

DRAFT

US 64–NC 49 Corridor Study

Land Use Policy Guidelines for Mobility Protection

Prepared for:



Prepared by:

LandDesign.

January 2005

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1.0 Introduction

Defining the ideal relationship between land use and transportation has long been a conundrum for those involved in the planning of either. A number of studies have focused on the impacts of new roads on land use, because improvements to the transportation network increase access to land parcels, which often brings more opportunities for development and growth. Several such studies have concluded that, while new roads have little to do with the rate of growth in a region, they do shape our cities and towns by attracting new development and redevelopment. Few studies, however, have addressed the impacts of land use on new roads. That there is a significant impact is clear, and controlling that impact will require land use policies that guide development in a way that distributes local traffic more evenly throughout the local road network, maintains the long-term mobility of our highways, and maximizes mobility for through traffic.

Though striking a balance between competing land use and transportation objectives has multiple benefits, reducing congestion is the primary goal of those wrestling with this issue. Congestion on our roadways is one of the first signs that urban growth and development have outpaced the rate of improvements to the transportation network. While economists will point out that some amount of congestion is good for business, planners know—and economists agree—that too much congestion will have negative impacts that will outweigh the good. Thus, finding and maintaining that balance between development levels and traffic flow is important, especially in rapidly growing areas.

Controlling development, which involves adopting and implementing land use policies, is largely the responsibility of local government. With states investing millions of dollars in major transportation improvements every year, it is not surprising that each state has an interest in protecting its investments through land use policy, as well. However, the specific activities that can be undertaken at the state level to ensure such protection are few. The purpose of this paper is to identify a broad range of land use policies that can inform the decisions of those who can make a difference in protecting the mobility of a new freeway or expressway [hereafter referred to as “the highway”], and identify the ways in which those policies can be translated into action at all levels of government.

2.0 The Land Use/Mobility Issue

Before land use policies can be evaluated, consideration must be given to the primary issue that the policies must address: the loss of mobility on major roadways.

Freeways and expressways are high-speed roadways designed to carry through traffic (inter- and intra-state traffic as well as some regional traffic). Such roadways are constructed when existing roads that once served this purpose become too congested to function in that way. They are constructed with the capacity needed to accommodate existing and future through traffic.

Whether the expressway or freeway is constructed as an upgraded roadway on an existing alignment, or as a new roadway on a new alignment, the result is the same.

Development near the intersections and interchanges intensifies. First, highway-dependent uses will locate along the new roadway, followed by uses that benefit from proximity to the highway-dependent uses. This combination and pattern of land uses boosts the number of local trips between them, placing a new burden on the local street network and often putting so many local trips onto the freeway or expressway that it acts as a part of that network. Over time, mobility is lost when such roads are utilized for local trips. Building our way out of congestion is a logical response, but the results are temporary. Typically, this congestion requires an increase in roadway capacity in the form of a new road or widening of an existing road. Once the improvement is made and congestion decreases, access is again perceived as good and development continues in that area until the additional traffic generated by new development results once more in an undesirable level of congestion. Again, one of two choices must be made to alleviate the congestion: build a new road or widen an existing one, creating a continuing cycle of increased development and increased congestion.

There are a limited number of solutions to this cyclical problem. One of those solutions is the adoption of effective land use policies that are aimed at protecting the mobility of new roads. Assessing the potential effects of land use on transportation facilities requires determining what kind of development will occur, where it will occur, and what form it will take. These determinations (and the land use policies that arise from them) are associated with two activities: growth management (where and when development occurs) and land use planning (what type of development occurs). Growth management techniques control the direction, pace, and timing of development, while land use plans describe the nature of development—its density/intensity, mixture of uses, site layout, building orientation, street patterns, and access/connectivity. The level to which both types of techniques are employed, which depends on adopted land use policies, affects the way a highway functions in the long term. Both growth management techniques and land use regulations, which should be based on adopted policies, need to work in conjunction to achieve the desired balance between transportation improvements and future land use.

No particular land use can be described as suitable or unsuitable for areas adjacent to highways. Instead, it is the mixture of uses, the relationship between them, and the way each use is accessed that determines whether development will have a positive or negative impact on the highway. Definitions of “Land Use” needs to be expanded to help communities guide growth and land use decisions. This definition includes design of development, which includes density/intensity, mixture of uses, site layout, building orientation, street patterns, and access/connectivity.

3.0 Existing Development Patterns and Related Issues

US 64–NC 49 corridor is characterized by various development patterns. The changing development patterns throughout the US 64–NC 49 corridor reflect the history of development in the corridor, which spans several decades. These patterns range from undeveloped areas to completely developed urban conditions.

All these different conditions affect the way the corridor functions. Undeveloped parts of the corridor provide better mobility; the more developed areas, while having access to goods and services, have experienced a decrease in mobility along the corridor.

Between the developed portions of the corridors lies land that to date has remained relatively undeveloped for a variety of reasons. These undeveloped areas include the following:

- Scenic/Protected – A segment of NC 49 is a designated NC Scenic Byway, and another segment passes through the Jordan Lake Recreation Area. Flanked by tree-covered areas, lakes and other natural features, these sections of the corridor are two of a few through which the roadways pass that stand the best chance of maintaining their natural, rural character. Some of these segments are protected in their undeveloped state, while others are not.
- Rural: Vacant or Agricultural – Clusters of large tracts of land that have never been developed or have been farmed (and continue to be farmed) can be found in multiple locations throughout the corridor between Mocksville and Lexington and between Lexington and Asheboro.

Scenic/Protected
US 64 - West of Lexington



Rural: Vacant or Agricultural
US 64 - East of Pittsboro



The patterns that should be examined include both those that exist in the corridor today and those that are emerging throughout the corridor.

- Rural: Low-density Residential – Over time, single family homes have been constructed on large tracts of land. Many of these structures are not visible from the highway, but the private driveways that provide access to them give an indication of the number that exist within areas that otherwise appear vacant.

Rural: Low-density Residential
US 64 - East of Asheboro US 64 - Ramseur



Conventional, Single-Use Subdivision
US 64 - Cary



- Conventional, Single-use Subdivisions – The subdivision of large tracts of land has occurred in multiple locations along the corridor. Some have been developed for single family homes on lots of one acre or less, while others have been developed as business parks for business and/or industrial uses. Common to both are the single (or few) points of access that, in this corridor, direct all related traffic to either US 64 or NC 49. Also, these subdivisions rarely have direct, physical connections to adjacent development. These subdivisions are more common near the endpoints of the corridor, in places such as **Apex, Cary, and Concord.**

- Commercial Strip–Taking advantage of the access from the highway, commercial development comprised mainly of large- and small-scale retail, restaurants, gas stations, and other commercial development lines both sides of several sections of US 64 and NC 49. Each commercial establishment is oriented toward the highway, and gains its access to the highway through at least one private driveway serving only that parcel. Such commercial development is typically continuous, stretching one parcel deep on each side of the highway for at least one-half mile where it occurs. **Siler City, Ramseur and Asheboro** are three communities within the corridor that have these commercial strips.
- Highway-oriented Business – An emerging development pattern is the highway-oriented business development, which is often comprised primarily of regional-scale retail, typically found at freeway interchanges. As improvements to US 64 and NC 49 have been made, interchanges have been constructed that encourage a concentration of businesses that depend on the patronage of passing traffic. Such interchanges, like those found along the bypass around **Pittsboro**, in **Apex**, and near **Lexington** are attracting large-scale retail and restaurant chains as well as gas stations, which are all being incorporated into conventional “power centers” (regional shopping centers of 300,000 or more square feet). While these businesses are typically not accessed by individual driveways, the centers in which they locate typically have a single point of entry near the interchange.
- Downtown – The alignments of US 64 and NC 49 pass through or near the original centers of the towns and cities (Mocksville and Lexington) within the corridor. In these locations, the development patterns still reflect forms of the traditional town center, such as narrow streets and small blocks edged by two- and three-story buildings containing a mixture of uses.

Commercial Strip
US 64 - Siler City



Highway-Oriented Business
Hwy 64–US 1



Downtown
Mocksville



Development, where it has occurred, has had an impact on mobility in the US 64–NC 49 corridor. Unless the issues presented by current and emerging development patterns are addressed, mobility will continue to be compromised even with improvements made to the roadways. The Future Land Use Composite Map (See Appendix II) depicts the land use vision of different communities. To understand the overall emerging patterns, this detailed future land use map is simplified into conservation, rural, suburban, and urban (See Development Patterns Map on Page 6). What is reflected in this vision is the continuation of the development patterns discussed above but depicted in a simpler form to show the linear urbanization of the corridor. The specific, related issues are as follows:

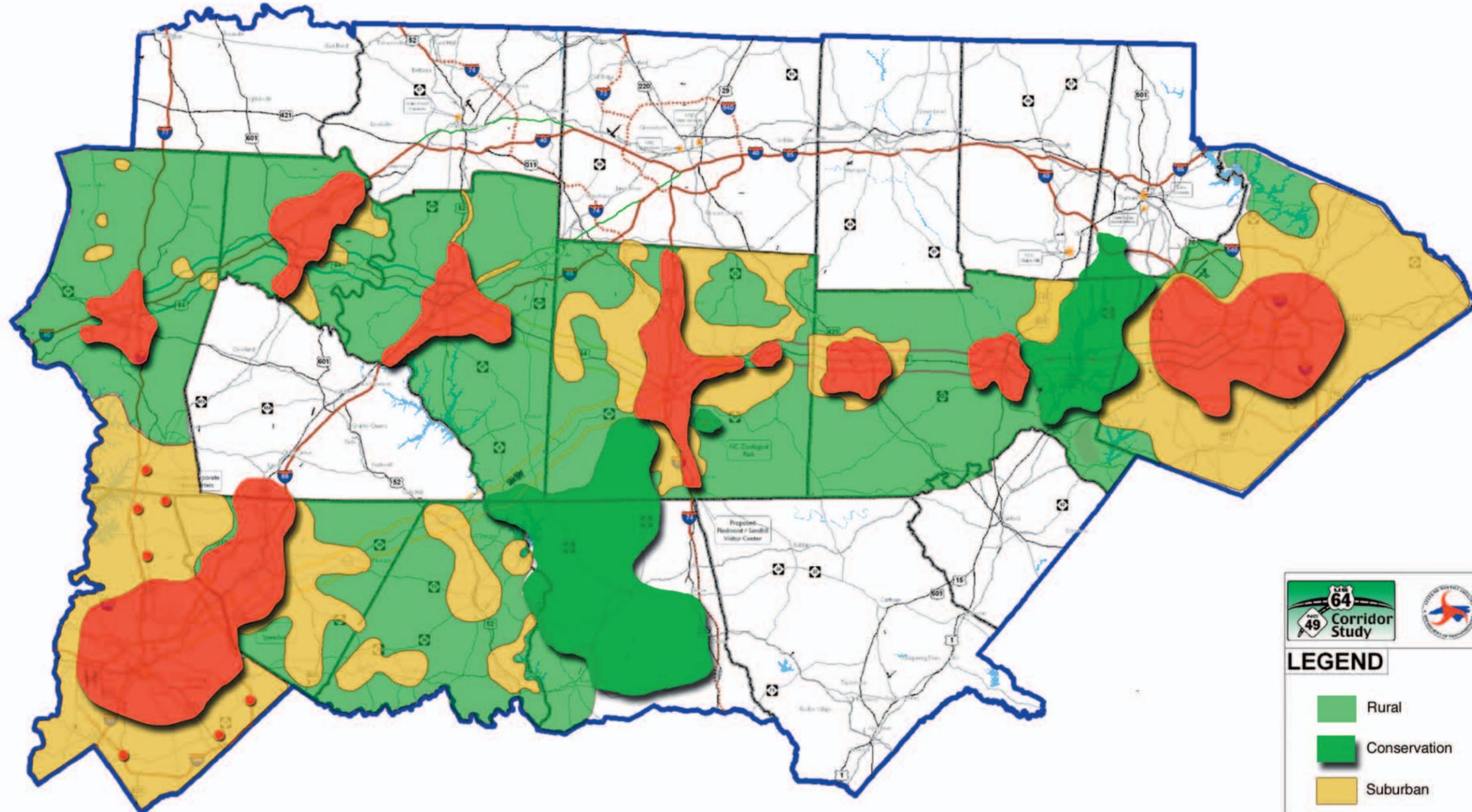
- Separation of uses – When uses are isolated or, when located near each other, not well-connected, travel to and from them becomes more difficult, which encourages vehicular travel and makes bike and pedestrian travel less convenient or feasible. When these isolated or separated uses are located on or near US 64 or NC 49, the local vehicular trips to or between the developments are often made via the highways, compromising mobility on them.

- Multiple access points (driveways) along the highway – Having multiple driveways on US 64 or NC 49 results in multiple turning movements, which slows traffic and contributes to congestion on the highway.
- Single points of ingress and egress serving large developments – When most or all of the traffic generated by one development is directed to a single entrance, the traffic entering and exiting the development utilizes only one road instead of being evenly distributed throughout the street network. If the ingress/egress point is located on US 64 or NC 49, the development compromises mobility on the highway.
- Lack of connectivity between adjacent developments – Without connections between developments, traffic traveling from one to another is unnecessarily forced out onto adjoining roads, increasing traffic on those roads.
- Lack of attention to parallel roads – Parallel roads are not constructed or improved to be attractive local routes when the new facility (strategic corridor) is constructed. Providing alternative east-west connections is critical for the corridor to function for intra-interstate travel. Unless local, parallel streets are created—or re-created—in a manner that attracts private investment and encourages orientation of development and access toward the local street, the highway will be perceived as the “front door” and the more appealing route for local trips, thus impacting mobility on the highway.
- Greenfield development – Development will follow the construction of infrastructure. When infrastructure is improved further and further from an urban core, development is attracted to these previously undeveloped “greenfield” locations. This phenomenon often contributes to the problem of suburban, low-density sprawl, which attracts local trips on the highway as people travel longer distances to and from the development. Highway-oriented development, especially around interchanges, possess additional problems since they attract a lot of local trips, often on the highway.
- Lack of strategic growth management – Unless growth is managed in a manner that directs it to key locations in an urbanizing area, development will continue to “strip out” highway corridors. This uncontrolled development pattern increases the occurrence of a number of the issues mentioned above, especially multiple access points, greenfield development, and interchange growth.

In combination, many of the issues listed above contribute to the larger issue of local trips shifting to the highway that is intended to move regional traffic. This increase in local trips impedes mobility.

DEVELOPMENT PATTERN MAP

(PER ADOPTED LOCAL PLANS AND REGULATIONS)



LEGEND

- Rural
- Conservation
- Suburban
- Urban



Sources: North Carolina Center of Geographic Information and Analysis, NCCGIA
 Town of Cary, Town of Apex, Wake County, Town of Pittsboro, Siler City, Chatham County
 Town of Randleigh, Asheboro, Randolph County, City of Lexington, Davidson County, Town of Mocksville
 Davie County, City of Statesville, Iredell County, Stanly County, City of Concord, Town of Harrisburg, Cabarrus County, City of Charlotte
 Mecklenburg County, Catawba Land Conservancy

4.0 Precedents

The best policies are those based on lessons learned. Where an issue has been successfully addressed in a similar situation, pinpointing the specific features of that successful solution and learning from them—learning why they contributed to success—will increase the likelihood of developing effective policies.

Based on the key issues associated with existing and emerging development patterns described in the previous section, several development alternatives, or precedents, were examined. Precedents are actual places that exhibit the characteristics that are believed to help achieve a desired condition. In this case, the precedents examined have qualities that help maintain the mobility of highways. Those that possess such characteristics that address such issues are presented below.

Precedent: Protected corridor with limited development

Lexington-Paris Pike

Lexington, KY

The corridor passes through a historic bluegrass landscape of rolling hills, passing large historic mansions and horse farms featuring plank and rock fencing. The corridor has remained virtually unchanged since the 1830s, flanked by agricultural uses for most of its length.

Notable features:

- Twelve miles of the corridor have remained undeveloped, as land has been protected by adherence to and regulations based on small area plans (recognized by all of the affected jurisdictions that call for preserving and protecting the character of the corridor.)

Paris Pike



Source: www.asla.org/lamag/lam03/may/feature3.html

Precedent: Corridor redevelopment

US 311 Bypass

High Point, NC

When the US 311 Bypass alignment was placed parallel to Brentwood Drive, enough distance was left for development to occur and thrive between the two roads.

Notable features:

- Orientation of development is toward local street, not 311.
- Depth of parcels between two roads suitable for viable development.
- Planned streetscape improvements are intended to create a safer, more comfortable pedestrian environment.

US 311 Bypass



Existing



Proposed

Precedent: Corridor development

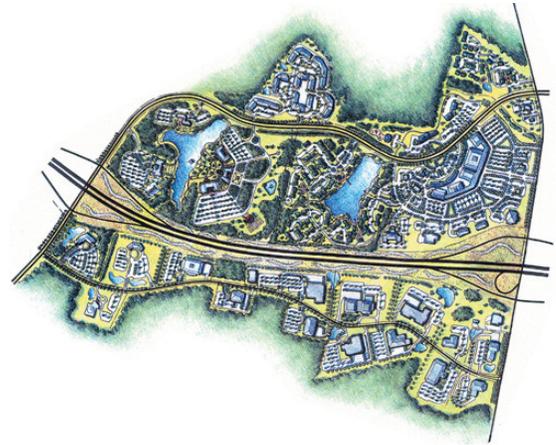
Whitehall

Charlotte, NC

Whitehall is a major employment center in the southern part of Charlotte located along I-485.

Notable features:

- Roadways parallel to the highway was designed to allow traffic to access the development without using the highway.
- Interchanges provide access to the local street network that includes these 2 parallel roadways, thereby keeping Whitehall traffic off of the highway.
- Internal circulation is designed to minimize traffic on these local roads, which minimizes congestion interchange areas.



Precedent: New interchange development

Ballantyne

Charlotte, NC

Ballantyne is a 2,000+ acre mixed-use development that offers a wide variety of employment, residential, and shopping uses all taking advantage of proximity to an interchange and major highway.

Notable features:

- An interconnected street system within the development allows users to access various areas without returning to the main roadway.
- Only one point of access (an interchange) to the highway (I-485) was created, with limited access to the perpendicular, intersecting road.
- Access through the local road network is encouraged.



Precedents: Greenfield, mixed-use development

Greenfield sites will always experience development pressure when infrastructure is extended to them. The next four precedents show how a mix of uses developed at different scales could achieve desired balance between land use and transportation.

Abingdon

Charlotte, NC

Notable features:

- Mix of uses within Abingdon combined with a highly connected system of streets and pedestrian and bicycle paths means that visitors, residents, and employees rarely have to use the highway or the major arterial roads that adjoin the site for local trips.



Birkdale Village
Huntersville, NC

An integrated mixed-use development combines street-level retail and office with apartments above for an exciting, truly walkable environment.

Notable features:

- A walkable, connected system of vehicular and pedestrian routes combined with a mix of residential, retail, and office space reduces the need for local trips on the highway.
- Connection points are provided allowing access to future development, and facilitating a highly connected local street system through developments lessening the pressure on the highway.



Harrisburg Town Center
Harrisburg, NC

A new town center was created with institutional using the Town Hall as the focal point. Different residential types are mixed with retail to create a more walkable community.

Notable features:

- Work as a compact mixed-use community next to the corridor.
- Interconnected to the local street network, providing alternative ways of getting in and out.



Baxter

Fort Mill, SC

A 1,000-acre mixed-use community with a blend of residential projects laid out in tight-knit, walkable neighborhoods. Civic uses including a library, elementary school, parks and greenways are an integral part of the plan. The Town Center includes businesses, employment, civic and open spaces, and a variety of residential units in a pedestrian-oriented setting.



Notable features:

- The mix of residential, retail, office, and open space combines with institutional uses such as a library and school to further reduce the need for local trips outside of the development.
- A development like this almost functions as a small town in its own right, which reduces residents' needs to use the highway to reach their everyday destinations.



Precedent: Developed area, mixed-use development

US 311 Bypass

High Point, NC

An interchange planned for the US 311 Bypass will connect to Lexington Avenue, which is already a congested roadway lined with a wide variety of commercial uses having access to Lexington Avenue.

Notable features:

- Redevelopment of the commercial strip along Lexington Avenue will allow for better integration of commercial uses in a residential area.
- Redevelopment will also reduce congestion on the highway by creating a better, more connected local street system and managing access along Lexington Avenue.



Precedent: Multi-modal design

Transit-oriented development (TOD)

Cornelius, NC

TOD possesses the characteristics of a good, walkable community. Where walking and biking is convenient, the environment is also conducive to transit. In many ways, it recreates the ‘streetcar suburbs’ of the late 1800s and early 1900s, before automobile use became a predominant transportation option.



Notable features:

- Compact development with compatible mix of uses.



Precedent: Infill development

Southend, including Camden Village and Atherton Mill

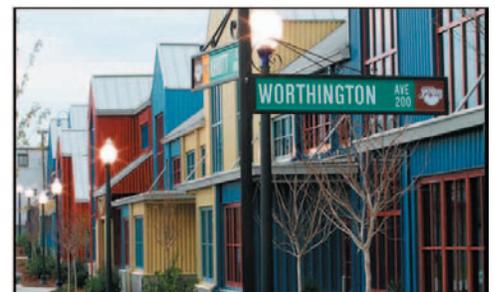
Charlotte, NC

Charlotte’s Southend has been redeveloped from a declining district of warehouses and mill facilities to a vital and attractive area popular with visitors, residents, and employers.



Notable features:

- Brownfield redevelopment, with the use of grants, in this area has offered a feasible alternative to greenfield development on the outskirts of city for retailers and offices.
- Infill development creates an urban environment that is compact.
- Existing infrastructure is better utilized.



Beneficial Characteristics of the Precedents

Though the specific features of the precedents presented above have been executed with varying degrees of success, these precedents have one or more of the following characteristics that, in combination, aid in protecting the mobility of highway corridors.

- Compatible uses are mixed in a compact environment where the proximity of uses makes alternative modes of travel as convenient or more convenient than vehicular travel.
- Few access points (driveways) along the highway. Parcel access is internal to development, minimizing the number of—and need for—driveways along the highway and other major roads adjoining development.
- Multiple points of ingress and egress serving large developments provide access to more than one local road off site, allowing traffic entering and exiting the development to be more evenly distributed throughout the local street network.
- Connectivity between adjacent developments providing routes for all types of traffic to travel between destinations without having to use the highway or other major roads.
- Parallel roads serve as the preferred routes to development. In addition, such streets are designed and constructed to attract private investment and encourage orientation of development toward the local street. This forces development to treat local roads as the “front door” and encourages primary access from it instead of the highway or other major roads.
- Preservation of greenfields by taking advantage of existing—and sometimes under utilized—infrastructure, thereby avoiding (or at least reducing) development outside from the urban core. This is incentivized in many communities through a number of mechanisms including brownfield redevelopment grants.
- Strategic growth management has been undertaken in the community in a manner that directs development to key locations, which helps to prevent the “stripping out” of highway corridors. Instead, a nodal pattern of development emerges, which limits access to the highway to a few key places along it.

5.0 Policy Guidelines

In order to address the issues outlined in section 3.0 and begin achieving the characteristics identified as beneficial in section 4.0, appropriate land use policies should be adopted throughout the corridor. The following land use policy guidelines address conditions associated with the many facets of the land use/mobility issue described in Section 2.0. Each policy statement is followed by a series of recommended actions for putting it into practice, which target various audiences from local planning staffs to the State’s Department of Transportation. Some of these recommendations are followed by associated sub-recommendations or specific tools that may be used to carry them out. **These policies are not intended to be assigned to specific communities. Each are appropriate for application in every segment of the corridor, although the prioritization of the policies and their application may vary depending on the particular challenges in each community.**

The policies and accompanying recommendations below outline ways to achieve a balance between land use and transportation along the highway and at interchanges.

5.1 Promote adherence to land development principles that minimize the need for local trips on the highway.

As stated previously, no particular land use can be described as suitable or unsuitable for areas adjacent to highways. Instead, it is the mixture of uses, the relationship between them, and the way each use is accessed that determines whether development will have a positive or negative impact on the highway. Thus, development should follow design principles that reduce numbers and lengths of local trips and provide alternatives to the new highway for those trips. Efficient travel behavior is positively associated with such land-use characteristics as density of development and a mix of complementary land uses within walkable distances. These land-use characteristics are in turn associated with transportation infrastructure and facilities that support efficient travel behavior, such as frequent transit service and complete sidewalk and bike lane networks. Development design must incorporate these elements effectively.

Recommended actions for putting this policy into practice:

- Encourage the concentration of a mixture of uses to minimize the number and length of local trips.
 - Locate auto-oriented businesses in a manner that does not conflict with the compact form of mixed-use development and can be accessed via the local street network.
 - Allow vertical mixing of uses (such as residential above commercial/retail) by right in zoning. Cities such as Seattle, Orlando, and Washington, DC, use density bonuses to encourage mixed uses.
 - Vary the intensity of development along a highway corridor by encouraging commercial/mixed-use activity centers near intersections of through streets that are well linked to the surrounding area.
- Establish site design standards to promote development patterns that make feasible a variety of transportation options for pedestrians, bicyclists, transit users, and automobile drivers. Not accommodating this variety of transportation choices encourages vehicular travel, thereby increasing local trips on a nearby highway.
 - Support human-scaled design and streetscape features that help enclose and define a more pedestrian-friendly environment by orienting buildings to the street and requiring building entrances to be placed close to the street. Also promote the incorporation of ground-floor windows, articulated facades, appropriately scaled signs and lighting, awnings and other

North Street Revitalization Project

In North Carolina, Burlington's Community and Economic Development Office is working on a North Street Revitalization Project to create a thriving, pedestrian-friendly area to encourage economic development along the mixed-use street. Transportation improvements are aimed at pedestrian safety, street aesthetics, and traffic reduction. Traffic-calming measures include narrowing the street and using pedestal-mounted signals and bump-outs at intersections and crosswalks. Bicycle use will be encouraged with additional signs and education. Lighting reconfiguration will improve lighting levels on the street and sidewalks, address issues of safety, glare, and discoloration, and decrease light pollution.

- weather protection, and landscaping, including buffering where appropriate.
- Locate parking and vehicle drives away from building entrances and not between building entrances and streets with pedestrian activity. Orient surface parking behind or to the side of buildings.
 - Provide access from shared driveways or alleys to minimize the number of driveways pedestrians must cross. Driveways separate buildings; minimizing them tends to shorten the walk between uses.
 - Provide pedestrian walkways through sites, connecting building entrances and the public sidewalk with safe crossings of streets, drives, and parking lots.
 - One way to do this is to create an overlay zoning district that applies design principles across multiple zoning districts without rewriting entire zoning categories. Parcels affected by an overlay zone are subject to the standards of the underlying zone in addition to the standards of the overlay zone.
 - Manage parking design, location, supply, and demand to help create more balanced auto and pedestrian environments. Surface lots should be small, on-street parking should be offered, and structured parking should be incorporated in order to avoid substantially separating uses and impeding pedestrian movement. Oversupply of parking should be avoided since it not only induces auto travel (including travel on the highway), but can discourage travel by foot or bicycle.
 - Reduce or waive minimum off-street parking standards.
 - Establish a maximum parking ratio based on land use.
 - Provide shared parking requirements in areas of mixed retail and commercial uses.
 - Allow “in-lieu” parking fees to be paid by a developer to forego providing on-site parking. These funds would combine in a fund for constructing off-site municipal parking facilities.

Traditional Neighborhood Development Ordinance

Belmont, North Carolina, was the first community in the country to adopt a municipal traditional neighborhood development zoning ordinance. Belmont's TND ordinance allows for the development of fully integrated, mixed-use, pedestrian-oriented neighborhoods. The intent of the ordinance is to minimize traffic congestion, suburban sprawl, infrastructure costs, and environmental degradation.

5.2 Support efforts to increase connectivity within and between developments.

Travel patterns within a road network are dynamic; they shift with each network improvement as motorists search for and find the optimal route: one that is the shortest in terms of travel time and distance between destinations. Many local roads are created through the subdivision of private property, but as developers strive to minimize costs, money spent on infrastructure is kept to a minimum. As a result, few streets, particularly through streets that could contribute to the local road network, are built; developers build only what is necessary to provide access *within* each development, leading to deficiencies in the transportation network. When the local street network is not sufficient, a highway or expressway can become the quickest route, reducing mobility for through traffic. Connectivity between and within developments not only

encourages drivers to use the local street network for local trips without traveling on the highway, but also provides options for people to walk or bike to their local destinations instead of driving, further reducing the number of local trips made by vehicle.

Recommended actions for putting this policy into practice:

- Foster the creation of a dense and highly connected street system.
 - Require a continuous network of streets at the local level. While local transportation plans recommend critical connections, implementation occurs primarily through the development process.
 - Designate future street extensions to plan for connectivity. Stub-out connections to neighboring parcels may be constructed if cross-access is not feasible at time of permit approval.
 - Require the formation of blocks with a minimum street spacing standard. Local governments can plan ahead by stipulating maximum block lengths and perimeters in their zoning codes.
 - Limit closed street systems and cul-de-sac designs to situations where topography, environmental impacts, or existing development patterns prevent full street connections.
- Encourage connectivity for pedestrian and bicycle travel by requiring a continuous network of pedestrian and bicycle pathways that link to roadways and adjacent developments. These pathways need not coincide with street and driveway locations, making their creation more feasible and, often, their use more convenient than taking a vehicular route.
- Require multiple points of ingress and egress for new developments, locating them on secondary roads in addition to or instead of the highway when possible. Encourage, require, or provide a density bonus for providing access points along more than one roadway, where appropriate, to distribute the trips to and from the development and reduce the burden on the main roadway.

5.3 Promote development design that adequately manages access and reduces congestion levels on roads.

Achieving transportation efficiency requires addressing potential conflicts between mobility on the highway and accessibility to the highway. As access to a highway is increased, mobility may be reduced, such as when a state highway corridor has an excessive number of curb-cuts, which encourage local trips on the highway. Access management is key to maintaining the mobility of the highway.

Recommended actions for putting this policy into practice:

The following access management recommendations should be applied to the highway, but may also be considered for intersecting roadways when access management could help reduce congestion on those roads. They may be applied by incorporating the techniques into the zoning code, creating an access management ordinance, or requiring the techniques' application during the subdivision and site plan review process.

- Minimize the number of driveways/curb cuts on the highway. Fewer driveways, appropriate driveway location, and design standards will allow for vehicular movement that will help minimize congestion.
 - Adopt minimum spacing requirements and maximum driveways per development.
 - Encourage shared driveway access through regulations and incentives.
 - Encourage cross-access agreements that allow one or more parcels to gain secondary access across the property of another, reducing the reliance on driveways onto the highway.
 - Because the width of lot frontage affects the spacing between driveways, set minimum lot frontage requirements high enough to prevent land along thoroughfares from being subdivided into small lot frontages. On strategic highway corridors, minimum lot frontage requirements could be tied to minimum driveway spacing standards. Where there are alternatives to direct access onto the highway (such as access to a cross street or shared driveway), smaller lot frontages could be permitted (Williams, 1996)
 - At the intersection of arterial and local roads, require corner lot access from local roads in order to minimize access points on the highway.
- Encourage smooth traffic flow on the highway by regulating the nature of driveways and other access points.
 - Encourage driveway turn-around areas to improve the safety of vehicles that would otherwise be backing out on the highway.
 - Implement adequate sight distance policies based on posted speed limits to allow traffic to enter the highway safely and efficiently and to improve visibility of driveways.
 - Establish guidelines for a minimum turn radius, minimum driveway width, and maximum driveway slope are important because they help slower, turning traffic move off the arterial more quickly, and help the traffic leaving a driveway turn and enter the stream of traffic more efficiently (Iowa Access Management Handbook, 2000).
 - Require new developments to conduct traffic impact analyses to determine the need for turn lanes to allow entering and exiting traffic to move smoothly.
 - Require bus pullout bays along transit routes.
 - Establish a minimum offset between a local road intersection

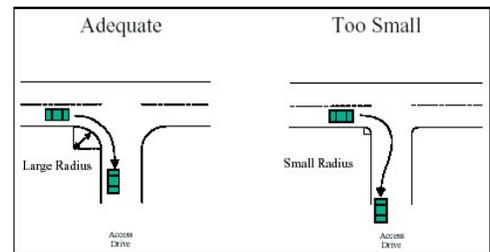
Alternate Access
 DeIDOT works with Delaware property owners to find access points to their property other than those linking directly onto the corridor. They also try to achieve a site design that conforms to the corridor capacity preservation program.

Landscaped Driveway



Source: Iowa Access Management Handbook

Adequate Turn Radius



Source: Iowa Access Management Handbook

Statewide Programs

In August 2000, the North Carolina Department of Transportation (NCDOT) made it easier for local governments to implement traditional neighborhood street networks in new developments. The NCDOT approved street design guidelines to support community interest in streets that slow and disperse vehicular traffic and provide a pedestrian-friendly environment. The guidelines specify widths, street geometry, utility placement, and provision of bicycle and pedestrian facilities that promote walkable, human-scaled communities.

New Jersey and Delaware have created similar statewide programs that combine access management approaches to road and street design with context-sensitive design principles. These programs seek to provide alternatives to street widening in order to preserve the character of small historic or suburban towns while improving conditions for traffic through the towns (Ewing, 2001).

and the highway in order to give enough stacking distance for traffic to exit the highway and turn onto the local road without causing congestion on the highway.

- When access must be provided to small lot frontages, build a backage road that can be integrated into the local street system more easily than a frontage road. To do this, the department of transportation may consider building the backage road.
- Encourage or require a traffic impact study for all projects that would generate traffic above a certain level in order to lay the groundwork for effective access management.

5.4 Maintain the viability of existing development when new highways are constructed.

When a new highway is built parallel to an existing roadway, whether immediately adjacent or as a bypass around a town or city, the danger exists that the development along the original roadway can migrate toward the highway, drawing local trips onto the highway and leaving the original roadway to lose vitality and users. This can have a negative impact on the existing land uses, provided these uses remain. Fully utilizing an existing roadway as a parallel connection after the new highway is built advances connectivity goals and helps reduce congestion on the highway. A main factor in ensuring that the existing development thrives is a roadway that continues to be used for local trips. The treatment of the existing roadway (i.e. investment that enhances the appearance and function of the roadway as a local street and front door to the existing uses) and the distance between it and the highway are critical.

Recommended actions for putting this policy into practice:

- Provide adequate space between the existing road and the new parallel highway for development to occur on both sides of the original roadway. The appropriate distance will vary depending on the municipality's size, type, and development pattern.
- Invest in streetscape and pedestrian amenities along the existing roadway

Orphan Highways

The "Orphan Highways" program in Portland, Oregon, promotes the conversion old highways running parallel to freeway to more pedestrian-friendly, dense, mixed-use corridors.

to attract private investment and help convert it into a vibrant street with the look, feel, and function of a local street instead of a highway or commercial corridor.

- Encourage continuous local streets as development and redevelopment occurs, particularly those that may provide a alternative, east-west route paralleling the new highway.

5.5 Encourage redevelopment in the urban core to reduce pressure for greenfield development, which is likely to occur along the highway and attract local trips to it.

Development is often attracted to areas where construction is easiest and access is most convenient, such as greenfield sites along new and existing highways. However, development of these greenfield sites often has negative effects on the highway, attracting local trips and resulting congestion. If new development can be concentrated in areas that have already been developed, especially areas within the inner city and urban core of a municipality, there will be less pressure for the growth to occur in greenfield locations, and the increased number of local trips on the highway can be avoided.

Recommended actions for putting this policy into practice:

- Use brownfield redevelopment incentives as a catalyst to promote growth in inner city and urban areas. Give tax incentives to municipalities (ultimately passed on to the developer) for site assessment, clean-up, and redevelopment. In order to encourage reuse of brownfield sites, DENR enters a “brownfields agreement” with a prospective developer that defines the clean-up and land management actions that are necessary for a particular brownfield site. With this agreement in place, the developer receives liability protection that opens the door to obtaining loans that would previously not have been offered for the project.

5.6 Manage development around highways, particularly the interchanges, that pass through relatively undeveloped areas (greenfields) in order to minimize negative effects of highway-oriented development on mobility.

Introducing unfavorable development patterns around highways and highway interchanges often attracts development patterns that are highway-oriented. Such patterns are not desirable from a transportation standpoint. For example, interchanges can attract the development of large land parcels that are typically commercial or industrial, are destinations for local trips, and are typically not connected in any way to neighboring parcels, which are often vacant. Because of its isolation, this type of development encourages local vehicular trips, as travelers must drive between the parcel and almost any other destination. In addition, the nature and the isolation of these developments often combine to create a lack of both pedestrian connections to neighboring parcels and transit links to more distant destinations, further promoting the number of local trips made by automobile. Thus, managing development in these high-impact areas is key to controlling the effects of land use on a new highway or expressway. The following recommendations show how this development may be managed.

Recommended actions for putting this policy into practice:

- Prepare small area plans at the local level prior to new highway construction. Interchange and other capacity expansions along the corridor should not take place until adequate land use preservation and facility access restrictions are put in place.
- Establish an additional layer of regulation for corridors and interchange areas to control the nature of this development.
 - Implement Interchange Zoning districts.
 - Implement Corridor Overlay Districts.
 - Establish conditional uses.
 - Require Planned Unit Developments (PUDs).
- Purchase land within a specified distance of such access points to prevent development in those locations.
- Provide incentives to stimulate development in target areas and to achieve desired design, intensity, and other characteristics.
 - Use transfer of development rights.
 - Provide density bonuses.
- Establish easements (e.g. scenic easements) or employ other preservation tools that can be put in place around interchanges.
- Create multi-governmental interchange access agreements (memorandum of agreement - See Appendix III as an example of multi-governmental agreement to better integrate land use with transportation), which could ensure that development around interchanges is managed to meet the criteria agreed upon by the interested municipalities, counties, and state department of transportation. This type of agreement is allowed under North Carolina law section 160A-461 – Inter-local cooperation authorized.
- Utilize new technology to predict and understand the impact of different land use policies on growth around interchanges. The Interchange Development Model (IDM) is a computerized, multivariate regression model that helps in identifying the overall impact of current development and how an interchange may help or fall below development expectations. It also helps determine steps that can be taken to enhance or limit development and provide future alternative scenarios.

Interchange Zoning Technique

Jurisdictions in several states have created specific interchange zoning categories that set forth the uses, standards, and restrictions for land within that zoning category. Lakeland, Florida, has an interchange activity center zoning category as one of the categories in local ordinances that are implemented at the regional level along key corridors. Use of this zoning category has encouraged compact development at interchanges along important corridors. (Salila Vanka, Susan Handy, Kara M. Kockelman, 2003).

Executive Order for Conservation

Vermont's Executive Order No. 19-3 (No. 07-01) addresses conservation of land in and around interstate interchanges. It encourages state agencies and departments to conserve land in these areas and ensure that any development that does occur meets the state's goals for new development, including compact development patterns and preservation of scenic, agricultural, natural, and historic assets.

5.7 Encourage growth management initiatives that would manage the rate and direction of growth community-wide.

The pace and direction of growth directly affects road mobility and therefore congestion. If the rate of growth in a region outstrips the road mobility serving and connecting it, then any new improvements, including the new or improved highway, will immediately feel negative impacts such as congestion. One way to handle this problem is by assessing existing and future transportation

improvements in light of the rate of growth. If it is determined that the transportation infrastructure planned, especially the highway, is not compatible with the growth rate, growth management efforts will be even more vital to protecting the mobility of the highway.

Recommended actions for putting this policy into practice:

- Restrict extension of services in areas where development should be limited.
- Conduct planning studies such as small area plans to guide development in areas in which growth should be directed.
- Adopt adequate public facility ordinances to make the connection between road mobility and the rate of growth.
- Create a program for protecting corridor mobility, incorporating an educational component that addresses land use policies.
- To reduce the number of workers driving on the highway to commute long distances to employment, reward communities that create a balance between jobs and housing. The state may do this by offering grants, tax incentives, or other advantages to communities that meet certain criteria.

Jobs-Housing Balance Grants

California offers “Jobs-Housing Balance Grants” to communities that have the greatest increase in the number of housing units permitted in comparison to a previous three-year average. The program goal is to encourage new housing construction, primarily in high job-growth areas where housing has not kept pace with job growth. There are two components to the award: production, which rewards increases in housing supply relative to county-level employment demand and the jobs-housing relationship; and planning incentive, which rewards production of types of housing that advance livable-community objectives. The competitive grant program also offers bonus points for infill and affordable housing projects. The communities can use the grants for a wide variety of community projects (EPA SGI).

6.0 Conclusion

Land uses along the US 64–NC 49 corridor range from agricultural in the rural areas to commercial and industrial in the relatively dense suburban and urban environments. Many of these uses depend on access to US 64 and NC 49 to be successful. However, the specific conditions surrounding development in the corridor are also varied, so the impact of land use on existing and future roadway mobility differs from one area to the next. Thus, the number and types of land use policies that should be applied vary throughout the length of the corridor.

One of the key issues in addressing the need for balance between land use and transportation priorities is how various authorities work at different levels. Most highway transportation improvements fall under the state’s jurisdiction, while land use planning is a heavily guarded power of local jurisdictions. Thus, the power to directly control two closely connected issues is dealt with at two very different levels by two very different organizations. Both state and local jurisdictions will play important roles in preserving highway mobility, and all of these entities working together to achieve this goal will be as important as any efforts they make individually.

In conjunction with other planning and zoning activities, adoption of the policies introduced in Section 5.0 at the local level may result in land use patterns that satisfy the needs of both the communities through which the roads pass and the agencies responsible for maintaining mobility for through traffic in a given area. Each jurisdiction may choose to adopt a subset of the policies described

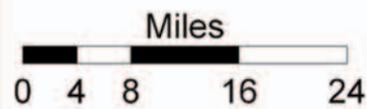
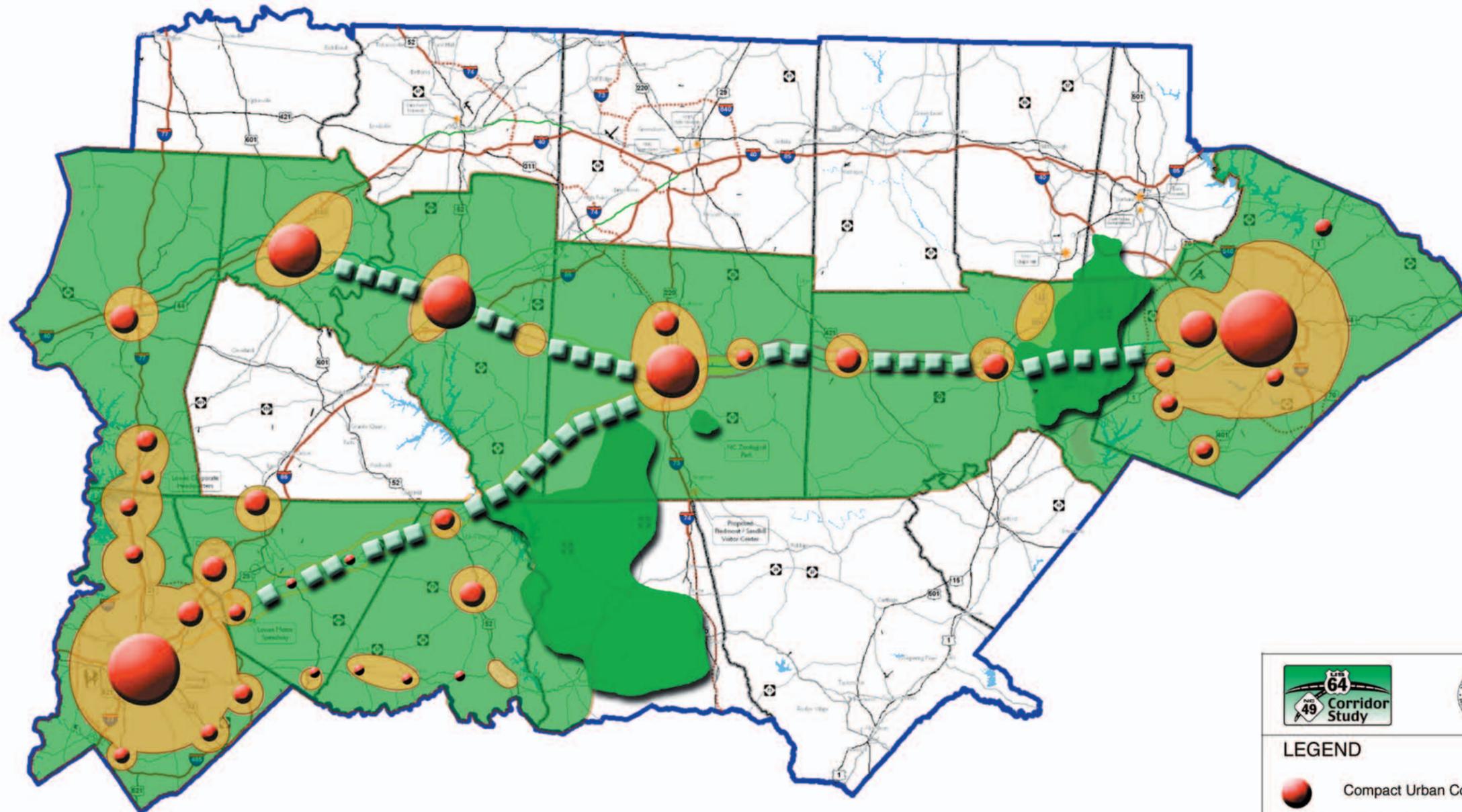
in this report, depending on the needs in the area and the input of citizens who are affected by the policies. While embracing these policies is an important first step in implementation, the true benefits will be realized when such policies are reflected in the regulatory frameworks of each municipality and county, ideally in a consistent manner.

If policies are applied appropriately throughout the corridor, the future development pattern that ultimately emerges may resemble that which is illustrated in the Alternative Development Pattern Map included at the end of this section (see Page 22). After analyzing the Future Land Use Map depicting the composite land use vision of various jurisdictions (see Appendix II) and the emerging issues from Section 3.0 of this report, an Alternative Development Pattern Map has been prepared. The alternative suggests compact urban cores surrounded by lower density suburban mixed-use development. It also depicts future scenic corridors protected at local level from intense development, mainly between major urban areas. It also discourages stripping of corridor for high intensity uses between Asheboro and Ramseur by encouraging more compact development.

Since land use is controlled at the local level, the State's ability to influence land use decisions is limited to communication and coordination with the units of local government. As a resource, the State can fill an educational role, giving the affected jurisdictions equal access to useful policy information, including helping to train local officials about land use and its impact on transportation. Providing consistent information opens the door for regional coordination, as neighboring jurisdictions consider the adoption of common policies. State government can also provide a policy framework, funding, and incentives to encourage changes in land use and transportation patterns in response to population growth. For instance, NCDOT can direct state and federal transportation funding to cities and regions that preserve land around key interchanges, facilitate the development of land use plans that foster long-term mobility, or demonstrate improvements in vehicle miles traveled per capita.

While efforts at the local level and the state level can be very effective, the best solution lies in bringing the two levels of government together and adopting an incentive-based approach in which road mobility and level of service (issues critical to NCDOT) are balanced with the intensity and nature of development (issues important to local jurisdictions). Balancing the needs and priorities of the two types of organization is part of the larger quest to balance land use and transportation needs and design principles. Successful land use/transportation programs are accomplished in states where inter-governmental cooperation thrives. Such efforts, though difficult and complex undertakings, will provide the most effective solution, allowing both statewide and local needs to be met as goals for the relationship between transportation facilities and land use patterns are realized.

ALTERNATIVE DEVELOPMENT PATTERN MAP



Sources: North Carolina Center of Geographic Information and Analysis, NCCGIA
 Town of Cary, Town of Apex, Wake County, Town of Pittsboro, Siler City, Chatham County
 Town of Randleman, Asheboro, Randolph County, City of Lexington, Davidson County, Town of Mocksville
 Davie County, City of Statesville, Iredell County, Stanly County, City of Concord, Town of Harrisburg, Cabarrus County, City of Charlotte
 Mecklenburg County, Catawba Land Conservancy.




LEGEND

- Compact Urban Core
- Suburban Mixed Use
- Conservation
- Protected Scenic Corridor
- Rural

Appendix I. Sources

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Appendix III. Multi-Governmental Interchange Access Agreement Examples

Presented here are two examples from two different states (North Carolina and Kentucky) that show how inter-jurisdictional agreements are formulated.

Example One:

NC 73 Corridor Transportation / Land Use Plan is currently under study by NCDOT. The corridor goes through one of the rapidly growing areas around Lake Norman, in Charlotte's metro area. It presents significant challenges in Land Use and Transportation for residents and people who travel in that area.

The Memorandum of Understanding (MOV) between thirteen participating jurisdictions and agencies in a vehicle to carry forward common goals and objectives in the form of policies. (See page 26 for detailed MOV.)

IMPLEMENTATION

Memorandum of Understanding

Each of thirteen participating jurisdictions and agencies were requested to approve a Memorandum of Understanding for the NC 73 Corridor Transportation/Land Use Plan, committing themselves to follow the recommendations of the Plan and to cooperate with each other in implementing the Plan. The Memorandum of Understanding is not a legal contract. Rather, it is a statement of intent by each jurisdiction. The approval of the Memorandum of Understanding can generally be considered to be acknowledgement that they:

- Adopt the MOU, as a statement of intent on behalf of the jurisdiction;
- Adopt a Council of Planning, agreeing to appoint a participant who can represent the jurisdiction's interests in the plan, can work cooperatively with the other jurisdictions, and can oversee the implementation of the recommendations within the jurisdiction;
- Accept the recommendations within their jurisdiction as guidance for land use and other actions to implement the Plan; and
- Acknowledge that their portion of NC 73 and any related roads in their jurisdiction is an integral part of an overall Corridor, and that actions taken that affect NC 73 within their jurisdiction that affect NC 73 in other jurisdictions as well, and must be made cooperatively.

The draft of the Memorandum of Understanding that was presented to each of the jurisdictions for adoption is as follows:

Memorandum of Understanding

Background

In February 2003, the North Carolina Department of Transportation ("NC DOT"), three counties, five municipalities, three Chambers of Commerce, two Metropolitan Planning Organizations and one Regional Planning Organization engaged the Centralina Council of Governments ("COG") to administer a study of the NC 73 Corridor from Interstate Highway 85 in Cabarrus County to US Highway 321 in Lincoln County. Funds for this Corridor Study came from NC DOT, as well as from the counties, municipalities and private sector sources along the Corridor. [The term "Corridor" in the Memorandum means the area lying roughly within one-half (1/2) mile of the centerline of the NC 73 right of way between the highway's intersections with Interstate 85 in Cabarrus County, and with US 321 in Lincoln County.]

The impetus for the NC 73 Transportation/ Land Use Corridor Plan (the "Plan") was the recognition that increased development pressures along the Corridor, and the resulting vehicular burdens, have stressed the roadway's capacity to serve as a reliable transportation facility for its many users. Moreover, all of the funding partners recognized two key factors: 1) considerable physical improvement will be required to "fix" the corridor; and 2) the current and foreseeable land uses along the Corridor need to be evaluated before undertaking any capital investment in "fixing" the roadway itself.

Beginning with this broad consensus, COG and NC DOT selected a team of planners to undertake the details of this study. The contract of these planning services was executed in April 2003, and the planning team's analysis began shortly thereafter.

Public meetings have been held in Cabarrus, Lincoln and Mecklenburg Counties during November 2003 and March 2004. The planning team's work has been guided by a steering committee comprised of COG and representatives of all municipalities or counties having land use planning jurisdiction over property along the

Corridor, as well as representatives of economic development or planning organizations affected by the NC 73's capacity. In addition, the planning team has hosted a series of land use planning charrettes with the local planning staffs for each of the municipalities and counties having land use jurisdiction along the Corridor. The planning team has also held briefings for the elected officials in each of those communities.

The resulting Plan consists of maps, drawings and other graphics that are incorporated within a Plan Report. In particular, maps corresponding to various Corridor segments show the existing and proposed land uses for each such segment. These segment maps also display the recommended improvements to the NC 73 roadway and to roads and streets connected to NC 73 and within the Corridor.

Understanding

1. Parties to this Understanding:

The Parties are:

- a.) The municipalities and the counties having jurisdiction over 1) land use ordinances and determinations whether land uses along the NC 73 Corridor are in compliance with such ordinances; or 2) public investments along the corridor.
- b.) The inter-governmental planning organizations having jurisdiction for transportation planning along the NC 73 Corridor.
- c.) COG.
- d.) NC DOT.

2. Current Land Uses: Each Party commits to accept and abide by the component of the Plan that falls within that Party's land use jurisdiction (including its extra-territorial jurisdiction) along the Corridor. Each Party's relevant component of the Plan is attached to this Memorandum, and is incorporated herein.

3. Inducements to Other Parties: Each Party understands that its commitment to its respective component of the Plan has induced other Parties to make like commitments for their respective segments of the Plan insofar as that Party has jurisdiction over the land uses within its Plan segment. Based on this understanding, each Party commits its best efforts to maintain its land use designations as shown in its respective segment of the Plan.

4. Future Collaboration Among Parties:

The Plan designates certain areas along the Corridor where further planning is needed. In most cases, those areas require collaboration among various Parties where their land use jurisdiction boundaries converge. In such cases, each Party commits its best efforts to undertake that collaborative planning, including providing direction to its planning staff and/ or consultants engaged for such planning purposes. At the conclusion of any such collaborative planning process, each Party commits to adopt and abide by the land use ordinances determined appropriate and consistent with the Corridor Plan.

5. Council of Planning: The Parties agree that periodic reviews of the land uses and public investments along the Corridor will be required over time. In the spirit of effective collaboration and prudent long range planning, the Parties agree to establish a Council of Planning for the Corridor. This Council shall be comprised of at least one representative knowledgeable in regional planning issues from each Party. The Council shall meet periodically to review and discuss land uses development trends, transportation operations and public investment requirements.

6. Future Actions Affecting Land Uses Along the Corridor: All parties recognize that future governmental entities may not be contractually bound by the adoption of this Memorandum of Understanding. In recognition of this limitation, the Parties commit to review the status of land use and public investment decisions along the

Corridor periodically. Furthermore, the Parties, in good faith, commit to: **1)** review the recommendations of the Council of Planning; and **2)** meet periodically with other Parties regarding emerging issues along the Corridor. The intent of this commitment is to promote periodic discussions of municipal and/or county **goals**, plans and strategies for maintaining effective development patterns, public investment and transportation flow along NC 73.

IN WITNESS WHEREOF, the Parties, through their duly authorized representatives, have executed this Memorandum of Understanding and have attached maps relating to their respective jurisdictions, effective this _____ day of _____, 2004.

COUNTY OF CABARRUS

By

(Title)

COUNTY OF LINCOLN

By

(Title)

COUNTY OF MECKLENBURG

By

(Title)

CITY OF CONCORD

By

(Title)

CITY OF KANNAPOLIS

By

(Title)

TOWN OF CORNELIUS

By

(Title)

TOWN OF DAVIDSON

By

(Title)

TOWN OF HUNTERSVILLE

By

(Title)

CABARRUS – ROWAN METROPOLITAN PLANNING COMMISSION

By

(Title)

CENTRALINA COUNCIL OF GOVERNMENTS

By

(Title)

LAKE NORMAN RURAL PLANNING ORGANIZATION

By

(Title)

MECKLENBURG – UNION METROPOLITAN PLANNING ORGANIZATION

By

(Title)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

By

(Title)

Funding, Design and Construction

The key to implementation of the roadway improvements is having the NC 73 Corridor on the NCDOT Transportation Improvement Program (TIP). The TIP is the programming document for expenditures of State and Federal transportation funds. It identifies priorities for planning, design, right-of-way, and construction of roadway projects throughout the State, through a very prescribed process.

Currently, two sections of NC 73 are on the TIP, but neither is funded. The two sections are:

- TIP No. R-2236 A, from I-77 to Davidson-Concord Road in Mecklenburg County, and
- TIP No. R-2706 from SR 1356 in Lincoln County to SR 2145 in Mecklenburg County.

The TIP is fiscally constrained, meaning that the projected revenues match the projects programmed. This requires that project requests include a cost estimate. The implication of this for NC 73 is that addition of NC 73 improvements within the seven year horizon of the TIP would require removing or delaying other projects to maintain the funding ceiling set by the equity formula for the region. The Board of Transportation member decides if a project gets put into the TIP, with or without a completed feasibility study. A NCDOT feasibility study determines the scope of a given project, including a Right-of-way and construction cost estimate.

A project can only be recommended for inclusion on the TIP through the mutual concurrence of the Metropolitan Planning Organization (MPO) and NCDOT. Each MPO develops its own needs list which is submitted to the NCDOT. Through a series of joint meetings, a Local TIP (LTIP) is developed. Because of the equity formula and the requirement for fiscal constraint, only the highest priority needs are likely to be included in the State TIP.

There are two steps that will be necessary to have all of NC 73 added to the TIP List:

1. NCDOT Feasibility Study. The recommended approach for NC 73 is to request the N. C. Department Transportation to accept The NC 73 Corridor Transportation/Land Use Plan and Memorandum of Understanding as the feasibility study for NC 73. It is recommended that the full NC 73 Corridor, from US 321 to I-85, be a single feasibility study, because of the integrated nature of all of the segments, including the network roads in addition to NC 73 itself. The feasibility study for R-2705 was done in 1991 and the study for R-2155 was done in 1995, so they would need to be included as part of the overall NC 73 feasibility study, since they are outdated. The NCDOT would need to prepare a right-of-way and probable cost estimate to complete the feasibility study.

2. Add NC 73 to the Local TIP. It is recommended that one of the first actions of the Council of Planning be to initiate negotiations with MUMPO, Cabarrus-Rowan MPO and Lake Norman RPO for inclusion on their LTIP's. It will be very important for each of the LTIP's to include NC 73 as a high priority project, which will aid in having it added to the State TIP List. Once NC 73 has been added to the State TIP, it follows the prescribed process for funding, planning, design, right-of-way acquisition and construction. The priority given by the North Carolina Board of Transportation helps determine the priority of projects on the State TIP.

Jurisdiction Responsibilities

Local jurisdictions will be responsible for implementing the land use portions of the NC 73 Corridor Transportation/Land Use Plan. The kind of commitments that will be needed include:

- Maintain land use plans that are the basis for the Corridor Plan, or make changes with the concurrence of the Council of Planning that the changes would not have an adverse effect on the rest of the corridor
- Undertake area plans at locations identified in the segment plans, jointly with abutting communities where the area plans are in more than one jurisdiction
- Coordination with abutting jurisdictions to undertake area plans and to participate in the Council of Planning
- Maintain or adopt development policies that will maintain the right-of-way necessary for the appropriate road typology
- Require that developments follow the Corridor access guidelines as part of the land use and zoning approval process
- Require as part of the land use and zoning approval process that some road be funded and built as part of the developments, as indicated on the segment plans

The local jurisdictions will likely be requested to take responsibility for implementing some aspects of the roadway projects. This could place responsibility on local jurisdictions for some of the following:

- Require some pedestrian/bike trails as part of development approvals
- Possibly pay for landscape and urban design elements
- Possibly pay for sidewalks and pedestrian/bike trails
- Maybe some right of way acquisition
- Possibly maintenance of “amenities” in the right of way

The Centralina Council of Governments commitment includes:

- Participation in the NC 73 Council of Planning; and
- “Reminding” member communities of their commitments

The MPO and RPO commitment includes:

- Transportation Plan amendments as necessary to incorporate NC 73 elements.
- Supporting the NC 73 Corridor Plan through inclusion of the Corridor on the LTIP; and
- Working for inclusion of the NC 73 Corridor on the State TIP.

The NCDOT commitment includes:

- Making its “best effort” to include the recommendations set forth in the NC 73 Corridor Plan in its long range planning for the corridor; and
- Following the road typologies, access management strategy and segment plan recommendations as guidelines for the design of NC 73 projects.

Recommendations for the Council of Planning

- **COG as Convener and Staff:** It is recommended that the Centralina Council of Governments (“COG”) serve as the convener for, and provide the staff functions to, the Council of Planning. Such staff functions include (but not limited to) the proposing operating by-laws, regular meeting dates and places, and minutes of meetings.
- **Communication Protocol among Jurisdictions:** With COG’s assistance, the Council of Planning should recommend to the jurisdictions along the Corridor methods and frequencies of communicating information important to the Corridor’s users, planners and funders. Specifically, the Council of Planning should present “State of the Corridor” reports to 1) NC Board of Transportation members having responsibility along the Corridor, 2) governing bodies of the Corridor’s respective jurisdictions, and 3) economic development and planning organizations interested in the Corridor.
- **Small Area Plan Updates:** Municipalities having designated responsibilities for directing, or participating in, the development of small area plans identified in the Corridor Plan should report regularly to the Council of Planning on their planning progress (e.g., selection of consultants, scope of work, project schedule, and impacts on land uses and/or traffic volume and flow along the Corridor).
- **Developing Funding Priorities:** The Council of Planning should coordinate with the respective Metropolitan Planning Organizations and with the Lake Norman Rural Planning Organization to develop priorities among the various Corridor segments for the Local Transportation Improvement Program. Included in this coordination and prioritization process would be considering the impact of segment funding priorities to any revisions of the Thoroughfare Plan.

- **Update of Corridor Plan:** The Council of Planning should recommend updates to the NC DOT, the respective jurisdictions and planning organizations, as needed.

Recommended TIP Projects

State and Federal guidelines for TIP projects require that they begin and end at “logical termini,” referring generally to major roads or highways where notable changes in traffic volumes could be expected to occur.

The following division of the 35 mile NC 73 corridor into TIP projects is based on the locations where notable changes in traffic volume are expected. The “logical termini” of these recommended project locations in most instances result in TIP projects that overlap jurisdictions. It is anticipated that this overlap will encourage the continued and ongoing cooperation of the various county, municipal, MPO/RPO, NCDOT division and private sector jurisdictions and agencies in order to secure funding for the projects which directly affect each of them.

1. **US 321 to new NC 16, Lincoln County.** This project would all be within unincorporated Lincoln County. It is all in the jurisdiction of Lake Norman RPO (LNRPO), and all in NCDOT Division 12. Anticipated traffic volumes through this section range from 14,000 near US 321 to 36,000 near the new NC 16. Traffic east of the new NC 16 is anticipated to be notably higher than to the west. This TIP project would include the section on new alignment from US 321 to Low Bridge Road and the potential section on new alignment from Reinhardt Circle to Maxwell Farm Lane, which is the reason it is recommended as a single TIP project. Other than construction needed in the immediate vicinity of the NC 73 Bypass, recommended improvements to Salem Church Road and Hill Road should be required as part of commercial and employment center development. Because the section on new alignment from US 321 to near Airport Road would provide notable relief to the existing NC 73/NC 27, this could potentially be two TIP projects:
 - 1a. US 321 to Airport Road, Lincoln County, and
 - 1b. Airport Road to new NC 16
2. **New NC 16 to new Gilead Road (SR 2136), Lincoln and Mecklenburg Counties.** This project would be partly within unincorporated Lincoln County, partly within unincorporated Mecklenburg County, and partly within the Town of Huntersville. It is partly in the jurisdiction of LNRPO and partly in Mecklenburg-Union MPO (MUMPO). It is partly in NCDOT Division 12, and partly in Division 10. It includes a major crossing of the Catawba River. Anticipated traffic volumes range from 36,000 near new NC 16 to 50,000 near new Gilead Road. Because of the improvements proposed to Gilead Road for access to I-77 and to I-485 via Vance Road, traffic volumes are anticipated to drop from 50,000 to approximately 25,000 in each direction at this intersection. NC 73 portions of this section are all on existing alignment. Recommended improvements of Little Egypt Road from NC 73 to old NC 16, of old NC 16 and Pilot Knob Road from NC 73 to old NC 16 are recommended to be included as part of this TIP project, as they have a direct bearing on the functionality of NC 73 in the West Lake Norman segment. Other recommended roads shown as part of the bypass south of NC 73 and NC 16 should be required to be built as part of developments in the area.
3. **New Gilead Road (SR 2136) to Davidson-Concord Road (SR 2693), Mecklenburg County.** This project falls partly within each of the Town of Huntersville, the Town of Cornelius, the Town of Davidson and unincorporated Mecklenburg County. It is in the jurisdiction of MUMPO, and NCDOT Division 10. Anticipated traffic volumes range from approximately 25,000 at new Gilead Road to 32,000 at Davidson-Concord Road, peaking at I-77 in the middle of the section. Because this is the central link of the limited network for the NC 73 corridor through Huntersville, Cornelius and Davidson, it is recommended to be a single TIP project for long-range planning purposes. This section is all on existing alignment.

Recommended improvements to US 21 should be included as part of this TIP project, as they have a direct bearing on the functionality of NC 73. Recommended improvements to NC 115 should be part of the transit oriented development at the proposed NC 73/NC 115 commuter rail station.

4. **Davidson-Concord Road (SR 2693) to Odell School Road (SR 1601), Mecklenburg and Cabarrus Counties.** This project falls partly with each of the Town of Davidson, unincorporated Mecklenburg County and unincorporated Cabarrus County. It is also with areas expected to eventually be annexed by the City of Kannapolis and the City of Concord. It is partly in the jurisdiction of MUMPO and partly in Cabarrus-Rowan MPO (CRMPO), and is in NCDOT Division 10. Anticipated traffic volume ranges from 38,000 at David-Concord Road to 30,000 at Odell School Road. This section is all on existing alignment. Recommended improvements to Odell School Road south of NC 73 should be included as part of this TIP project, since it is part of the Untz Road southern alternative route and will relieve traffic on NC 73, resulting in a smaller and less expensive NC 73 project. Recommended improvements to Poplar Tent Church Road/Shiloh Church Road and to Odell School Road north of NC 73 should be part of the area plan development at those two locations.
5. **Odell School Road (SR 1601) to I-85, Cabarrus County.** This project falls partly within unincorporated Cabarrus County and partly within the City of Concord. It is also with areas expected to eventually be annexed by the City of Kannapolis and the City of Concord. It is all within the jurisdiction of CRMPO and NCDOT Division 10. Anticipated traffic volume ranges from 28,000 at Odell School Road to 44,000 at I-85. Because the recently completed Kannapolis Parkway has the potential to redirect some NC 73 traffic south to I-85, this section could potentially be two TIP projects:
 - 5a. Odell School Road (SR 1601) to Kannapolis Parkway (SR 1430), and
 - 5b. Kannapolis Parkway (SR 1430) to I-85

This project is all on existing alignment. Recommended improvements to Odell School Road and Untz Road should be included as part of this TIP project, since they are part of the southern alternative route and will relieve traffic on NC 73, resulting in a smaller and less expensive NC 73 project.
6. **Gilead Road (SR 2136) from NC 73 to I-77, Mecklenburg County.** This project falls partly within the Town of Huntersville and partly within unincorporated Mecklenburg County. It is all within the jurisdiction of MUMPO and NCDOT Division 10. This project is the western half of the southern leg of the limited network for NC 73 through Huntersville. Anticipated traffic volumes are in the 25,000 to 35,000 range. This section is mostly on existing alignment, except for approximately the first ½ mile south of NC 73.
7. **Gilead Road (SR 2136), Huntersville-Concord Road (SR 2448) and Ramah Church Road (SR 2439) from I-77 to the proposed Prosperity Church Road Extension, Mecklenburg County.** This project falls partly within the Town of Huntersville and partly within unincorporated Mecklenburg County. It is all within the jurisdiction of MUMPO and NCDOT Division 10. This project is the eastern half of the southern leg of the limited network for NC 73 through Huntersville. Anticipated traffic volumes are in the approximately 15,000 to 20,000 range. This section is mostly on existing alignment, except for the connection between Huntersville-Concord Road and Ramah Church Road.
8. **Catawba Avenue (SR 5544) and Westmoreland Road (SR 2147) from NC 73 to US 21, Mecklenburg County.** This project falls partly within the Town of Huntersville, partly within the Town of Cornelius and partly within unincorporated Mecklenburg County. It is all within the jurisdiction of MUMPO and NCDOT Division 10. This project is the eastern half of the northern leg of the limited network for NC 73 through

Huntersville. Anticipated traffic volumes are in the approximately 25,000 to 30,000 range. This section is all on existing alignment.

9. **US 21, Bailey Road and Davidson-Concord Road (SR 2693) from Westmoreland Road to NC 73, Mecklenburg County.** This project is the western half of the northern leg of the limited network for NC 73 through Huntersville. The Bailey Road and Davidson-Concord Road sections have been proposed by the Town of Cornelius and the Town of Davidson as part of the Cornelius East & Davidson-Concord Road Vision Plan. This portion of the limited network is included for informational purposes only, and is not proposed as a TIP project.

Recommended TIP Project Priorities

The priorities for the TIP projects are shown separately for NCDOT Division 10 and Division 12, since they are accounted separately under the equity formula.

Division 10 Priorities

- Priority 1: New Gilead Road (SR 2136) to Davidson-Concord Road (SR 2693), Mecklenburg County. This project is currently the most congested in the corridor, with the largest projected population and the highest anticipated traffic volumes.
- Priority 2: New NC 16 to new Gilead Road (SR 2136), Lincoln and Mecklenburg Counties. This project is anticipated to carry 50,000 vehicles per day by 2025. It has the potential to become a major bottleneck.
- Priority 3: Davidson-Concord Road (SR 2693) to Odell School Road (SR 1601), Mecklenburg and Cabarrus Counties. This project is in the section of the corridor with the highest rate of projected population growth. It is already experiencing peak period congestion problems.
- Priority 4: Odell School Road (SR 1601) to I-85, Cabarrus County. This project serves a commercial and business corridor that currently experiences congestion and access management issues. If planned as two TIP projects, 4a. from Kannapolis Parkway to I-85 would be the higher priority of the two.
- Priority 5: Gilead Road (SR 2136) from NC 73 to I-77, Mecklenburg County. This project will be needed to provide diversion of traffic from NC 73. Without this project, NC 73 from Catawba Avenue to I-77 would have to be a much bigger and more expensive road project.
- Priority 6: Catawba Avenue (SR 5544) and Westmoreland Road (SR 2147) from NC 73 to US 21, Mecklenburg County. This project is also needed to provide diversion of traffic from NC 73. Without this project, NC 73 from Catawba Avenue to I-77 would have to be a much bigger and more expensive road project.
- Priority 7: Gilead Road (SR 2136), Huntersville-Concord Road (SR 2448) and Ramah Church Road (SR 2439) from I-77 to the proposed Prosperity Church Road Extension, Mecklenburg County. This project is needed to eventually divert traffic from NC 73 so that NC 73 will not have to be a bigger and more expensive project. The timing of this project will be affected by the Prosperity Church Road Extension and the construction of the link between Huntersville-Concord Road and Ramah Church Road as part of development in that area.

Priority 8 US 21, Bailey Road and Davidson-Concord Road (SR 2693) from Westmoreland Road to NC 73, Mecklenburg County. The priority for this section of the NC 73 corridor will be determined by the Towns of Cornelius and Davidson as part of the development of the Cornelius East & Davidson-Concord Road Area Plan.

Division 12 Priorities

Priority 1 New NC 16 to new Gilead Road (SR 2136), Lincoln and Mecklenburg Counties. This project is necessary to relieve existing congestion in the vicinity of NC 73 and old NC 16, which is steadily increasing due to the rate of development in West Lake Norman. Further, it is anticipated to carry 50,000 vehicles per day by 2025 and has the potential to become a major bottleneck.

Priority 2 US 321 to new NC 16, Lincoln County. This project will relieve congestion on existing NC 27 between NC 73 and US 321. It will also support economic development in the area around the Lincoln County Airport and between US 321 and existing NC 73. If planned as two TIP projects, 1a. from US 321 to Airport Road would be the higher priority.

Example Two:

Paris Pike, US 27/68, is a major road connecting two fast growing areas in the Lexington region. The corridor transverses Kentucky's bluegrass country of rolling hills, rock fences, lush foliage, horse farms, and older mansions. Due to growth pressures there was tremendous pressure (1 week) for widening the two lane road. Original plans to widen the road by Kentucky Transportation Cabinet would do significant damage to the cultural resources as well as open the land for undesirable development.

A Multi-jurisdiction Agreement (MOA) was thus created to control the land uses along the corridor and therefore protect the scenic heritage - see following detailed description of MOA.

Lexington – Paris Pike, KY**Inter-Local Cooperation Agreement**

“The Lexington – Fayette Urban County, Bourbon County, and the city of Paris entered into an inter-local agreement under Kentucky law to create a Paris Pike Commission. The Commission is separate administrative entity whose purposes are to prepare small area land use plan for the corridor, secure its adoption by the participating city and county planning commissions, review all land use applications or proposals in the corridor as to conformity to the small area plan, and to devise a Paris Pike Corridor District Ordinance to preserve and protect the character integrity of the Paris Pike Corridor.”

*- Case Studies from Transportation
Corridor Management: Are we Linking
Transportation and Land Use Yet?*