the Framework Plan that can become truly mixed-use, walkable districts.

The Town should consider rezoning underutilized properties or properties that are not likely to support commercial uses between identified commercial centers to other uses—perhaps higher density residential, or office/institutional or other types of development—that are consistent with the Framework Plan recommendations. This issue is especially acute along Village Road and Old Fayetteville Road, where commercially zoned property extends beyond where it can be

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conveniently accessed on foot by many residents or where commercial development should be focused based on the Town's goals of creating a vibrant downtown environment and a walkable community. Coupled with the other recommendations above, focusing commercial zoning in nodes will help to create more compact, walkable centers of development.

Focus Higher Density Development near Commercial Centers

The highest intensity zoning for both residential and non-residential uses should be focused around the neighborhood and regional centers identified in the Framework Plan. The normal order of density progression is to concentrate people and activities closer together around downtowns and commercial centers to provide efficient service and encourage a healthy, vibrant pedestrian environment. This is not the case in Leland. Most of the area allowing higher density residential (MF and PUD, permitting at least 13 units per acre) is the far from Leland's traditional town center or emerging and recommended regional and neighborhood centers, in locations that do not have sufficient public infrastructure such as roads, schools, libraries, as well as basic commercial services such as shops that can offer basic household goods. This results in more automobile trips, which results in more congestion and other ills associated with increased traffic. In contrast, the Town's least dense zoning district, R-20 (at 2 units/acre), is the closest residential district to the downtown.

Enhance Environmental Standards for New Development

Protection of Leland's rich natural resources is a priority for the Town and its citizens. As such, development regulations should reflect this priority. For example, the Town should include the implementation of Low Impact Development (LID) standards as an accepted method for permitting similar to those adopted by the Town of Huntersville, NC. According to Huntersville's Ordinance, "the goal of LID is to develop site design techniques, strategies and BMPs [best management practices] to store, infiltrate, evaporate, retain, and detain runoff on the site to more closely replicate pre-development runoff characteristics and to better mimic the natural and unique hydrology of the site thereby limiting the increase in pollutant loads caused by development" (www.huntersville.org). In developing areas, these techniques may range from conventional underground retention to rain barrels and planted ("green") roofs.

Other regulatory changes that should be implemented to improve the environmental impact of new development include: establishing minimum riparian buffer widths for streams and prohibiting development in the 100-year floodplain (as detailed in the Framework Plan section); revising tree and landscape protection and open space requirements; reducing parking requirements; developing low-impact and context-sensitive street design standards.

Revise Tree & Landscape Protection Requirements

Much of the beauty of Leland is drawn from its natural surroundings with the rivers, marshes, floodplains, and forests. Hundreds of acres of previously forested lands in and around Leland have been and are being cleared for new development in recent years. Losses of forest are affecting wildlife habitat, water quantity (flooding), as well as water and air quality.

There are number of available techniques for protecting forests ranging from fee simple purchase and conservation easements to development restrictions. The following issues must be addressed in developing tree protection regulations:

- Woodland Protection versus Individual Tree Delineation.
- Location: Where (in what locations) should tree preservation requirements apply?
- Amount: How many trees should be protected?
- Mitigation: Mitigation requirements should prescribe the number of replacement trees needed to replace an existing tree, and where the replacement trees must be located. And,
- Protection During Construction.

This plan recommends the use of a sliding scale of site evaluation in regulatory standards that preserves trees and other environmental features based on maximum permitted density; open space requirements, and minimum forest protection based on the following site features:

- **Prime Buildable.** Land with little or no building restrictions that occur as a result of slope conditions or site topography.
- **Secondary Buildable.** Such areas require selective clearing and grading.
- **Conserved.** These areas offer optimal opportunity for the preservation of existing tree canopy, forest stands, or significant vegetation outside of satisfying open space dedication requirements.
- **Preserved.** Natural floodplain and floodways, wetland areas, existing tree canopy, and forest stands that should be preserved.

Enhance Open Space Requirements

Currently the Town requires open space from all residential subdivisions at a rate of ½ acre minimum or 5%, whichever is greater. (This formula disadvantages small subdivisions and infill locations since subdivisions of 0.1 to 10 acres would be required to provide at least ½ acre of open space.) While this formula provides a simple and easily administered approach, this plan recommends that the Town consider additional approaches and standards to account for the different types of new development that is occurring in Leland (single family, multi-family, and mixed-use) and to promote variety in the types and locations of open

space provided. The type and character of the urban open space should be influenced by the surrounding uses (e.g. retail, office) as well as by the prospective user groups (e.g., workers, shoppers, youth). Furthermore, the Town should give preference (through requirements or incentives) to open spaces that are accessible to all citizens of the Town and not just the homeowners in a given development.

The Town should also consider a payment-in-lieu-of-dedication option for developers where it isn't practical to dedicate a reasonably sized tract or where the development is close to another park or open space that can be improved.

Develop New Street Design Standards

This plan recommends that the Town adopt and require new street design standards for all streets. The design standards should include requirements for appropriate pedestrian, bicycle, and landscaping infrastructure based on the land use context and the type of street.

The Town of Leland currently uses the NCDOT *Subdivision Streets Manual*. This standardized manual has been designed primarily for rural developments in unincorporated areas where few, if any, urban services are being provided. The NCDOT minimum dimension for subdivision streets is excessive for in-town neighborhoods. Not only is it more expensive to build these roads (a cost that is passed on to the home buyers), but the width encourages speeding. In addition, this width also significantly contributes to storm water runoff with its increase in impervious surface.

For single family suburban neighborhoods like those in Leland, the roadway width may be decreased up to 6 feet (to 20 feet in width) with no perceptible impact on service delivery. This dimension permits occasional on-street parking. Where on-street parking is expected with higher frequency, a minimum width of 24 feet is recommended. Neighborhood streets should be low speed, so additional width for safety purposes is unwarranted. Recommendations for collector street dimensions are included in the *Collector Street Plan*.

Finally, this plan strongly recommends that the Town require all streets in new developments to be public streets so that all citizens of the Town and the Town's service providers can benefit from the street network that is created through the development process. Private streets should not be permitted.

Revise Streetscape Requirements

Streets, as the largest public investment of any community, should be designed to serve all roadway users-including pedestrians, cyclists, and motorists and property owners who front on the street. Sidewalks

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should be required in all new development in the town and should be a minimum of five (5) feet the space required for two adults to walk side by side in most residential developments and six to twelve (6-16) feet wide in higher density and mixed use developments.

In addition, streetscape standards should include the planting of shade trees at regular intervals (preferably an average of 40-50 feet). To accommodate the trunk and root system of the street trees, the planting strip between the curb and the sidewalk should be a minimum of 6 feet in width, but preferably 8 feet. This plan also recommends that the Town develop a list of approved tree species for planting strips and other streetscape applications (preferably, trees such as Live Oaks that are adapted to the local area are best). The consistent planting of trees within the right-of-way ensures a long term public amenity, provide protection to pedestrians, improves air and water quality, and creates a consistent visual aesthetic along a corridor regardless of the phasing of the development.

Reduce Setback requirements and Use Density-based Zoning Districts

All of Leland's primary zoning districts are governed by minimum lot sizes with relatively large setbacks. By permitting a reduction in front setbacks, such as 10 feet instead of 25 feet, house lots can increase the private, usable space of the rear yard as well as the building envelope and increase pedestrian-orientation of the street by bringing buildings closer to the sidewalk.

Minimum lot dimensions also determine residential density in Leland. A more flexible tool is the application of base density requirements for new development. Base density requirements can aid in neighborhood design by permitting (but not necessarily requiring) clustering to preserve environmental features and the use of a variety of lot sizes within close proximity while regulating the actual number of units that impact surrounding infrastructure.

Revise Connectivity Standards

Recommendations for improved connectivity standards are discussed in detail in the Transportation section as well as in the collector street plans and the *Grow Greener* report. This plan also recommends the following related standards:

- Maximum block lengths: 800 to 1000 feet (depending on the density of development and/or the Transect category)
- Limits on the use of cul-de-sacs: only to be used with topographic or other conditions permit no practical alternative;
- Maximum cul-de-sac lengths: 250 feet; and
- Pedestrian/bicycle connections: through blocks longer than 800 feet, between neighborhoods, and across streams

Revise Parking Standards

Leland is to be commended for its simplified and fairly progressive approach to minimum parking standards. Unlike most jurisdictions, Leland has minimum parking requirements which are below national standards in many cases. This allows developers to determine the amount of additional parking they wish to provide based on local market demands.

This plan recommends that for non-residential developments of less than 15,000 square feet the parking requirements be reduced to 2 spaces per 1000 feet of leasable space. In addition, some of the current parking requirements are based on employee or customer count, which is a variable number. For ease of administration, it would be better to base the parking requirements solely on square footage and use.

This plan also recommends requiring bicycle parking for all multi-family and non-residential uses. Bicycle parking should be roughly based on five bicycle spaces per 100 car parking spaces for most commercial and office uses to begin with.

Lastly, this plan recommends establishing a threshold of maximum parking requirements beyond which the use of pervious pavement systems would be required. Non-residential developments that provide more than 3 spaces per 1,000 square feet should provide all of the excess spaces using pervious pavement systems. This standard is consistent with the general desire to reduce impervious pavement for the reduction of stormwater impacts.

Revise Buffering/Screening Requirements

The Town's buffering/screening requirements are very reasonable compared to many municipalities. This plan's primary recommendation would be that no buffering/screening be required between residential uses in mixed-use districts or developments. Further, buffering between commercial uses in a PUD and surrounding residential uses should only be required where no street connection is proposed. If a street connection is provided between development in the PUD and adjacent development, then no screening should be required so that a relatively seamless development pattern can be maintained. Finally, requirements for screening of front yard parking for commercial uses; and trees in parking lots internal to the parking area (rather than at the sides in order to provide shade and storm water capture throughout the lot) should be included in ordinance requirements.

Allow Conditional District Zoning

Currently, rezoning applications in Leland are handled as base district map amendments. While this is certainly efficient and simple, it lacks the details that most neighborhood groups are interested in when they

attend a public hearing. The use of Conditional Districts permits the applicant to submit additional information along with the application including a voluntary limit of the types of uses as well as a site specific plan. This type of submission is very useful to surrounding property owners and neighborhood groups who would otherwise be afraid of the "worst case scenario" that the base zoning district would permit. This plan recommends that the Town allow conditional district zoning as currently allowed under North Carolina law.

Require Transportation Impact Analyses

A Transportation Impact Analysis (TIA) is a specialized study that evaluates the effects of a new redevelopment's traffic on the surrounding transportation infrastructure. It is an essential part of the development review process to assist developers and government agencies in making land use decisions involving annexations, subdivisions, rezonings, special land uses, and other development reviews. The TIA helps identify where the development may have a significant impact on safety, traffic and transportation operations, and provides a means for the developer and government agencies to mitigate these impacts.

Ultimately, a TIA can be used to evaluate whether the scale of development is appropriate for a particular site and what improvements may be necessary, on and off the site, to provide safe and efficient access and traffic flow.

At a minimum, a TIA should be required for developments with an estimated trip generation of 3,000 vehicles per day or greater during an average weekday based on a five day national average as defined in the ITE Trip Generation Manual. Typically, the following developments meet or exceed the 3,000 vehicles per day threshold:

- 55,000 square feet of retail
- 300 Single family homes
- 250,000 square feet of office
- 400,000 square feet of industrial
- 350 room hotel

The *Collector Street Plan* recommends requiring traffic impact studies, prepared by a professional engineer, to accompany all development applications that may generate any of the following:

- An increase of 100 or more peak hour vehicular trips
- An increase of 1,000 or more daily vehicular trips
- Any other development at the discretion of the Town planning staff